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In the "Wiadomości Lekarskie" Journal (issue No 4, volume 72, 2019) the article of Nadiia V. Shulzhenko entitled "LEGAL BASES FOR IMPROVING LEGISLATION ON THE TRANSPLANTATION OF HUMAN ANATOMICAL MATERIAL" was published, which after releasing the paper version was withdrawn from the electronic version of the Journal (pdf, www.wiadomoscilekarskie.pl) due to the suspicion of plagiarism.



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PRACA ORYGINALNA ORIGINAL ARTICLE

HEALTHCARE-ASSOCIATED INFECTIONS IN INTENSIVE CARE UNITS

Aidyn Salmanov, Viktor Litus, Sergiy Vdovychenko, Oleksandr Litus, Lena Davtian, Sergiy Ubogov, Yuriy Bisyuk, Anna Drozdova, Iryna Vlasenko

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ABSTRACT

Introduction: Healthcare-associated infections (HAIs) remain a major public health problem and patient safety threat worldwide. Scant information is available on the occurrence HAI and antimicrobial susceptibility of responsible pathogens in Ukrainian intencive care units (ICUs).

The aim: To evaluate the prevalence of HAIs and antimicrobial resistance of the responsible pathogens.

Materials and methods: The study included 642 patients and 262 samples isolated from patients with microbiologically proven HAI. The identification and antimicrobial susceptibility of the cultures were determined, using automated microbiology analyzer. Some antimicrobial susceptibility test used Kirby — Bauer antibiotic testing. Interpretative criteria were those suggested by the Clinical and Laboratory Standards Institute.

Results: Among 642 patients, 148 HAIs were observed (23.1%). Death during hospitalization was reported in 20.1% HAI cases. Pneumonia (47.3%), blood stream infection (21.6%), and urinary tract infection (14.9) together accounted for 83.8% of all HAIs reported. Most cases of these infections were device-associated. Considering all HAI types together, *Klebsiella pneumoniae* were most commonly reported, accounting for 21.8% of all organisms, followed by *Acinetobacter baumanni* (14.3%), *Pseudomonas aeruginosa* (12.4%) and *Escherichia coli* (9.4%). 59.8% and 6.6% of *Staphylococcus aureus* were oxacillin and teicoplanin resistant, respectively. Third-generation cephalosporins resistance was found in 53.8% of *K. pneumoniae* and 32.1% of *E. coli* isolates; and carbapenem resistance in 78.6% of *A. baumanni* and 29.3% of *K. pneumoniae* isolates.

Conclusions: Infection control priorities in intensive care units should include preventing nosocomial pneumonia, blood stream infection, urinary tract infection and of device-associated infections.

KEY WORDS: nosocomial infection, antimicrobial resistance, intensive care unit

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INTRODUCTION

Healthcare-associated infections (HAIs) are one of the most common adverse events in patient care and account for substantial morbidity and mortality [1, 2]. Despite major advances in infection control interventions, HAI remain a major public health problem and patient safety threat worldwide [3]. According to published national or multicentre studies, pooled HAI prevalence in mixed patient populations was from 7.6% to 9.5% in high-income countries [4-6].

HAIs are serious patient safety problems in intensive care units (ICUs). The risk of acquiring HAI is significantly higher in ICUs, with approximately 30% of patients affected by at least one episode of HAI with substantial associated morbidity and mortality. Pooled cumulative incidence density was 17.0 episodes per 1000 patient-days in adult high-risk patients in industrialized countries. By contrast, the incidence of ICU-acquired infection among adult patients in low- and middle-income countries ranged from 4.4% up to 88.9% and pooled cumulative incidence density was 42.7 episodes per 1000 patient-days [7, 8].

In Ukraine, a national network for the prospective surveillance of HAIs in all wards is not in place. To identify

HAI prevention targets and reduce thus disparities between countries, ongoing surveillance is necessary. However, resources are severely limited in Ukraine, creating difficulties implementing surveillance and establishing effective measures for infection control and HAI preventio. In Ukraine, efforts to improve infection control training and begin HAI surveillance have been underway. However, previous reports of HAIs in Ukraine were limited to surgical site infections (SSI) and did not address the broad spectrum of HAIs in ICU [9, 10].

THE AIM

The objective of the current study was to evaluate the prevalence of HAIs and antimicrobial resistance of the responsible pathogens in Ukrainian ICUs.

MATERIALS AND METHODS

SETTING AND PATIENTS

Over a 36 month period (January 2012 to December 2014), this retrospective study was performed in ICU departments

in 4 Kyiv city hospitals (2 general, 1 pediatric, and 1 women's hospitals) that are similar in terms of medical equipment, personnel, laboratory facilities. The ICU type was classified according to the CDC/NHSN (National Healthcare Safety Network, CDC) criteria as a medical/surgical unit [11].

All eligible patients (642 patients) have been included in the surveillance. Patients who were transferred to the ICU from an outside hospital are also included. The exclusion criteria were patients with a community acquired infection, ICU stay for less than 48 h and death within 48 h of ICU admission. The follow-up of each patient was continued until discharge, referral, or death.

DEFINITIONS

A HAI was considered to be an infection developing during a hospitalization. Major and specific HAI site definitions were adapted from the CDC/NHSN case definitions [12]. Because of limitations in laboratory infrastructure, clinical sepsis was included among HAIs under surveillance in neonatal intensive care units (NICU). Surgical site infections were not monitored because surveillance focused on infections detected in ICU patients. An infection episode met HAI criteria when it occurred on or after the third calendar day in the ICU or within two calendar days of discharge from the ICU. In addition, institution of antimicrobial treatment by a physician was not considered to be sufficient for diagnosis of an HAI because of widespread use of empiric antimicrobial therapy. An infection was defined as device-associated (i.e., urinary catheter-, ventilator-, or central line-associated) if the corresponding device was in place on the date of infection or within two calendar days prior. ICU type was classified according to CDC/NHSN's criteria.

ETHICS

The data was collected as a part of the hospital's infection prevalence survey. According to the Health Research Act of Ukraine, quality assurance projects, surveys and evaluations that are intended to ensure that diagnosis and treatment actually produce the intended results do not need ethical committee approval and patient consent is not required. The research was carried out according to the plan of scientific investigations of the Shupyk National Medical Academy of Postgraduate Education, Kyiv, Ukraine.

DATA COLLECTION

Surveillance data on all ICU-acquired HAIs, both in patients with or without a device, and their causative pathogens were collected retrospective on a specifically designed form by the investigators using medical records comprising charts, daily flow sheets, laboratory (microbiology) results. The collected data included demographics; clinical signs; isolated pathogens with antibiogram results; and outcome on discharge from the ICU. All types of HAIs were recorded and analysed, including symptomatic urinary tract infection (UTI), pneumonia (PNEU), lower respiratory tract infection (LRTI), and blood stream infection (BSI). HAIs with only a few included cases such as skin, soft-tissue infections and gastrointestinal infections were analysed together as "other infections". Patients with more than one type of infection simultaneously were analysed as a separate group.

Up to four pathogens per HAI were recorded. For bloodstream infections specifically, "common commensal" organisms (e.g., coagulase-negative staphylococci, Bacillus spp.) were only considered pathogens if isolated from at least two blood cultures with signs or symptoms of a bloodstream infection, in accordance with CDC/NHSN criteria. The following variables were recorded for each patient: sex, age, season of admission, elective versus emergency admission, surgical procedure, use of urinary tract catheter (permanent and intermittent catheter).

MICROBIOLOGICAL SAMPLING

All samples (262) of isolates from HAI cases was sent to microbiology laboratory for identification and antimicrobial resistance testing. The identification and antimicrobial susceptibility of the cultures were determined, using automated microbiology analyzer Vitek 2 Compact (BioMerieux, France). Susceptibility to antibiotics was determined using AST cards (BioMerieux, France). Some antimicrobial sus ceptibility test used Kirby — Bauer antibiotic testing. Interpretative criteria were those suggested by the Clinical and Laboratory Standards Institute (CLSI) [13].

STATISTICAL ANALYSIS

HAIs were analysed as a binary exposure variable (no HAI, any HAI). We also analysed HAIs by type of infection (no HAI, UTI, PNEU, LRTI, BSI, other HAIs), which were mutually exclusive. The analysis of statistical data was performed using Microsoft Excel for Windows. Comparisons were carried out using the Student's t-test, χ 2. Statistical significance was defined as P < 0.05.

RESULTS

During the surveillance period, among 642 patients, 148 (23.1%) HAIs were observed. Death during hospitalization was reported in 20.1% HAI cases. The pooled mean incidence of HAI varied by ICU type (Table I). PNEU (47.3%), BSI (21.6%), and UTI (14.9) together accounted for 83.8% of all HAIs reported (Table II). Most PNEU, BSI, and UTI cases were device-associated. A minority of BSI (42%) were central line-associated. Of BSI 69% occurred in patients <1 year old, of which 83% were laboratory-confirmed BSI and the remainder (17%) clinical sepsis. The overall prevalence of HAIs was 23.1% and the prevalence of the three most recorded types of infections was for PNEU 10.9 %, BSI 5.0%, and UTI 3.4%.

DEVICE-ASSOCIATED INFECTIONS

A total of 118 (79.7%) device-associated infections (DAIs) were found, of which 46.8% were ventilator associated pneumonia

Type of ICU	Total patient days, n	HAI reported, n	Pooled mean incidence HAI/1,000 patient days
Adult medical	4132	16	3.9
Adult med/surg	812	8	9.9
Adult surgical	1198	15	12.5
Adult/ped medical	2127	6	2.8
Adult/ped med/surg	1703	16	9.4
Adult/ped surgical	2022	18	8.9
Burn	654	10	15.3
NICU	4932	36	7.3
Pediatric medical	782	11	3.7
Pediatric surgical	3298	12	3.6
Total	16289	148	9.1

Table I. Description of types and patient-days and HAI reported for each type of ICU, and pooled mean HAI incidence for each I
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Note: NICU – neonatal intensive care unit

Table II. Distribution of HAI types in Ukrainian ICUs, 2012-2014

Type of HAI	Namber of HAI		
All infections	148 (100%)		
Pneumonia	70 (47.3%		
Bloodstream infection	32 (21.6%)		
Urinary tract infection	22 (14.9%)		
Skin and soft tissue infection	8 (5.4%)		
Lower respiratory tract infection	7 (4.7%)		
Gastrointestinal tract infection	5 (3.4%)		
Other	4 (2.7%)		

Note:

Other infection types include bone and joint infection; central nervous system infection; cardiovascular system infection; eye, ear, nose, throat and mouth infection; and reproductive system infection.

(VAPs), 43.2% central line-associated bloodstream infections (CLABSIs) and 9.3% catheter-associated urinary tract infections (CAUTIs). In the population, 56 out of 642 patients (6%) were affected by at least one episode of ICU-acquired pneumonia, and 72.7% of these were VAPs. The incidence rate of ICU-acquired pneumonia was 9 episodes per 1000 patient-days and VAP incidence rate was 18.2 per 1000 MV days. On average, ICU-acquired BSIs occurred in 4.4% of patients staying in an ICU for more than 48 h. The incidence rate was 6.8 BSI episodes per 1000 patient-days. 89.5% of cases were CLABSIs with an incidence rate of 8.2 per 1000 CL days. The ICU-acquired urinary tract infections (UTIs) occurred in 2.7% of patients staying in an ICU for more than 48 h., with 84.6% of UTI episodes being associated with the use of a UC The incidence rate per ICU was 1.5 UTI episodes per 1000 patient-days and a mean device-adjusted rate of 1.6 CAUTI episodes per 1000 UC - days.

MICROORGANISMS CAUSING HAI IN ICUS

Among all 148 HAI, a total of 262 organisms were identified (Table III). Considering all HAI types together, *Klebsiella*

pneumoniae were most commonly reported, accounting for 21.8% of all organisms, followed by Acinetobacter baumanni (14.3% of organisms), Pseudomonas aeruginosa (12.4% of organisms) and Escherichia coli (9.4% of organisms); these were the same organisms reported most commonly for pneumonia cases. Thirteen VAP episodes were non-microbiologically confirmed. All yeasts found were classified as Candida species. The most frequently isolated microorganisms in ICU-acquired CLABSI episodes were Staphylococcus aureus and coagulasenegative staphylococci (Staphylococcus epidermidis) (14.6%); among Gram-negative bacteria K. pneumoniae and A.baumanni spp. were the most frequent isolates. Candida species (45.4%), K. pneumoniae (18.1%) and P.aeruginosa (13.4%) were the most frequently isolated microorganisms in CAUTI episodes.

ANTIMICROBIAL RESISTANCE

The antimicrobial-resistance in the isolates associated with ICU-acquired HAIs showed, among the Grampositive bacteria, that 59.8% and 6.6% of *S.aureus*

	% of organisms reported							
Microorganism	All HAI (<i>n</i> =262)	PNEU (n=124)	BSI (<i>n</i> =62)	UTI (<i>n</i> =48)	Other HAI (n=28)			
Klebsiella pneumoniae	21,8	23,8	9,1	3,3	4,3			
Acinetobacter baumanni	14,3	15,8	6,9	2,1	3,6			
Pseudomonas aeruginosa	12,4	17,6	6,2	16,9	11,3			
Escherichia coli	9,4	14,9	18,6	22,9	27,8			
Staphylococcus aureus	7,8	8,7	4,2	4,8	11,7			
Enterococcus spp.	7,7	2,1	8,8	6,4	15,1			
Coagulase-negative staphylococci	7,5	4,3	21,7	2,2	9,7			
Candida spp.	6,7	3,6	9,7	16,1	5,2			
Enterobacter spp.	4,4	4,4	6,6	7,8	4,7			
Proteus spp.	4,1	1,7	1,1	9,9	4,3			
Other*	3,9	3,1	7,1	7,6	2,3			

 Table III. Pathogens reported during surveillance for HAIs in Ukrainian ICU, 2012-2014.

Note:

PNEU – pneumonia; BSI – bloodstream infection; UTI – urinary tract infection.

*"Other" includes 11 different organisms.

isolates were β -lactam (oxacillin) - and glycopeptide (teicoplanin) - resistant, respectively. Among the Gramnegative bacteria third-generation cephalosporins (cefotaxime or ceftazidime) resistance was found in 53.8% of *K.pneumoniae* and 32.1% of *E.coli* isolates; and carbapenem (imipenem, meropenem, ertapenem) resistance in 78.6% of *A. baumanni* and 29.3% of *K. pneumoniae* isolates.

Results of univariate analysis showed that no statistically significant difference between infection and the independent covariates was found (data not shown).

DISCUSSION

This report presents the first surveillance data across all HAI types in ICUs from Ukraine. Surveillance for surgical site infections was not performed in this study.

HAI surveillance data are crucial for informing priorities for infection control. The surveillance data described in this report identify several priority areas for prevention. First, PNEU, primary BSIs, and UTIs represented over 80% of HAIs reported and should be the focus for infection prevention (e.g., prevention of device-associated infections [14]) and continued surveillance efforts. The highest CLABSI rate was reported from NICUs, indicating an important target for CLABSI prevention. Second, gram-negative organisms were commonly associated with HAIs, and high rates of antimicrobial resistance were present in participating ICUs.

The cumulative incidence of HAIs in ICU wards varies widely among countries (5%–38.9%) [15], and the detected rate in the present surveillance (9.2%) was in the range of values specified in other studies. Data reported by The European Surveillance System showed that, in 2014, 8% of the patients staying in the ICU for more than 2 days presented at least one HAI [16]. The HAI incidence rate of

9.1 per 1000 patient days was less than that noticed in the study from the USA where the rate of HAI in an adult ICU was shown to be 16.2 per 1000 patient days [17].

PNEU was the most commonly identified HAI in this surveillance system. The majority of HAIs in ICUs are associated with the use of invasive devices. Therefore, our surveillance system paid particular attention to DAIs, since a significant proportion of these HAIs are considered preventable. The findings showed that the most common DAI was VAP (46.8%), consistent with the reported literature. Globally, the VAP rate we observed (18.2/1000 MV days) was higher than the surveillance data from Germany (5.4/1000 MV days) [18] and from the United States where the VAP incidence rate was 2.1 per 1000 device days in medical/surgical major teaching ICUs [19].

The CLABSI incidence rate (8.2 per 1000 CL days) we observed was much lower than that reported from limitedresource countries [20], but higher than 1.1 per 1000 CL days reported in the medical/surgical major teaching ICUs in the healthcare facilities adhering to NHSN surveillance [19]. In the SPIN-UTI, in the 2010–2011 survey, and in the GiViTi projects the CLABSI incidence rate was 1.8 and 1.9 per 1000 CVC days, respectively [21]. The higher rate in the present surveillance could be explained by a high CL utilization ratio, exceeding the 90th percentile of the NHSN distribution for medical/surgical major teaching ICUs. Intravascular devices remain an essential component of ICU care, but many studies recognize CL duration as a risk factor for CLABSI [22].

The reasons for lower CAUTI rates observed in the present study compared with other studies may be related to the effectiveness of the interventions implemented in our setting. They included educational strategies, UC avoidance, policies for UC insertion, daily necessity review and limiting catheter days that have been proven to decrease CAUTI events [23].

In the present study Gram-negative bacteria were the most common causal pathogens, in agreement with several surveillance studies in the United States [24], Europe [25], Saudi Arabia [26] and Brazil [27]. Among these Gram-negative bacteria, *Klebsiella pneumoniae* (17.8%) and *Acinetobacter baumannii* (10.2%) were the most frequently reported. This finding is of particular concern, since these organisms are often involved in outbreaks that require the activation of an organizational response until the outbreak is under control [28].

Klebsiella pneumoniae, Acinetobacter baumanni and Pseudomonas aeruginosa, two of the three most commonly reported organisms associated with HAI in Ukrainian ICUs, are notably gram-negative organisms that can persist in the patient care environment. In contrast, in NHSN, *S. aureus* is the most commonly reported pathogen, whereas *Acinetobacter baumannii* ranks only 14th among pathogens reported [29]. The predominance of organisms that may be commonly found in the patient care environment suggests that greater efforts at environmental infection control might play a critical role in reducing or preventing HAI transmission in Ukraine.

In the present study, the high level of resistance to multiple antibiotics is of great concern. This condition represents an indication of seriously limited options for the treatment of patients infected with those microorganisms. These high rates of resistance are similar to those reported previously for device-associated infections in Cairo University Hospitals [30], with approximately 70% of *E. coli* and *K. pneumoniae* isolates tested being ESBL-producers. In contrast, in the United States, only approximately 20% of *E. coli* and *K. pneumoniae* isolates reported to the NHSN have extendedspectrum cephalosporin resistance. Resistance rates for other organisms are also substantially higher in Ukraine.

Overall, high case-fatality rates were reported in association with HAI. However, one possible explanation is that there might be a bias in Ukrainian ICUs towards late clinical diagnosis of HAI; hence HAIs might be diagnosed either in patients with more severe underlying illness, or late in the course of infection with a more severe clinical course for the infection. In addition, baseline mortality rates for ICU patients are not available to use to determine the mortality attributable to HAI. However, the large proportion of deaths within seven days of diagnosis suggest HAIs could have an important role in excess mortality.

In summary, these surveillance data suggest that enhanced hospital environmental infection control, investigating the cause of bloodstream infections in NICUs, evaluation and improvement of ventilator equipment processing, stopping transmission of Multidrug Resistant Organisms (MDROs), and carefully evaluating antimicrobial use are critical needs in Ukrainian hospitals.

The strengths of our study lie in the prospective nature, and application of NHSN methodology. It is well known that indicators of HAIs provided by surveillance activities require comparison with adequate reference data to stimulate further infection control actions and to enhance quality of care. This surveillance system demonstrates that despite the challenges experienced during this study, implementing HAI surveillance in Ukraine is feasible and can identify priorities for intervention. This system represents an important step towards ensuring safety of patients in Ukrainian hospitals. Continuing HAI surveillance can only improve awareness of the need for control of HAI in Ukraine and spur efforts towards global HAI elimination.

STUDY LIMITATIONS

This analysis is subject to the following limitations. Resource limitations create challenges with HAI surveillance in Ukraine. To adapt surveillance to these realities, one option would be to modify surveillance definitions to include more syndromic detection of HAI (i.e., fewer requirements for laboratory testing). However, given the high rates of antimicrobial-resistant pathogens isolated, increased awareness that microbiology data are necessary to guide clinician decisions is critical. Moreover, even if more syndromic definitions were implemented, further development in hospital infrastructure might still be needed to allow expansion of HAI surveillance to other hospitals.

An HAI incidence study should preferably be performed on large cohorts, taken from a national ICU sample. The consequence of a small population size is the low probability of detecting an important effect, since the analysis is underpowered. For this reason, we did not show the results of the univariate analysis. The present surveillance was conducted in in 4 hospitals, and the results cannot be generalized to all public Ukrainian hospital settings. It is reasonable to suppose that an analogous context may be referred to other hospitals of our country.

CONCLUSION

Infection control priorities in ICU should include preventing nosocomial PNEU, BSI, UTI and of DAIs, as well preventing infections due to antimicrobial-resistant pathogens. The majority of HAIs in the ICUs studied were associated with the use of invasive devices. Since a significant proportion of these HAIs are considered preventable, reinforcement of the evidence-based preventive procedures are needed.

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PRACA ORYGINALNA ORIGINAL ARTICLE

ORAL STATUS IN ADOLESCENTS WITH ALCOHOL ADDICTION

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ABSTRACT

Introduction: Alcohol addiction is one of major public health concerns because rich assortment of alcohol drinks, alcohol advertising may hasten the initiation of alcohol drinking and increase consumption among children and adolescents nowadays. Cytotoxic effect of alcohol is among the leading causes of oral mucosa malignant degeneration, therefore alcohol drinkers are at risk of cancerous diseases. This should be taken into consideration by dentists during routing check-ups. The assessment of oral status in alcohol abusers is essential for making up a treatment plan and prophylaxis, and the investigation of oral manifestations in alcohol drinkers is of great clinical significance. **The aim:** To determine the peculiarities of oral status in underage drinkers.

Materials and methods: The study involved 135 inpatients aged 14-17, who took the course of treatment at the Narcological Department, Poltava Regional Clinical Psychiatric Hospital. We assessed the condition of periodontal tissues and oral mucosa.

Results: There was a tendency towards an increase in precancerous diseases depending on the age of patients and the length of alcohol addiction. The prevalence rate of the diseases in the first group of patients who had being abused alcohol for 2 years was 10,91% of cases; and in the second group of patients who had being abused alcohol for 3 years it made up 16,80%. This may be explained by adverse effect of ethanol on the oral mucosa and by no regular dental check-ups.

Conclusions: Based on the results obtained, it is appropriate to recommend mandatory oral check-ups for adolescents with alcohol abuse.

KEY WORDS: acute and chronic oral mucosa damage, mechanical traumas of oral mucosa, adverse effect of ethanol

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INTRODUCTION

Expansion of alcoholic beverages at the contemporary alcohol market, their variety and easy availability, obsessive advertising and the common tradition of alcohol consumption among population are the causes of early use of alcohol and alcoholism in children and adolescents [1, 2, 3]

Alcoholism can equally be assigned to mental and somatic diseases, since the polymorphism of the symptoms of alcoholic disease asserts total affection of the body by the effect of ethanol-containing substances [4].

The general pathological effect of alcohol on the body is determined primarily by the biochemical properties of ethanol, which is a cytoplasmic poison with a strong devastating effect [2]. The cytotoxic effect of alcohol is the cause of frequent malignant degeneration of the oral mucosa; therefore, patients with alcoholism are at risk for the development of oncological diseases, which should be taken into account by the dentist during prophylactic checkups [5]. In this regard, the identification of dental status in patients with alcohol dependence is of therapeutic and preventive value, and the study of its features is crucial.

MATERIALS AND METHODS

135 people who received treatment in the narcological unit of the A.F.Maltsev Poltava Regional Clinical Psychiatric Hospital have been examined according to the diagnostic criteria of the International Classification of Diseases, 10th Revision with the diagnosis of "Mental and behavioural disorders due to use of alcohol" (code F10) [1].

The patients have been assigned into 2 groups according to the age and duration of alcohol abuse for more accurate evaluation of the dental status and to clarify some of the features of the development of pathological lesions, dependent on the duration of alcohol intoxication.

Group I involved 65 patients, aged 14-15 years with 2 years of alcohol abuse and signs of stage II alcoholism;

Group II involved 70 patients, aged 16-17 years with 3 years of alcohol abuse.

50 people without alcohol dependence have been selected using the AUDIT screening tool (assessment of the alcohol dependence) to verify the resulting data. They formed a control group (III) with the similar study of dental status.

The prevalence of oral diseases in patients with alcoholism was studied using the clinical-anamnestic, clinical and epidemiological methods.

THE AIM

The paper was aimed at determination of the features of dental status in adolescents with alcohol dependence.

RESULTS AND DISCUSSION

Notably, the paper presents the nosological forms, which have significant differences as compared with the control group.

Inadequate awareness of patients about existing dental diseases and their prognosis in both groups was revealed.

The tendency towards an increase in precancerous diseases, depending on the age of the patients and the duration of alcohol abuse was noted. Thus, their prevalence in patients of Group I and II accounted for 10.91% and 16.80% of cases, respectively, caused, in our opinion, by both the negative effect of ethanol on oral mucosa and the low rate of medical aid appealability. This is confirmed by the data of the anamnestic survey of the examined patients, which showed that in the main groups of patients the visits to a dentist in connection with oral mucosa diseases was about 0.75%, whereas all controls visited dental care facilities.

The determination of the incidence and severity of acute and chronic injuries of oral mucosa, estimated in 38.29% of cases in patients of the major groups was crucial; it is more frequent than in the control group, where the total number of detected injuries accounted for 8.00% (p < 0.01). The higher frequency of mechanical injury to oral mucosa in patients with alcohol dependence was caused by the specific course of the disease, mainly by the complex of psychopathological disorders (aggression, psychopathisation, predisposition to destructive actions, etc.), as well as spasmodic manifestations of metalcohol psychoses at stage II and III of the disease. The number of injuries to oral mucosa was tending to increase, depending on the age and duration of alcohol consumption.

All patients with injuries to oral mucosa needed dental care. They underwent the necessary set of therapeutic measures and were given recommendations, which were recorded in the patients' medical history and outpatient's card.

The study of the findings of the epidemiological analysis of the prevalence of oral mucosa diseases in young people with chronic alcoholism has shown that this group of patients has a significantly higher morbidity and severity of lesions.

The reasons for the high incidence of the diseases were mainly the clinical features of alcoholism, both psychic (personal decompensation, spasmodic syndrome in metalcohol psychoses), and somatic, due to the toxic influence of ethanol on the functioning of organs and systems, metabolism.

Social deadaptation of adolescents with chronic alcoholism, a range of personality mental disorders, especially psychopathisation, undervaluation of their own health has become the reasons for their critically low dental aid appealability. The lack of qualified dental care in patients with alcohol dependence led to exacerbation of clinical symptoms of oral lesions, an increase in their intensity and severity. The problem was aggravated by the progressive course of the underlying disease due to the continuing negative influence of factors, leading to the emergence of the oral diseases. The effect of these factors along with low dental aid appealability resulted in the increased frequency of occurrence and intensity of oral mucosa lesions in patients.

CONCLUSIONS

On the basis of the conducted research, it is necessary to carry out a comprehensive dental diagnostic examination of adolescents with alcohol dependence syndrome both inpatients at the specialized psychiatric facilities and outpatients at narcological clinics. Preventive activities aimed for this contingent of patients is also important.

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PRACA ORYGINALNA ORIGINAL ARTICLE

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PECULIARITIES OF MORPHOLOGICAL CHANGES OF ENDOTHELIOCYTES AND REMODELING OF THE ARTERIES UNDER THE EXPERIMENTAL HYPERCHOLESTEROLEMIA

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ABSTRACT

Introduction: Under the conditions of experimental hypercholesterolemia, endothelial dysfunction develops with the morphological marker which is an increase in the number of blood-circulating desquamated endothelial cells (DEC), but this situation needs to be clarified in the development of this pathology in the age aspect.

The aim: To find out the features of remodeling of endothelial cells and arteries of the hind limbs in the rats of pre-repopductive and reproductive age with experimental hypercholesterolemia.

Materials and methods: The experimental group consisted of 16 animals with biochemically confirmed hypercholesterolemia, which were divided into 2 groups: group 1 - 8 animals, aged 2-3 months, weighing 150–170 grams and group 2 - 8 rats aged from 11 to 11 months weighing 230–250 gram. The control group consisted of rats of the same age of 8 animals in each.

Results: Hypercholesterolemia causes damage to the vascular endothelium of the arteries, which is characterized by an increase in the number of desquamated endothelial cells in the peripheral blood. The most circulating blood in desquamated endothelial cells was detected in 45 days of study in animals of reproductive age, where the number of desquamated endothelial cells increased by 2.56 times, and in animals of pre-reproductive age – 2.35 times. Morphological changes were characterized by thickening of the intima of the arteries of the femur, knee and tibia due to swelling of the endothelial cells, their desquamation and proliferative changes in places of preserved vascular endothelium. In response to the deposition of lipids and PAS-positive substrates, cellular reactions appeared as weak lymphocytic infiltration. In addition to hyperlastosis, fragmentation of elastic fibers was revealed. Correlation of intima contributed to the narrowing of vascular lumen. Lipids, xanthoma cells and sour mucopolysaccharides were accumulated in the inner membrane of the arteries. In addition to lymphocytic infiltrates, the amount of collagen fibers in adventitia increased.

Conclusions: Under conditions of hypercholesterolemia the number of desquamated endothelial cells in the blood increases, and arterial remodeling is characterized by manifestations of hypertrophic-neoplastic remodeling in rats of pre-reproductive age, and in reproductive animals there were sclerotic and inflammatory changes.

KEY WORDS: desquamated endothelial cells, remodeling, arteries

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INTRODUCTION

According to current scientific data, endothelial cells can be attributed to the endocrine organ, which provides vascular homeostasis, vascular tone and anatomical structure of the vessel wall [1, 2, 3]. Hypercholesterolemia (HC), in particular excessive concentrations of low density oxidative lipoproteins in the blood, as well as local non-specific systemic inflammation, are the main risk factors for endothelial cell damage in cardiovascular disease [4]. Hypercholesterolemia enhances the arterial wall reaction to vasoconstrictors and reduces endothelium dependent vasodilatation [5] as a result of inhibition of synthesis and reduction of nitric oxide activity. Endothelial dysfunction is considered one of the important prerequisites for the development of cardiovascular pathology, in particular atherosclerosis, coronary heart disease, arterial hypertension, thrombosis, microcirculatory disorders in various organs and systems [6]. This is confirmed by manifestations of endothelial dysfunction, which are described in case of diabetes mellitus [7], hepatitis [8], chronic obstructive pulmonary disease [9], and in conditions of experimental hyperuricemia [10, 11]. The morphological marker of endothelial dysfunction is an increase in the number of circulating in the blood of the DEC, but this situation needs to be clarified in the study of this pathology in the age aspect.

THE AIM

To find out the degree of morphofunctional remodeling of endothelial cells and arteries of hind limbs in pre-reproductive and reproductive age rats under experimental hypercholesterolemia.

MATERIALS AND METHODS

The studies were conducted on 32 white rats. The experimental group consisted of 16 animals with biochemically confirmed HC which were divided into 2 groups: Group 1 - 8 animals aged 2-3 months, weighing 150–170 grams; and Group 2 - 8 rats aged 11–11 months, weighing from

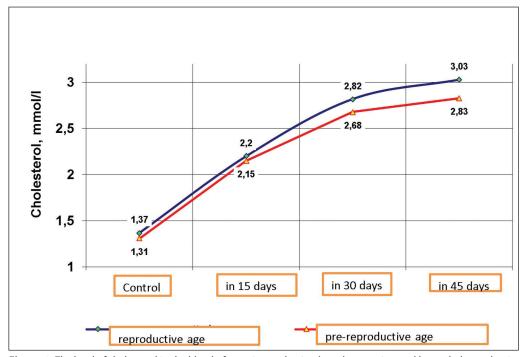


Figure 1. The level of cholesterol in the blood of experimental animals under experimental hypercholesterolemia.

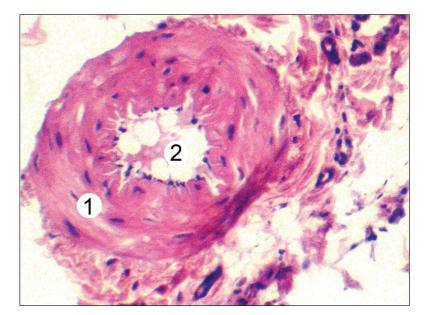


Figure 2. Thickening of the artery wall (1) with pronounced narrowing of the lumen (2). Histologic cut of the popliteal artery of the rat of pre-productive age. 30th day of experimental hypercholesterolemia. Coloring with hematoxylin and eosin. Amplification: \times 200.

230 to 250 grams. The control group consisted of rats of the same age of 8 animals in each.

Determination of the number of desquamated endothelial cells circulating in blood was carried out according to the method of J. Hladovec (1978) in the modification of V.V. Sivak [12].

Hypercholesterolemia was modeled by feeding cholesterol in a dose of 0.5 g/kg with warmed vegetable oil. In order to inhibit the function of the thyroid gland, Mercazolilum was used in a dose of 10 mg/kg. The mixture was administered with a help of a catheter intravenously [13, 14, 15].

Rats' holding and all experiments were performed in accordance with the provisions of the European Convention for the Protection of Vertebrate Animals Used for Experiments and Other Scientific Purposes (Strasbourg, 1986), the General Ethical Principles of Animal Experiments adopted by the First National Congress on Bioethics (Kyiv, 2001), the Helsinki Declaration of the World Medical Association (2000).

The removal of laboratory rats from the experiment was carried out by intra-abdominal injection of large doses of thiopental sodium in 15, 30 and 45 days of the study.

For histological examination, soft tissues were excised with vascular-nerve beams up to 0.5 cm in thickness from the femoral, knee, and tibia of the hind limbs of the rats. The obtained tissue, after removing the bone fragments, was fixed in 10% neutral formalin solution and sealed with paraffin according to the standard method. Depar-

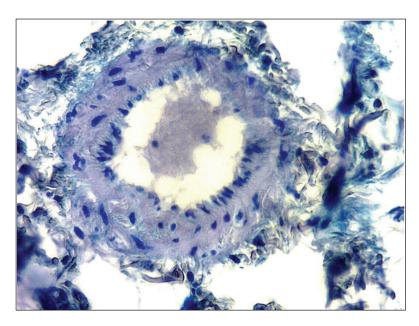


Figure 3. Positive reaction to glycosaminoglycans. Histologic cut of the popliteal artery of the rat of pre-reproductive age. 30th day of experimental hypercholesterolemia. Alcian blue coloring. Amplification: × 200.

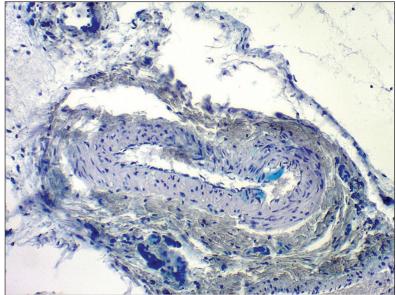


Figure 4. A histological cut of the vein of the femur segment of the posterior limb of the rat of pre-reproductive age. 30th day of experimental hypercholesterolemia. Reaction with Alcian blue. Alcian blue coloring. Amplification: × 200.

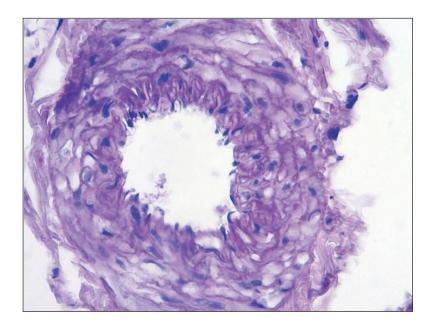


Figure 5. PAS-positive reaction of membranes of smooth myocytes. Histological cut of the artery of the lower leg segment of the reproductive age rat. 30th day of experimental hypercholesterolemia. PAS-reaction. Amplification: \times 200.

affined histologic sections were stained with hematoxylin and eosin, resorcinol-fuchsin by Weigert and van Gizon, fuxelin after Hart, iron hematoxylin by Hendegain and Alcian blue, toluidine blue, and PAS-reaction. The level of cholesterol was determined by the biochemical method on the semi-automatic biochemical analyzer Humalyzer 2000 (Germany) using the standard set of reagents and instructions for their use by the company Human (Germany).

In the work with histological preparations, the microscopes of SEOSCAN, Lumam R 8 were used. Images from the microscopes were output to the computer monitor using the VISION Color CCD Camera and the Inter-VideoWinDVR software. The analysis of the obtained numerical data was performed at the Department of Systemic Statistical Research of I. Horbachevsky Ternopil State Medical University in the software package Statsoft Statistica. Relevant results were considered when p <0.05.

RESULTS AND DISCUSSION

The level of cholesterol in rats of both age groups in terms of experimental hypercholesterolemia increased significantly and in 15 days it was (2.15 ± 0.03) mmol/l in animals of pre-productive age (PRA), and in rats of reproductive age (RA) – (2.20 ± 0.03) mmol/l, after 30 days – respectively (2.68 ± 0.04) mmol/l and (2.82 ± 0.03) mmol/l, and after 45 days – (2.83 ± 0.05) mmol/l and (3.03 ± 0.03) mmol/l. In the group of intact rats, the level of cholesterolemia was in animals of PRA (1.30 ± 0.04) mmol/l against (1.37 ± 0.04) mmol/l in animals of RA, as shown in Fig. 1.

The number of desquamated endothelial cells (DEC) in intact PRA rats was $(3.13\pm0.35) \times 10^4$ /l, and in RA animals $(4.38\pm0.26) \times 10^4$ /l.

On the background of the growth of cholesterol indexes, the number of desquamated endothelial cells in 15 days of the experiment in the blood of PRA rats increased to $(4.00\pm0.33) \times 10^4/l$, or 27.80 %, which was not authentic, and in RA animals – $(5.63\pm0.38) \times 10^4/l$, which was 28.53 % (p <0.05). After 30 days of the study, the number of DEC increased in 2.11 times and amounted to $(9.25\pm0.56) \times 10^4/l$ in animals of reproductive age (p <0.001) and in 1.95 times in animals of pre-productive age, reaching $(6.13\pm0.44) \times 10^4/l$ (p <0.01). After 45 days of experimental hypercholesterolemia, the level of DEC in rats of RA increased in 2.56 times and amounted to $(11.25\pm0.70) \times 10^4/l$ (p <0.001), and in PRA animals – in 2.35 times and it was (7.38\pm0.42) $\times 10^4/l$ (p <0.01).

After 15 days of the experiment, thickening of the vessel wall was observed, primarily due to the subendothelial layer. In this case, the endothelial cells became heterogeneous – in the unchanged cells there appeared the rounded, swollen with a light cytoplasm and predominantly pycnotic nuclei. A part of the cells was mutilated. The subendothelial layer was unevenly thickened and sealed, especially in the areas of denudation, due to plasma irradiation and proliferation of collagen fibers. Sometimes the xanthoma cells were detected and small PAS-positive deposits were visualized. The reaction with Alcian blue was poorly

positive. Occasionally, powdered inclusions of neutral fat were detected. The inner elastic membrane retains its usual appearance. Smooth myocytes of the tunica media are unevenly hypertrophied. Extracellular matrix was and swollen. The coloration with Alcian blue in some cases gave a weakly positive reaction. The outer envelope looked loose, rash edema.

The mentioned set of morphological changes revealed by us was more pronounced in the popliteal artery. The phenomena of disrupting the extracellular matrix grew and there were weak signs of lipidation of intima.

In rats of reproductive age, at the same time of the experiment, structural reorganization affected, first of all, the arteries of the shin. The most significant changes occurred in intima and tunica media. The number of damaged and desquamated endothelial cells increased and the areas of denudation of intima expanded, which contributed to a more profound infiltration of blood plasma proteins. The cells of plasma coagulation appeared. The sub endothelial layer sometimes lost any structuring. More often, "loaded" macrophages with lipids and isolated lymphocytes were found out. Artery lumen, as a rule, without the contents of formed elements of blood however, in the places of desquamation of endothelial cells, aggregation of erythrocytes was revealed. Elastic membranes usually retain their integrity, but the corrugation was uneven, often a multiplication of elastic fibers was observed, and their fragmentation was rarely visualized.

Like previous observations, smooth myocytes in the tunica media of the arteries were hypertrophied, but in this study group, these changes became uniform. The number of collagen fibers in the extracellular matrix increased. Unlike vessels of animals of PRA, lymphocytes appeared in insignificant quantities. The coloration with Alcian blue gave an uneven, slightly positive perception of the dye. In some cases, PAS-positive regions were also detected. The histoarchitecture of the adventitia was similar to the described changes, but isolated lymphocytes were found among the thin collagen fibers.

After 30 days of the experiment, the manifestations of morphological changes significantly increased. Microscopic examination in these conditions in rats of pre-reproductive age also showed the predominance of these changes in the arteries of the femoral and knee areas. At this time the narrowing of the lumen of the vessels became systemic. Centripetal contraction was conditioned by further thickening of the intima, which acquired sufficiently clear outlines of a thick homogeneous or fibrous sub endothelial ring. Here also appeared focal clusters of xanthoma cells and free lipids. Among the stored endothelial cells proliferating cells appeared. Endothelial conglomerates and sludge erythrocytes were found in the lumen of the vessels (Fig. 2). Correspondingly, the elastic frame of the vessels changed. The most characteristic manifestation was hyperplasia of elastic fibers. The fibrils themselves acquired an uneven thickness and sinuation, fragmentated, straightened, and fluttered, which led to a change in the configuration of the intima, giving it a clear corrugation. Smooth myocytes

of the middle layer were hypertrophied. Between them there was a swollen extracellular matrix with proliferating collagen fibers. Alcian blue coloration was characterized by a slight increase in the perception of the dye. (Fig. 3).

Generally, processes of concentric remodeling of the inner and middle layers prevailed in the arteries of PRA rats under hypercholesterolemia.

Moderate fibrous changes were observed in the outer membrane according to Van Gison method.

Histological analysis of structural changes in the blood vessels of rats of both age groups showed their stereotypeness. However, in animals of reproductive age, manifestations became more expressive. Characteristic was the presence of cell infiltrates, which consisted predominantly of lymphocytes and macrophages, xanthoma cells with localization in all membranes, which were most pronounced in the arteries of the tibia and in the area of the branches of arteries. Perception by the tissues of the Alcian blue and the PAS-reaction were more intense (Fig. 4; 5).

After 45 days of experimental hypercholesterolemia in rats of pre-reproductive age, we revealed further, but significantly delayed thickening of the intima of the arteries of the femur, knee, and tibia caused by the swelling of the endothelial cells, their desquamation and proliferative changes in the places of the preserved vascular endothelium and the sub endothelial layer. In response to the lipid deposition and PAS-positive substrates, cellular reactions appeared as a weak lymphocytic infiltration. In addition to hyperelastosis, fragmentation of elastic fibers was revealed. Corrugation of intima contributed to a further narrowing of vascular lumen. This type of structural adjustment was most characteristic for arteries of the femoral and knee regions of these arteries The processes of concentric remodeling combined with signs of a violation of lipid and carbohydrate metabolism dominated in these arteries. The reaction with Alcian blue and PAS-reaction were positive. The adventitia was thickened, collagen fibers merged into thicker beams.

The same changes in 45 days of the experiment were detected in the arteries of rats of reproductive age, but more closely related to the ankle arteries and regions of the arterial branches. It should be noted that the peculiarity was the accumulation of lipids, xanthoma cells and acid mucopolysaccharides in the intima of the arteries. Lymphocytic infiltration, increased hyper elastosis of the arteries of the femoral and knee regions were characteristic compared to those of animals of pre-reproductive age. Elastic fibers were thickened. At the same time their fragmentation and multiplication were noted. In addition to lymphocytic infiltrates, the amount of collagen fibers in adventitia increased. Often, the manifestations described were revealed in the areas of branching, or the withdrawal of additional arterial branches.

Summing up the results of the study, it is advisable to take into account that endothelial cells are the first barrier between blood and vascular wall and hyperuricemia leads to their damage by neurohumoral stimulation of the synthesis of biologically active substances involved in the remodeling of the vascular bed. Important role in the process of remodeling is to reduce the production of endothelial NO-synthetase, preventing the adhesion of leukocytes and platelets to the vascular wall, which contributes to thrombocytopenia, the transfer of monocytes to the sub endothelial layer and their transformation into macrophages and foam cells, the formation of a large number of free radicals. The latter oxidize low density lipoproteins, providing their transition through the endothelium to the medium and the development of subclinical atherosclerosis. Reducing the formation of endothelial NO-synthetase has a vasodilating effect and leads to a narrowing of the lumen of the arterial lumen and focal accumulation of foam cells.

Thus, the vascular endothelium is involved in the pathological process, causing a change in the quantitative and qualitative composition of vasoactive peptides that are synthesized by endothelial cells and determines the changed vascular reactivity in the background of their dysplastic changes and remodeling. This hypothetical assumption was confirmed by the results of our study. Damage to endothelial cells, that is, their morphological changes violate intercellular compounds, which leads to increased endothelial permeability and violation of its barrier function.

CONCLUSIONS

1. Hypercholesterolemia causes damage to the vascular endothelium of the arteries, characterized by an increase in the number of desquamated endothelial cells in the peripheral blood, which significantly increases until the 30th day of the experiment, somewhat slows down on the 45th day of the experiment and predominates in rats of reproductive age.

2. In animals of pre-reproductive age, manifestations of hypertrophic remodeling were observed in the arteries of the femoral and knee regions, and in animals of reproductive age, along with manifestations of hypertrophic-neoplastic remodeling, there were sclerotic and inflammatory changes that were most pronounced in the tibia.

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PRACA ORYGINALNA ORIGINAL ARTICLE



IMPACT OF POLYCHEMOTHERAPY ON THE ORAL SOFT TISSUES IN CHILDREN WITH MALIGNANT ABDOMINAL TUMORS

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UKRAINIAN MEDICAL STOMATOLOGICAL ACADEMY, POLTAVA, UKRAINE

ABSTRACT

Introduction: According to modern standards of treatment of malignant neoplasms conducting polychemotherapy requires up to 90% of cancer patients. However, in addition to the expected cytotoxic effects, it is accompanied by disorders in dental health in the vast majority of patients.

The aim: To study the effect of cytostatics on soft tissues of the oral cavity in children with malignant tumors of the abdominal cavity.

Materials and methods: Material for writing this scientific work served as a synthesis of results for 25 people aged 7 to 15 years with malignant tumors of the abdominal cavity, in which a comprehensive oral examination was performed to determine the manifestations of dental toxicity cytostatics.

Results: At the end of the first course of chemotherapy, all patients had dry redness of the lips, 20 - (80,0%) with eruptions, in 18 - (20,0%) erosion. The Green-Vermillion, PMA, and PBI indices grew by 1,8; 7 and 3,3 times respectively. In cytograms with buccal epithelium an increase in the number of cells of polymorphic sizes and forms with signs of gidropic dystrophy was found. The nuclear-cytoplasmic ratio decreased by 1,4 times compared with the primary examination.

Conclusions: This situation creates the preconditions for the development of inflammatory process in the tissues of the oral cavity and requires the use in this category of patients of a substantiated pathogenetic correction of existing disorders.

KEY WORDS: children, malignant tumors, abdominal cavity, oral cavity, polychemotherapy

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INTRODUCTION

Currently, the growing effectiveness of treatment of oncologic patients is one of the priority aspects of the development of the world medical industry. The urgency of this issue is determined by the constant rise of the prevalence of malignant pathology among different segments of population. The WHO experts report that the annual increase in cancer cases is accounted for 3%, and by 2020 it will be twice higher worldwide [1,2].

Generally, the tumor chemotherapy is based on the principle of selective harmful effect of specific drugs on a malignant cell. Its conduct is rational and more effective when chemosensitivity of tumor has been confirmed. According to current state-of-the-art treatment standards, up to 90% of cancer patients require chemotherapy. Therefore, currently, one of the promising areas of scientific research in the field of oncology is the pharmacogenetic testing of antitumor drugs, which is based on the study of associations between the gene polymorphism and pharmacological response, followed by the assessment of the effectiveness, resistance and probability of occurrence of side effects [3-6].

Currently, polychemotherapy (PCT) is considered a promising aspect in the treatment of malignant pathology, based on a rational combination of pharmacological agents with a different mechanism of action to synchronize tumor growth phases, which makes the cells particularly sensitive to the subsequent chemical component [1,3,4]. However, the major disadvantage of cytostatics is their incomplete selectivity, which leads to the occurrence of undesirable effects. Among them, the reactions, caused by the affection of normal cellular structures with a high degree of proliferation, prevail, resulting in the development of cytotoxic disease, which may prevent the achievement of the maximum therapeutic effect of the regimens of the administration of antineoplastic agents. Unfortunately, no single active antitumor substance without negative effect on healthy organs and tissues has been found to date [1,2,4,5].

In addition to the expected cytotoxic effect on the kinetics of malignant tumors, long-term polychemotherapy is accompanied by disorders of dental health. Thus, many investigators report that the incidence of dental toxicity ranks the second after hematologic one and varies in a rather wide range from 30% to 90%, depending on the individual characteristics of the body, gender and age. Moreover, one of the risk factors for the development of adverse reactions is childhood, which predetermined the subject of the present research [1,2,5,6].

THE AIM

The paper was aimed at the study of the effect of cytostatics on the oral soft tissues in children with malignant abdominal tumors.

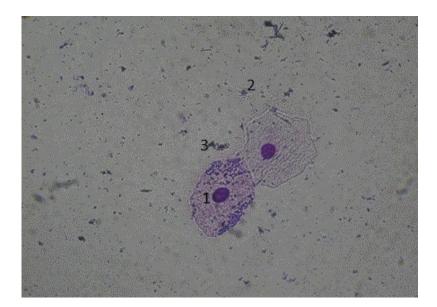


Fig. 1. Microimage of impression smear from the surface of the buccal mucosa of the 14 year-old patient R., at the time of the initial examination. Diagnosis: hepatoblastoma of the right lobe of the liver. PRETEXT IIp. T3N1MO. Grouped epithelial cells with clearly contoured nuclei (1); indistinct contours (2); moderate amount of microorganisms (3).



Fig. 2. The view of erosion on the lower lip mucosa of the 6 year-old patient Ch., at the end of the 1st course of PCT. Diagnosis: Nephroblastoma, Stage II, Clinical Group II. Stage II oral mucositis, chronic catarrhal generalized gingivitis of the first degree.

MATERIALS AND METHODS

The paper is based on the generalization of the results of the clinical-laboratory and instrumental examination, supplemented with special research methods, of 48 patients aged 1 to 15 years with malignant tumors of the abdominal cavity tissues of various morphological nature. All patients were on the inpatient treatment in the Oncohematology Department of the Children's Municipal Clinical Hospital in Poltava.

The research was conducted in compliance with the ethical standards of the Bioethical Committee, developed in accordance with the Helsinki Declaration of the World Medical Association (1964), supplemented by the 59th General Assembly of the WMA, Seoul, 2008. All relatives of children, involved in the study, were informed about their rights and solely voluntarily gave their informed consent.

Out of 48 patients a group of 25 individuals aged 7 to 15 years old, who underwent thorough examination of the oral cavity organs to identify manifestations of the dental

toxicity, caused by the same type protocol chemotherapy treatment, was formed.

The common clinical methods of examination included complaints from children and their relatives, life and disease medical history. In clarifying the complaints, the issues that directly concerned disorders of the oral cavity organs as the initial part of the gastrointestinal tract have been identified. The dental status has been studied utilizing the WHO conventional methodology and in compliance with the standards of medical care provision.

The state of oral hygiene has been estimated on the basis of the analysis of the Green-Vermillion index (1964). To detect inflammatory process in the periodontal tissues, the papillary-marginal-alveolar (PMA) index (modified by G. Parma, 1960) and the PBI index (Papilla Bleeding Index, H.P. Muhlemann (1977) have been used; in children of the control group the hygiene index was $0,52 \pm 0,02$, and the PMA and PBI indices had the value of 0.



Fig. 3. The view of the gingival margin of the 14 year-old patient D., at the end of the1st course of PCT. Diagnosis: Nephroblastoma, Stage II, Clinical Group III. Stage I oral mucositis, chronic catarrhal gingivitis.

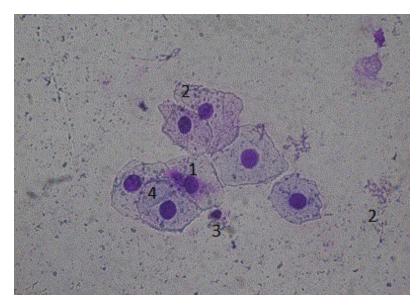


Fig. 4. Microimage of impression smear of buccal mucosa of the 12 year-old patient R., at the time of repeated examination. Diagnosis: hepatoblastoma of the right lobe of the liver. PRETEXT IIp. T3N1M0. Aggregations of epithelial structures of various shapes and size (1); marked contamination with microorganisms of the background field and epithelial cells (2); the remnants of "bare nuclei" (3); signs of hydropic dystrophy (4).

The material was collected for cytological study of the cell composition of the impression smears taken from the buccal mucosa using the proposed device [2]. The smears were Romanowsky-Giemse stained, and calculation of the cellular elements was made in 10 fields of view; their structure was visually evaluated. To determine the severity of the effect of the toxic factor, additional determination of the nuclear-cytoplasmic ratio in the buccal epithelium cells and its colonization resistance was made [2].

All children underwent antitumor therapy in the amount prescribed by the clinical protocols for treatment of children with solid tumors, taking into account their morphological type and the risk group according to the histological variant (Ministry of Health of Ukraine Order No. 649 dated 28 August, 2009). The study of all characteristics was carried out before and after the completion of the 1st course of PCT.

RESULTS AND DISCUSSION

The objective dental examination at the time of the initial treatment of children of the formed group showed a minor pallor of the face with characteristic grayish tinge. The prolabium in 12 individuals (48,0%) looked pale; in the rest 13 individuals (52,0%) it had a natural coloring. Its prominent dryness, combined with the oral type of respiration, was detected in 4 patients (16,0%). The oral mucosa was moderately moistened, colored pale pink without visible lesions. In 5 children (20,0%) abnormal attachment of the frenulum of the lower lip and shallow vestibule of the mouth was detected. Combination of pathological attachment of the frenulum of the tongue and upper lip was detected in 4 individuals (16,0%).

Examination of the tongue revealed its lesions in the form of "geographical tongue" in 3 children (12,0%) and presence of white patches in 4 children (16,0%).

The gingival status of 6 patients (24,0%) met the criterion of "clinically healthy" and at the time of the examination

the gums were colored pale pink, painless in palpation, adhered tightly to the surface of the necks of the teeth; no patches were noted. Gums of 10 patients (40,0%) looked pale, pasty and painless in palpation; no dental plaque was noted. In 9 patients (36,0%) the mucous membrane of the gingival margin was congested hyperemic, interdental papillae were swollen and bled in diagnostic sounding. Instrumental examination revealed layers of soft plaque within the frontal teeth of both jaws. Such clinical picture indicated about manifestations of chronic generalized catarrhal gingivitis of the first degree. The Green-Vermillion index in the group was consistent with the value of 1,13 \pm 0,04, which is 1.2 times higher the control, the score of the PMA and PBI indices was 4,78 \pm 0,16 and 0,92 \pm 0,03, respectively.

The cytograms obtained from impression smears of buccal epithelium, revealed single epitheliocytes, as well as groups of 2-3 per power field with rounded centric nuclei of the same size; disintegration of the cell membrane of some epithelial structures was noted. Moderate contamination with microorganisms of both the background field and cellular elements was detected (Fig. 1). The index of nuclear-cytoplasmic ratio in the buccal epithelium cells was 0,018 \pm 0,006 against 0,024 \pm 0,006 in healthy children, and the score of colonization resistance of the mucous membrane of the buccal areas in both the controls and patients was 1 point.

At the end of the 1st course of PCT, 19 individuals (76,0%) indicated a marked feeling of dryness in the oral cavity, increased thirst, change in food tastes and difficulty in swallowing, and 12 out of them (48,0%) experienced a pronounced speech impairment. 17 patients (68,0%) complained of burning pain in the gums and their bleeding and 9 patients (36,0%) complained of painful sensations due to the presence of lesions of the oral mucosa that aggravated the intake of food and worsened their well-being. Another 5 individuals (20,0%) clearly felt pain in the area of the angle of the mandible and soft tissues in the projection of parotid salivary glands, the intensity of which increased in mouth opening and chewing.

Physical examination revealed pallor face, dryness of the prolabium in all patients, in 20 of them (80,0%) it was accompanied by the formation of exfoliations, mostly on the lower lip. In 14 individuals (56,0%), angulary heilitis was noted that restricted the opening of the mouth and hampered dental examination.

Examination of the oral mucosa showed individual differences. Thus, in 18 individuals (72,0%), its erythema was noted, causing single erosive lesions in 5 of them (20,0%), which were located on the lower lip mucosa and the mucogingival fold in the area of premolars, molars and soft palate that corresponded to oral mucositis of the second degree (Fig. 2). In the rest 7 patients (28,0%), the oral mucosa was pale with signs of pasty.

Visual assessment of the gingival margin mucosa in 19 patients (76,0%) revealed cyanotic hyperemia of the interdental papillae and their marginal portion; swelling and tenderness in palpation. Gums of the rest 6 individuals (24,0%) were pale. Diagnostic sounding in the area of the dentogingival sulcus provoked bleeding in all patients (Fig. 3).

Repeated studies conducted after the completion of the first course of PCT showed deterioration of the oral hygiene status, indicated by incresed value of the Green-Vermillion index by 1,8 times and a decline in the quality assessment to "unsatisfactory". In addition, the PMA index increased by 7 times, which was concordant with the significant proliferation of inflammatory events in the gums, although the severity of the manifestations of lesions varied from minor to severe, and it was selective. Apparently, such lesions were caused by the individual sensitivity of the oral tissues, including sensitivity of the mucous membrane to the cytostatics. Thus, in 12 patients (48,0%), the PMA index was in the range of 60%, indicating proliferation of inflammation and in 9 individuals (36,0%) it was associated with painful lesions of erosive nature, coated with a fibrin film, and sometimes with a tendency to confluence. Moreover, voluntary bleeding from the gingival margin was noted. In 10 patients (40,0%), the index score showed moderate degree of inflammation, and only in 3 individuals (12,0%) it was minor.

The PBI index at the end of the 1st course of PCT was 3,3 times higher than the reference value. Diagnostic sounding of the gingival sulcus revealed bleeding with the score of 4 points in 9 people (36,0%), in 10 patients (40,0%) its intensity score was 3 points and in 6 patients (24,0%) this index was within the score of 2 points.

Repeated study of the cytograms with buccal epithelium revealed elevated amount of epithelial cells with polymorphic shapes and size, their increased contamination, as well as the background field, with aggregations of microorganisms and the remnants of "bare nuclei"; in places the signs of hydropic dystrophy were noted (Fig. 4).

The nuclear-cytoplasmic ratio of buccal epithelium cells was 1,4 times lower in comparison with the previous survey and constituted $0,013 \pm 0,004$, whereas the score of colonization resistance of the oral mucosa increased to 2 points.

Thus, at the time of completion of the 1st course of PCT deterioration of the dental status was noted. In this way, the mean values of the Green-Vermillion, PMA, and PBI indices indicated unsatisfactory oral hygiene and the presence of inflammation in periodontal tissues, namely, cyanotic hyperemia, edema of the gingival margin mucosa and interdental papillae with signs of both spontaneous bleeding, and during irritation with a dental instrument during diagnostic sounding, combined with manifestations of mucositis of the I and II degree. The study of the cytograms of the impression smears of the buccal epithelium revealed an increase in the degree of its desquamation and contamination by microorganisms and elevated amount of destruent cells. Significant decrease of the nuclear-cytoplasmic ratio indicates the marked destructive and dystrophic changes in the epithelial cellular structures of the mucous membrane, and the growth of its colonization resistance score to 2 points indicates a high level of contamination with microbial flora, promoting the development of inflammatory process in the oral tissues.

Findings of the study are related to the outcomes of toxic effect of cytostatics on the mucous membrane, deterioration of the oral hygiene status and impairment of certain components of oral homeostasis components in children with solid tumors of the abdominal cavity, who underwent the first preoperative course of polychemotherapy. Unfortunately, little information is available in the fundamental publications, presented without considering the pathogenetic mechanisms that lead to above impairments in this category of patients. Moreover, the sporadic research data found in publications mainly concern children with hemoblastomas, and sometimes the provided information is controversial.

CONCLUSIONS

In conclusion, manifestations of dental toxicity, detected in children with solid abdominal tumors during polychemotherapy require mandatory application of the rational pathogenetic correction of existing disorders.

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PRACA ORYGINALNA ORIGINAL ARTICLE

MEDICAL – SOCIAL REHABILITATION IN A CASE OF THE METAEPIPHYSEAL OSTEOMYELITIS AT THE CHILDREN

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ABSTRACT

Introduction: Surgeons and orthopedists, which carried out medical and rehabilitative measures at the patients with metaepiphyseal osteomyelitis did not pay attention to the socio-psychological rehabilitation.

The aim: Purpose of research is determination volume of methods for rehabilitation this group of patients.

Materials and methods: We investigated contingent of persons (53 respondents), who were treated in the clinic 20 years ago with severe complications and consequences of metaepiphyseal osteomyelitis (MEO).

Results: In our study we carried out sociological survey, using own questionnaire. On the basic question of the questionnaire – does the disease influence to the realization of vital important plans in a patient's life, 8 (15.1%) respondents had been answered, that osteomyelitis destroyed all plans in their life.

Conclusions: The given conclusion was shown primary among male – patients – 18.2%, than among female – only 10% (p >0.05). Volume of rehabilitation we combined with issues of abilitation – the system of therapeutic measures, which should prevent and eliminate pathological conditions at the children with metaepiphyseal osteomyelitis. In the article was scientifically proved the following stages of rehabilitation of children with metaepiphyseal osteomyelitis: treatment of metaepiphyseal osteomyelitis in the acute period and clinical supervision by the surgeon and orthopedist up to 2 years (rehabilitation); recovery of the structure and function of affected segment of a limb during growth of the patient (clinical observation and correction by orthopedist); correction consequences of the metaepiphyseal osteomyelitis.

KEY WORDS: children, metaepiphyseal osteomyelitis, medical-social rehabilitation, bone structure, metaphyseal region

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INTRODUCTION

Review of the numerous studies [1-8] demonstrated that acute clavicle osteomyelitis in children is representing in less <3% of osteomyelitis cases. Acute clavicle osteomyelitis mainly affects older children and has generally good prognosis. Staphylococcus aureus is most commonly implicated and surgery may be needed [9, 10, 11].

Osteomyelitis is inflammation of bones located in the metaphysis and is more frequent in the lower limbs [12]. The diagnosis of osteomyelitis in childhood is usually straightforward and timely use of appropriate antimicrobial therapy has virtually eliminated mortality [13]. In 65–75% of cases the femur, tibia, or humorous is involved. Involvement of other long bones is less common and of bones such as clavicles, ribs, spine, and bones of the hands and feet is unusual; thus, at these sites, diagnostic problems may present [14]. Clavicle is involved in 1–3% [15].

A total of 89 articles were retrieved from literature search, which [16, 17, 18, 19] reported 16 cases of acute clavicle osteomyelitis in children and adolescents (ages ranging between 0 and 16 years) that were included in the analysis. Infection after surgical treatment of fractures is a complication with significant morbidity and in rare cases even mortality [20]. Consequences of infections include delayed or non-union of the fracture [21]. Most research in this field focuses on peri-prosthetic infection, despite of the different treatment challenges in prosthetic surgery and osteosynthesis. Treatment algorithms have been developed, which dictate aggressive debridement, antibiotic treatment, and if necessary staged replacement of the prosthetic material [22].

Majority of articles is devoted to the bone and joint infections in children and acute hematogenous osteomyelitis [23]. Acute hematogenous osteomyelitis (AHO) is one of the commonest bone infections in childhood. The main clinical symptom and sign in AHO is pain and tenderness over the affected bone especially in the metaphyseal region [24]. The study [25] shows that acute osteomyelitis of the clavicle tends to affect older children, as in our case, in which the patient was a 12-year-old boy. Recurrence happened in 1/16 cases and persistence of symptoms happened in 2/16 cases. Wang X. et all. [26] considered, that chronic hematogenous osteomyelitis often results from the improper treatment of acute hematogenous osteomyelitis. As a rule, the complications of chronic hematogenous tibia osteomyelitis treated with the induced membrane technique. A collective of authors [27] proved that acute clavicle osteomyelitis in children is rare representing <3% of osteomyelitis cases. Osteomyelitis was hematogenous in most cases, with S. aureus being the most frequent cause, isolated from either blood or tissue. Acute clavicle osteomyelitis mainly affects older children and has generally good prognosis.

In the research of Morita M. et all. [28] had been revealed various conditions, including bacterial infection, which can promote osteonecrosis: following invasive dental therapy with anti-bone resorptive agents, some patients develop osteonecrosis in the jaw; however, pathological mechanisms underlying these outcomes remain unknown. Wagner JM. et all. [29] study osteomyelitis as a frequent consequence of open fractures thus representing a common bone infection with subsequent alteration of bone regeneration. Impaired bone homeostasis provokes serious variations in the bone remodeling process, thereby involving multiple inflammatory cytokines to activate bone healing. Tuck M. et all [30] described a patient with ALK-negative ALCL presenting with clinical and radiographic findings suggesting osteomyelitis 6 months after left rotator cuff repair surgery. ALCL should be considered in patients not responding to therapies for osteomyelitis.

In the case study [31], 66-year-old Caucasian female presented with insidious sciatic pain leading to an uncommon diagnosis of tuberculous (TB) osteomyelitis with unknown portal entry. Considering TB in the differential diagnosis of a 'bone abscess', it is of paramount importance to come to a correct diagnosis. At work [32] was study acute hematogenous osteomyelitis (AHO) in children as an ideal condition due to its representation of a wide spectrum of disorders that comprise pediatric musculoskeletal infection. Proper care for children with AHO is multidisciplinary and collaborative. In the research [33] was demonstrated a case of a man aged 68 years presenting to the emergency department with a 3-day history of fever, low back, right hip and leg pain. It was diagnosed Staphvlococcus aureus vertebral osteomyelitis complicated by recurrent epidural abscess and severe sepsis. Hellebrekers P. et all. [34] considered, that infection after osteosynthesis is an important complication with significant morbidity and even mortality. The authors analyzed the effect of such an aggressive standardized treatment regime with implant retention for acute, existing <3 weeks, infection after osteosynthesis. Hudson JW. et all. [35] research the response of mandibular osteomyelitis treated by surgical decortication with disruption of the affected adjacent periosteum in concert with long-term targeted antibiotic therapy. The hypothesis is that, by removing the buccal cortical plate and disrupting the hypertrophically inflamed adjacent periosteum, the medullary bone will be brought in contact with bleeding tissue and circulating immunologic factors and antibiotics, which will promote definitive resolution. In Ukraine surgeons and orthopedists carried out medical and rehabilitative measures at the patients with metaepiphyseal osteomyelitis (MEO) with the purpose of physical recovery. At the same time, the given patients need

firstly the social and psychological rehabilitation. Solution of these problems has a great medico-social significance.

THE AIM

Purpose of research is to determine volume of methods for medical rehabilitation of the patients with MEO.

MATERIALS AND METHODS

Research was conducted with using sociological survey by a specially designed questionnaire. Questionnaire included questions, which were focused on the socio-psychological and physical condition of the patients with MEO. We investigated contingent of persons (53 respondents), who were treated in the clinic 20 years ago with severe complications and consequences of MEO.

RESULTS AND DISCUSSION

The conducted rehabilitation in childhood age and in the long terms after diseases, respondents estimated as not in the full volume (table I). Among these respondents, 28 (52.8%) patients were not received any treatment after discharge from the hospital and in the polyclinic.

Treatment in the hospital received only 11 (20.8 %) respondents, sanatorium and resort treatment received 13 (24.5 %) of patients with MEO. To the main question of the questionnaire – does the disease influence on the implementation of life plans 8 (15.1%) of respondents reported, that osteomyelitis has crossed out all their plans for life (table 2). This conclusion often had done the male patients 18.2% against 10% of female (p > 0.05). The given results were presented in (Figure 1).

Taking into account results of our research, rehabilitation of patients should begin in the acute period, during treatment of the complications, correction of the consequences. Psychological adaptation is necessary at the presence of a long-term corrected state of discomfort. Results of research have been shown that all children, coming to the clinic with the diagnosis of metaepiphyseal osteomyelitis, should carry out a complex treatment, which allowed 93% of patients to decrease an inflammatory process (table II).

The patient undergoes an inpatient treatment for 10-14 days, after that in the polyclinic conditions the restorative therapy and dynamic supervision till 2 months should be performing. Hereafter, a pathological process in the bone was estimated in the clinic, correction of the immobilization is carried out, if necessary – treatment of the disease recurrence. After 4-6 months of the acute process relief or later, almost all children, depending on the age (after 3 years), were recommended treatment of bone in the sanatorium, which have to specialized on the bone and joint system. The basic indications for sanatorium-resort treatment, should be violations of the bone structure, which leads to the orthopedic complications and consequences, i.e. disability. During 2 years the child should be under the supervision of the pediatric surgeon

Frequency of supervision	In the po	lyclinic	In the hospital		Sanatorium-and -resort treatment		
and treatment	absolute	%	absolute	%	absolute	%	
1–2 times a year	9	17.0	2	3.8	4	7.6	
2–3 times a year	5	9.4	1	1.9	-	-	
3–4 times a year	2	3.8	_	-	-	-	
Once in a few years	3	5.7	_	_	4	7.6	
Unable to specify a term	6	11.3	8	15.1	5	9.4	
Not treated	28	52.8	42	79.2	40	75.5	
Generally	53	100	53	100	53	100	

Table I. Rehabilitation of a primary disease among the respondents

Table II. Distribution of the respondents' answers, depending on the gender and realization of life plans

		Ge	Generally			
Implementation of life plans	male				female	
	absolute	%	absolute	%	absolute	%
Disease is not affected	18	54.6	9	45.0	27	51.0
Implemented plans	7	21.2	5	25.0	12	22.6
Implemented plans adequately to the disease	2	6.0	4	20.0	6	11.3
Disease has crossed out plans	6	18.2	2	10.0	8	15.1
Generally	33	100	20	100	53	100

Note. Difference between the distribution of respondents' answers by gender was not statistically significance (p=0.393, $\chi 2=2.99$).

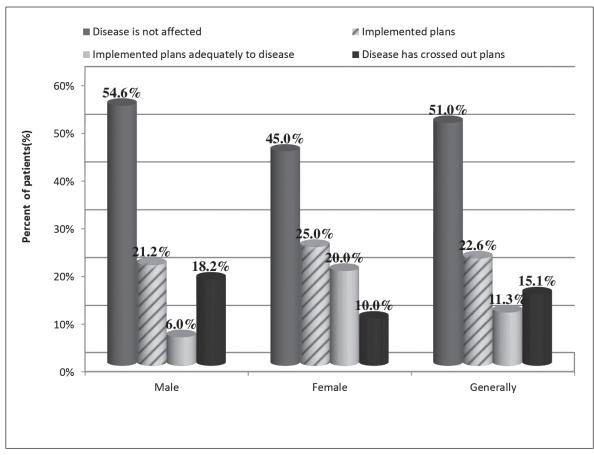


Figure 1. Graphical presentation of realization plans for life for patients with MEO.

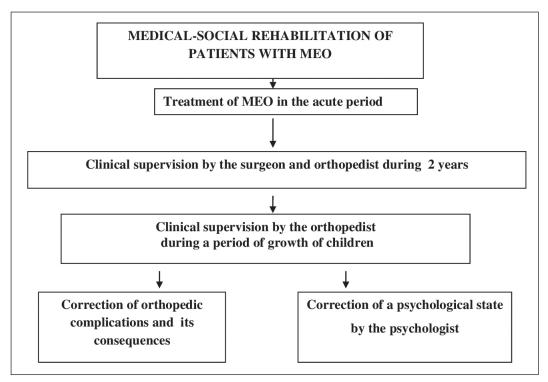


Figure 2. Scheme of medical-social rehabilitation of patients with metaepiphyseal osteomyelitis.

and orthopedist in the polyclinic. Recovery of the patient is evaluated not only on the form and function of the extremities restoration, but primary – on the restoration of the bone structure. Observation of the patient, treatment of probable consequences of the disease should be carried out by orthopedists - traumatologist.

Since 2005 all children, suffering from MEO, coming to the polyclinic of the Dnipropetrovsk Regional Children Clinical Hospital in Dnipro city should be covered with the consultation of psychologist. The psychologist's work is carried out with children, who have orthopedic consequences of MEO, which allows to prepare children for the life and work, taking accounts these consequences.

Scientifically proved a scheme of rehabilitation patients with MEO, because MEO – is acute disease, which requires the immediate medical and surgical intervention as well as in a case of acute appendicitis. Firstly, all this facts determines that the doctor's tactics should be focused on a source of infection, elimination causative agent of inflammation, prevention of the bones' structures destruction and damage of the cartilage surfaces of the joints. Therefore, volume of rehabilitation we combine with modern issues of abilitation, which means system of medical measures, which should prevent and eliminate pathological state at the children of early age, patients with MEO.

There are several theories, which covered pathogenesis of acute hematogenous osteomyelitis: vascular (thromboembolic), allergic, neuro-reflex, etc. A numerous of them indicates that the issue is not fully understood. Mechanism of development this disease is complex, not fully understood. Classic modern concepts are focused on the connection of inflammation with microcirculation and an immune response of the body. Scheme of the proposed methods of medical-social rehabilitation is presented in the graphical structure (figure II).

CONCLUSIONS

In the article was scientifically proved the following stages of rehabilitation of children with metaepiphyseal osteomyelitis: treatment of metaepiphyseal osteomyelitis in the acute period and clinical supervision by the surgeon and orthopedist up to 2 years (rehabilitation); recovery of the structure and function of affected segment of a limb during growth of the patient (clinical observation and correction by orthopedist); correction consequences of the metaepiphyseal osteomyelitis. Firstly, metaepiphyseal osteomyelitis is the result of severe defects closely connected with correction of the psychological state, which allowed patients to create adaptation to the society (during whole period of life in the orthopedist and psychologist). The basic conclusion of the given research is inadequate and unsystematic medical rehabilitation, which was determined during investigation of the patients' outpatient records.

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PRACA ORYGINALNA ORIGINAL ARTICLE

USAGE OF HISTOLOGICAL METHODS IN DETERMINING THE PRESCRIPTION OF KIDNEY INJURIES IN FORENSIC MEDICAL PRACTICE

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ABSTRACT

Introduction: The article presents data from literary sources and a statistical analysis of our own research on the nature, mechanism and prescription of kidneys injury in case of mechanical trauma and the absence of alcohol intoxication.

The aim: To study the dynamics of changes in the histological parameters of the kidneys injured tissues in case of mechanical trauma depending on the prescription of injury. Materials and methods: The material of the study was the kidneys tissue of 48 males and females aged from 20-60 who died at known and unknown time in the presence and absence of alcohol in the blood. We used histological, histochemical methods, and carried out the analysis of results.

Results: The obtained results showed that during the mechanical injury of kidneys there often developed a capsule and a parenchyma with hematoma in the area of injury. Our records showed that during the first 6 hours after injury, there appeared a hematoma in the center of the injury. Hemolysis of the erythrocyte particles was observed in the center of the hematoma. There were also isolated leukocytes and fibrin tissues closer to the edge of the hematoma.

Conclusions: The obtained results indicate that there are several histological changes in the damaged kidneys tissues area which directly depend on the time which passed from the moment of injury.

KEY WORDS: forensic medical examination, trauma, prescription, kidneys, histological parameters

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INTRODUCTION

Kidney injuries occur quite often in medical practice and represent the scientific and practical interest for both clinicians and forensic physicians. A number of authors found that the incidence of kidney injuries occured in 6-18% of cases [1,2] among other injuries of the parenchymal organs in the abdominal cavity. According to other data, kidney injury is diagnosed in individuals with closed abdominal trauma in 6.1% of cases, with 60% of cases when kidney injury is combined with injuries of other organs [3]. A number of researchers [4] studied the possibility of using the morphological features of kidney damage for establishing the injury mechanism and the type of traumatic action.

The study of the mechanism of development and the prescription of injury to the abdominal cavity, in particular the kidneys, is thoroughly researched by specialists in various fields of medicine, as these issues are extremely relevant, both in terms of diagnosis and treatment of patients, and in the preventive aspect of injury. The prescription of injuries determination in the

deceased, the life expectancy of victims after injury, the mechanism and morphological characteristics of injuries of the abdominal cavity were not deliberately studied and systematized, despite the fact that these cases are encountered very often in forensic medical practice. In recent years, many domestic and foreign authors [5, 6], studying the possibility of solving this problem, have begun paying serious attention to the study of various biological objects with the following laboratory methods: histological, histochemical, biochemical, immunological, etc. The comprehensive methods for assessing the prescription of injury, based on the consideration of the case circumstances, in combination with the results of the forensic examination of the corpse and laboratory data are prospective. From this point of view, histological research methods turned to be very informative, as they were most often used in forensic medical practice while determining the prescription of injuries. The dynamics of organ and tissue changes after injury, in particular of the skin, and less attention was paid to the study of internal organs [7, 8].

Microscopic changes in the damaged zone of kidneys from the view point of the prescription of their formation have not been studied in details. Moreover, the features of the kidneys damaged in cases of combined injury with other organs [9] have not been described. One of the methods for determining the prescription of kidney injury is a histological method.

THE AIM

The purpose of this work was to study the dynamics of changes in the histological parameters of the kidneys injured tissues in case of mechanical trauma depending on the prescription of injury.

MATERIALS AND METHODS

The material of the study was the kidneys tissue of 48 males and females aged from 20 to 60 who died in the presence and absence of alcohol in the blood and were subjected to an autopsy in the anatomical department of the Forensic Medical Examination Bureau. The collection of tissues of traumatized organs was carried out in the morgue at air temperature from +16 to 25 C, relative humidity 40-60%. In the course of research, we used histological and histochemical methods to detect the dynamics of regeneration processes of histological changes in the kidneys tissues, and carried out a analysis of the results.

The work was carried out in accordance with the requirements of the "Instruction on conducting forensic medical examination" (Order of the Ministry of Health of Ukraine No. 6 dated January 17, 1995), in accordance with the requirements and norms, the standard provisions on ethics of the Ministry of Health of Ukraine No. 690 dated September 23, 2009, "The procedure for the removal of biological objects from the dead, whose bodies are subject to forensic examination and pathological anatomical investigation, for scientific purposes" (2018).

RESULTS AND DISCUSSION

It should be noted that the kidneys are firmly fixed in their place, and their mobility is very limited. The anatomical structure of kidneys, with a pronounced network of blood vessels, creates an opportunity for the formation of large hematomas in them and the violation of tissue integrity in case of trauma. We should also take into account the fact that the right kidney is more protected, compared with the left one, as it is less vulnerable in case of body compression, and is not shifted by objects of injury. In women, the kidneys are located lower than in men. In the diagnosis of kidney injury, we should consider their pathologies, which may affect the formation of traumatic injuries and their consequences.

An expert assessment of the histological study results helps to resolve the issue of the kidney injury prescription. Moreover, the severity of these or other microscopic changes in kidneys depends on such factors as: the nature and extent of the subcapsular fracture, the severity of the related injuries, previous illnesses, etc.

Sapozhnikova M. A. [6] distinguished three stages of morphological changes in the injured kidney: severe circulatory disruption, traumatic edema (in the area of violating organ integrity there appear erythrocytes concentrations with addition of isolated leukocytes); dystrophic-necrotic changes and inflammation; regeneration and the processes of organization. The uninjured kidneys had the following changes: in the first hours there were blood disorders, the phenomenon of anemia, which changed into full-bloodedness of small and medium blood vessels and glomeruli; 2-4 hours after the injury there were dystrophic changes in the epithelium of the tubules with the formation of necrosis; later in the cortical substance there were focal sclerosis with lymphocytic infiltrates and signs of compensatory hypertrophy of the nephrons.

Sosedko Yu. I. [7] notes that at the onset of death in the area of the subcapsular hematoma revealed hemorrhages from unchanged red blood cells, destruction of the renal tissue without reactive changes in the surrounding tissues. Further (after 1-1.5 hours and later after death), the author detected the swelling of intermediate tissue, the capsule of the kidney, glomeruli, and the accumulation of granulocytes. 1-1.5 days after the injury, there dominated necrosis of kidney tissues with deep epithelium degeneration in the convoluted tubules of the injury zone, dystrophic changes in the convoluted tubules epithelium. At the histological examination of the kidneys removed from the victim during the operation, on the 3rd day after the injury, the scientist detected an embryo in the blood of adipose tissue in the gate area, a massive hematoma under the capsule, mostly in the gate area, with varying degrees of severity of erythrocyte destruction and with high levels segmental nuclear neutrophils in peripheral hematoma departments; the renal parenchyma necrosis with the phenomena of splatting the tissue in the adjacent hematoma regions of the kidneys; on the border of the kidney necrotic tissue with hematoma there was a leukocyte torus demarcationis; pronounced dystrophic changes in the epithelium of the convoluted tubules with the withdrawn epithelium and the accumulation of eosinophilic homogeneous protein masses in their lumen.

According to our data, in the first hours after injury, there occured peripheral damage in the blood circulation; blood vessels had uneven blood flow with leukostasis and plasma separation in the lumen of individual vessels. The walls of the arteries were uneven, sometimes thickened by edema, spasmodic. The stroma of the cerebral cortex and the places of the cortical layer were swollen, as shown in Figure 1.

6-12 hours after the injury, circulation disturbances continued; blood vessels were with uneven blood filling, there was leukostasis and plasma separation in the lumen of individual vessels, there were dystrophic changes in the epithelium of the tubules: the epithelium was swollen and vacuated in some areas, in other areas the epithelium

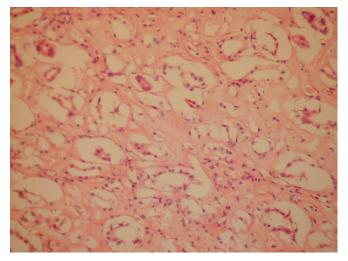


Fig. 1. The presence of edema in the cerebral layer (1) of the right kidney in a woman, 36 years old, who died from a mechanical trauma. The injury prescription is 2 hours. Colored with hematoxylin-eosin. Scale: x 200

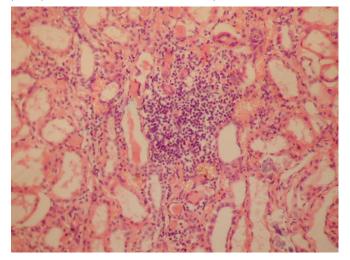


Fig. 3. Localized homeopathic infiltration (1) of the left kidney in a man, 56 years of age, who died from a mechanical trauma. Prescription of injuries is 2 days. Colored with hematoxylin-eosin. Scale: x 200

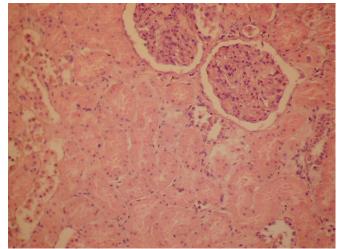


Fig. 2. Dystrophic changes in the epithelium of the canine (1) of the right kidney in a man, 58 years of age, who died from a mechanical injury. The prescription of injury is 10 hours. Colored with hematoxylin-eosin. Scale: x 200

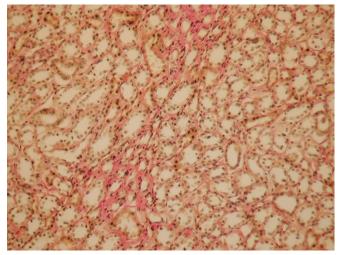


Fig. 4. Cells of sclerosis in the cortical layer (1) of the right kidney in a man, 48 years old, who died from a mechanical injury; prescription of injury is 4 days. Colored for Van Gison. Scale: x 200

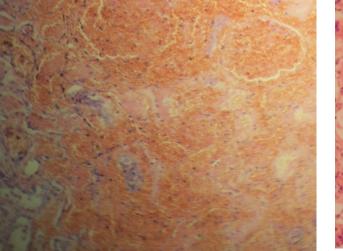


Fig. 5. Hematoma in the right parenchyma (1) of the right kidney in a woman, 24 years old, who died from mechanical injury. The prescription of injury is 6 hours. Colored with hematoxylin-eosin. Scale: x 200

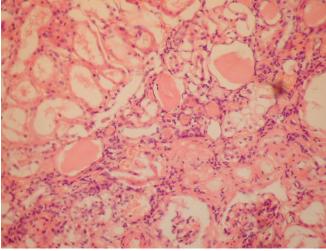


Fig. 6. The presence of protein in the lumen of the tubules (1) of the right kidney in a man, 44 years old, who died from a mechanical injury. Prescription of injury is 2 days. Colored with Van Gison. Scale: x 200

was deep; there was a lack of epithelial nuclei, as shown in Figure 2.

Within 12-24 hours after injury, on the background of the above-mentioned changes, the stroma was diffusely marked with single leukocytes, their number decreased; the integrity of many leukocytes was broken; the number of leukocytic infiltrates increased; isolated histocytes were detected.

2-3 days after the injury there appeared some signs of the organization: there was an increase in lymphostiocytic infiltration of the stroma, as shown in Figure 3; the formation of thin-walled vessels from the walls of the capillaries began. In this period, stroma injuries also showed signs of the nephron compensatory hypertrophy.

4-6 days after the injury, new granulation tissue became more mature, the formation of scars began. At this period after injury there appeared centers of sclerosis in the cortical layer (Figure 4).

6 days from the moment of injury, the processes of organization continued; the lymphostitic infiltration lasted for some time; the formation of vascular-tissue scars was also in progress.

In the area of injury there was a violation of microcirculation, spasm of the vessels, localized clusters of erythrocytes with clear contours with hemolysis of their separate groups in the center; there was also an admixture of infiltrated single leukocytes, granulocytes, cerebellum and partially stratum kidney layers (Figure 5).

Within 12-24 hours after injury there was a breakdown of red blood cells and accumulation of leukocytes around the damage zone; there appeared fibers forming the torus demarcationis; tubules epithelium was unstructured.

During the next 2-3 days, the breakdown of erythrocytes was pronounced, fibers were formed by a well-defined torus demarcationis, parenchymal necrosis was detected; epithelium excretion and accumulation of protein were observed in the vorticular tubules, as shown in Fig. 6.

Subsequently, in the period of 4-6 hours after injury, in the cortical layer there were significant areas of growing connective tissue; individual glomeruli were replaced by fibrous connective tissue; the epithelium necrotized in the majority of the convoluted tubules; the stroma of the vessels cortical layer had thickened walls due to fibrous connective tissue with signs of elastofibrosis; the epithelium cytoplasm contained a brown pigment in the brain layer tubules; the areas of fibrous connective tissue growth were detected in the cerebellum stroma.

Histologically, 6 days after injury, the area of fibrous connective tissue enlargement increased; epithelium necrotizing areas in the convoluted tubules extended; the replacement of glomeruli with fibrous connective tissue continued, and a brown pigment in the cytoplasm of the epithelium was observed.

As a result of our research, we have found a regular dynamics of changes in the histological parameters of kidneys in the deceased who died as a result of mechanical traumas, indicating the possibility of developing a set of criteria for assessing the establishment of the injury prescription to the internal organs of the retroperitoneal space, in particular, the kidneys.

When determining the time of injury, it is necessary to take into account the external and internal factors that could have been observed in the injured and the deceased at various types of injuries, namely: the presence of diseases, alcohol, syndrome of mutual encumbrance, traumatic illness, individual features of the organism, circumstances and the mechanism of injury, the presence of related injuries and localization, the nature and extent of kidney damage.

CONCLUSIONS

The obtained results indicate that there are several histological changes in the damaged kidneys tissues area which directly depend on the time which has passed from the moment of injury. It is appropriate to use the histological method to determine the prescription of injury both in cases of isolated kidneys injury and in cases of combined injury of the abdominal organs as it enables establishing the prescription of injury more precisely.

Prospects for further research: Further research of kidneys injuries, in particular the diagnosis of its mechanism, nature and time, is necessary for the development and application of such injuries prevention.

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PRACA ORYGINALNA ORIGINAL ARTICLE



X-RAY ANALYSIS OF THE MANDIBLE IN PATIENTS WITH CROSSBITE AND MANDIBULAR DISPLACEMENT

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ABSTRACT

Introduction: Significant morphological and aesthetic disabilities of the face, observed during the formation of a cross bite in combination with the displacement of the mandible, prompt the doctors – orthodontists to study carefully the morphogenesis of this anomaly.

The aim: Analysis of the mandible structure in patients with a cross bite and lower jaw displac ement based on the analysis of orthopantomograms.

Materials and methods: For this study, the orthodontic examination of 20 patients, 18-22 years old, was made they complained about facial asymmetry, displacement of the lower jaw and a violation of the cosmetic centers. A diagnosis of the buccal cross bite form in combination with the displacement of the lower jaw was put according to the Uzhumeckiene classification. The methods used do not contradict the conclusions of the ethics commission.

Results: The analysis of the obtained data indicates that the angle of the mandible has more variable ($p \le 0,05$). Go120,8° and 125,1°. Significant of the angles of the canines according to the basal arch of the lower jaw of 102,8° and 105,4° ($p \le 0.01$) and the angle of inclination of the first permanent molars of 89,6° and 91,4°, respectively ($p \le 0.01$). **Conclusions:** The obtained data indicate that there is no clear correlation between changes in the studied parameters and the localization of anomalies (left-sided, right-sided). Indicators of the angle of the lower jaw are significantly altered from the opposite direction of its displacement. The change in the angles of inclination of the canine and the first permanent molars, as occlusive compensation, is determined reliably. The more the angle of the mandible changes, the more the lower jaw moves in the transversal direction. Perhaps this is due to the asymmetric tone of masticatory muscles.

KEY WORDS: cross bite, lower jaw, orthopantomograms

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INTRODUCTION

National researchers report that in the structure of dentoalveolar abnormalities crossbite has prevalence on the average of 8%; however, morphological and aesthetic disorders that occur as a result of the progression of this pathology can lead to significant deformations of the facial skeleton [1]. These changes are especially prominent in crossbite, combined with mandibular displacement, which suppresses patients by physical inferiority and depressively affects their psyche [2]. A great variety of types of crossbite has the corresponding clinical manifestations [3, 4] and its elimination is not always possible through the use of orthodontic devices. Numerous studies have shown that orthodontic treatment of these patients is impeded due to the increase in the degree of age-related disorders and deformation of the facial skull bones, which lead to disharmonic development of the face [5].

Consequently, further improvement of the methods of study and analysis of morphological and aesthetic disorders that accompany this pathology, and the possibility of their correction in the age-related aspect is crucial.

It is the asymmetries of the face that are most often noticed by patients and their neighborhood, encouraging orthodontic treatment. Correction of asymmetries of gnathic growth is rather complicated part of the orthodontic treatment of crossbite [6]. This is due to the numerous manifestations of morphological disorders and, consequently, a large number of options for their elimination. Since the maxilla develops in close conjunction with the structures of the skull base, it is less unstable. The mandible has certain autonomy of development, due to the greater influence of the action of functional factors and is more prone to asymmetric deformations. In this regard, orthopantomogram is sufficiently accessible and informative method for the analysis of the symmetric and proportional development of the mandibular complex as the major component in the formation of crossbite with mandibular displacement according to classification suggested by I. I. Uzhumetskene.

The study of this issue is relevant, as it will help to correctly perform differential diagnosis of disorders, choose an adequate method of treatment of crossbite, predict its course, which in turn will contribute to the restoration of the morphology and function of the dentoalveolar apparatus, improvement of the patients' appearance, achievement the physiological optimum.

THE AIM

Based on the orthopantomogram, to analyze the structure of the mandible in patients with crossbite with mandibu-

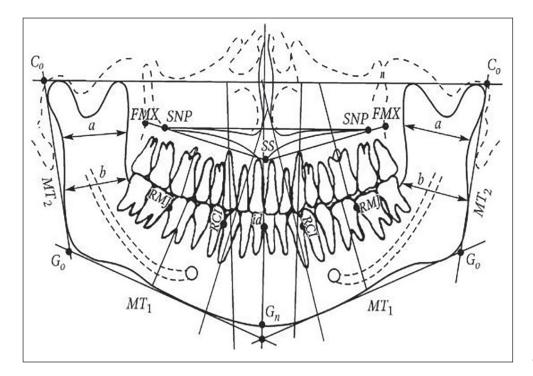


Fig. 1. The pattern of morphometric analysis of the dentoalveolar complex.

lar displacement and to conduct a correlation analysis of the morphometric parameters, as well as to evaluate the nature of morphological disorders according to the degree of mandibular displacement.

MATERIALS AND METHODS

20 patients aged 18-22 years with complaints of mandibular displacement and the cosmetic center disorder, have undergone orthodontic examination. The diagnosis was crossbite, buccal form in combination with mandibular displacement according to Uzhumetskene's classification. All patients underwent comprehensive clinical and paraclinical examination according to treatment protocols (2005).

Basically, the transverse mandibular displacement is possible due to several factors, namely, incoordination of the masticatory muscles activity, irregular occlusal contacts, articular displacement and skeletal asymmetries of the congenital genesis [7, 8]. Consequently, morphogenesis of the mandible, as one of the possible etiological factors, has been selected to study.

The analysis of the orthopantomogram made for all patients has been carried out to analyze the development of the mandible as the major component of the dentoalveolar complex, which directly affects the aesthetics of the face. The state-of-the-art orthopantomographs provide with simultaneous images of the entire dentoalveolar system as a single integral functional complex. Angular distortions are almost absent on the resulting images due to the orthoradial direction of the beam, which allows to study the structure of the mandible in terms of the symmetry of its development..

We used the method of morphometric analysis of the mandible in patients with crossbite [8], which includes the analysis of the most frequently changed morphological characteristics. Consequently, the parameters of the body MT1 (between the Gn-Go points) and the branch MT2 (between the Go-Co points) on the right and on the left were determined. The deviation of the parameters between the MT2 parameters and MT1 parameters corresponds to the vertical and horizontal component of the asymmetry, respectively. The size of the mandibular Go angle, which is formed by the MT1 and MT2 lines, variations of which are one of the major signs of morphological asymmetry, has been analyzed. The width of branches of the mandible in the upper segment (a) and the lower segment (b) was determined. Dentoalveolar height of the lateral segments, angulation of the cuspids to the basal arc of the mandible, the degree of asymmetry of the dentitions in the lateral segments, angulation of the first permanent molars to the basal arc of the mandible was analyzed. Differences in these parameters may indicate relative hypertrophy of one of the sites (Figure 1). Начало форКонец формы

Subsequently, the comparison of the data obtained on the right and left was made and the degree of difference in millimeters and degrees (for angular parameters) was determined. Correlation analysis of the parameters was carried out.

The methods used do not contradict the conclusions of the ethics commission.

RESULTS AND DISCUSSION

All 20 subjects have been assigned into two groups according to the direction of mandibular displacemen: 13 individuals with crossbite and mandibular displacement towards the right side and 7 individuals with mandibular displacement towards the left side. The degree of displacement of the mandible was determined in relation to the width of the lower central incisor.

		Th	e analy	sis of th	e mano	lible in	patient	s with r	ight-sid	ed cros	sbite a	nd man	dibular	displac	ement			
Number of patients	The sof the			ight branch	brar the u	n of the nch in upper ment	the b in the	th of ranch lower ment	Dentoa hei	lveolar ght	9	of the dible	5	lation spids	5	lation olars	the	gth of lateral ment
	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L
	116,03	117,2	77	77	36,3	36	30,84	33,69	40,84	41,4	120,8	125,1	102,8	105,4	89,6	91,4	50,1	49,92
13	±	±	±	±	±	±	±	±	±	±	±	±	±	±	±	±	±	±
	12,4	12,9	9,7	9,7	4,3	4,2	2,98	2,03	5,99	4,9	9,24	8,77	13,3	11,08	4,9	6,7	5,3	7,29
		Tł	he analy	ysis of t	ne man	dible in	patien	ts with	left-side	ed cros	sbite an	id mano	libular	displace	ement			
	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L
	122,71	120,0	76,5	76,8	38,28	37,85	37,42	34,71	42,42	41,7	123,7	118,2	97	93,7	93,4	95,57	51,2	51,85
7	±	±	±	±	±	±	±	±	±	±	±	±	±	±	±	±	±	±
	5,88	8,75	8,7	8,96	1,9	6,8	3,68	3,8	4,6	4,06	11,5	2,75	20,5	18,46	6,02	4,46	7,2	4,48

	Table I. Morp	hometric	parameters of	^t the mandible	in patier	nts with crossbite.
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Note: R-right; L-left.

Group I: in 7 subjects mandibular displacement towards the right side was 1/3 of the width of the crown of the lower central incisor. In 4 subjects mandibular displacement was ½; in 1 subject mandibular displacement was per tooth crown's width.

Group II: in 6 subjects the displacement was 1/3 of the crown of the lower incisor. In 1 subject the displacement was ½ of the crown width. The resulting data are presented in Table I.

The average values showed that in the first group of subjects (right-sided crossbite with mandibular displacement) the size of the body of the mandible was within the limits of physiological asymmetry and accounted for 116,03 mm and 117,2 mm, respectively ($p \ge 0.05$). The height of the branches was almost unchanged and accounted for 77.0 mm and 77.0 mm, respectively ($p \ge 0.05$). The width of the branch on the right and left in the upper segment was 36.3 mm and 36.0 mm, respectively ($p \le 0.05$). In the lower part of the branch a significant difference in the parameters (30.84 mm and 33.7 mm, respectively), was noted ($p \le 0.05$), which definitely influenced on the change of the angle of the mandible, judging by the Go120,8° and 125,1° parameters in this study group ($p \le 0,05$). Therefore, it is evident that one of the factors that cause deviation of mandible in the transversal plane is the unilateral increase in the angle, which is a manifestation of skeletal disorders, which, consequently, affects the symmetry of the face. The proportion of the dentoalveolar height on the left and right is almost preserved and is 40.84 mm and 41.4 mm, respectively ($p \ge 0.05$). Significant variations are observed in the parameters of angulation of cuspids to the basal arc of the mandible (102.8° and 105.4°) ($p \le 0.01$) and the angulation of the first permanent molars is 89.6° and 91.4°, respectively $(p \le 0.01)$. The length of the lateral segments is almost the same and is 50.1 mm and 49.92 mm.

The group of patients with left-sided displacement of the mandible showed the following average morphometric parameters: the variation of the length of the body of the mandible was within the physiological asymmetry and

accounted for 122.7 mm and 122.0 mm ($p \ge 0.05$). The height of the branch on the right and left was symmetrical (76.5 mm and 76.8 mm, respectively). The width of the branch in the upper segment was 38.28 mm and 37.85 mm, respectively. Similarly to the right-sided crossbite, the width of the branch in the lower segment significantly $(p \le 0.05)$ changed, accounting for 37.42 mm on the right and 34.71 on the left, and, accordingly, the angle of the mandible increases from the side of the branch extension in the lower segment, accounting for 123, 7º on the right and 118.2° on the left. Angulation of cuspids on the basal arc of the mandible underwent variations, accounting for 123.7° on the right and 118.2° on the left. Angulation of molars was 95.57° and 93.4°, respectively. The proportionality was maintained in the dimensions of the length of the lateral segments and was 51.2 mm and 51.85 mm on both sides.

Thus, we can state that in patients of both groups, regardless of the side of localization of the anomaly (right- or left-sided crossbite with displacement of the mandible), the morphometric characteristics of the mandible on the orthopantomogram are the same. Changes in the angle of the mandible underwent significant variations: in the right-sided displacement the angle increases to the left, and in the left-sided localization the angle increases to the right, indicating the skeletal nature of the disorders. The angles of inclination of the cuspids and the first permanent molars change.

The resulting analysis of correlation, aimed at determination whether the variability of one sign in some correspondence with another, indicates that our study shows a correlation between the parameters of the body and the angle of the mandible and is 0.045; 0.006 between the size of the body of the mandible and the angle of the inclination of the cuspids; 0.017 between the size of the body and the angle of inclination of the molars. It can be interpreted as compensations from the side of dentoalveolar system to create maximum stable occlusive relationships, which is important for mastication.

The analysis of the dependence of the severity of morphological disorders and the rate of displacement of the mandible in the transversal plane indicates that an increase in the angle of the mandible contributes to more significant lateral displacements.

CONCLUSIONS

The findings show that there is no clear correlation between changes in the studied parameters and localization of the anomaly (left-sided, right-sided). Parameters of the angle of the mandible significantly change from the opposite side of its displacement. Significant change in the angles of inclination of the cuspids and the first permanent molars, as occlusive compensation, is determined. The more the angle of mandible changes, the more the mandible moves in the transversal direction. Perhaps this is due to the asymmetric tone of the masticatory muscles.

The situation with unilateral increase in the angle of the mandible requires careful study. Noteworthy, the fibers of the proper masticatory and medial pterygoid muscles are fixed in the zone of the angle of the mandible. And, apparently, it is the unilateral mastication that facilitates such changes.

That is why when planning an orthodontic treatment of crossbite with mandibular displacement it is impossible to rely solely on the data of X-ray examination as the key method of diagnosis of asymmetric development of the mandible. It is necessary to conduct a comprehensive examination, including the analysis of the state of masticatory muscles, as well as the structure of the entire facial part of the skull.

Consequently, the perspectives of further research will encompass mandatory electromyographic study of such patients to determine the symmetrical activity of the muscles. Supposedly, timely coordination of muscle function will prevent significant morphological changes in the formation of the mandible and improve the conditions for aesthetic development of the face.

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PRACA ORYGINALNA ORIGINAL ARTICLE

PATHOGENETIC PECULIARITIES OF NEUROENDOCRINE AND METABOLIC DISORDERS IN PATIENTS WITH ACNE ASSOCIATED WITH CHRONIC STRESS

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ABSTRACT

Introduction: Acne is a chronic relapsing skin condition with multifactorial nature associated with disorders of sebaceous glands activity, psycho-emotional disorders and slow response to treatment.

The aim: To study a pathogenic role of chronic stress and certain metabolic and neuroendocrine disorders in the development of acne in women depending on the duration of the disease.

Materials and methods: A total of 119 women with acne were examined. Index insulin resistance (index HOMA), serum cortisol and prolactin, level of Reactivity-Personal Anxiety and Dermatology Life Quality Index (DLQI) was determined.

Results: Possible changes in serum cortisol level depending on duration of the disease (increased in women with duration of the disease less than 1 year and decreased in women with duration of the disease 1-5 years), increased index of serum prolactin and HOMA, with more significant changes in women with duration of the disease 1-5 years. The DLQI was determined in all examined patients. An increased level of anxiety, characterized by higher levels of personal anxiety, was also observed, especially in a group of women with duration of the disease 1-5 years.

Conclusion: The changes in certain neuroendocrine and metabolic indices, which are the markers of chronic stress, worsening of life quality and significant levels of reactivity and personal anxiety, were observed in women with acne. A strong and moderate correlational relationship between the nature of changes in the abovementioned indices and duration of the disease was detected.

KEY WORDS: acne, stress, anxiety, neuroendocrine and metabolic disorders

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INTRODUCTION

Acne (acne vulgaris) is a chronic relapsing skin condition characterized by a set of objective and subjective symptoms of multifactorial nature associated with disorders of sebaceous glands activity with growth of Propionibacterium acnes bacteria, psycho-emotional disorders and slow response to treatment. According to numerous studies, acne affects 60-80% of adolescents. There is also a tendency of the rising incidence of acne in adults [1,2,3,4].

As of today, it has been established that skin is a key link of sex steroid hormone metabolism. These hormones interact with androgen receptors in various androgen-dependent structures. The main targets are epidermis, hair follicles, sebaceous glands and fibroblasts. [5,6]

Hyperandrogenism is often considered as one of the components of metabolic syndrome. Hyperandrogenism can develop as a result of hyperprolactinemia, under the influence of which pathological changes occur in blood plasma in the form of induced production of squalene (precursor of sebaceous glands cholesterol) and increase of dehydroepiandrosterone. Since prolactin affects, directly or indirectly, all tissues of macroorganism, even an insignificant increase in its level in blood plasma can cause hyperandrogenism. During depression, prolactin is produced uncontrollably, which can have irreversible consequences. [7,8,9].

Psychological stress stimulates an increased synthesis of stress hormones – cortisol, adrenaline and noradrenaline, which force the adrenal cortex to increase the production of male sex hormones, which, in its turn, stimulates the activity of sebaceous glands with an increased production of oily sebum.. Stress also affects hypothalamus, which secretes adrenocorticotropic hormone. An increased level of the latter affects the sebaceous glands receptors that produce sebum [7,10,11].

The development of metabolic syndrome with further development of insulin resistance and, as a result, manifestation of hyperandrogenism, plays one of the key roles in promoting the formation of acne. This is due to the similarity of the structure of an insulin receptor and cytochrome P450c17a in adrenal and sex glands through the presence of serine amino acid.. During the phosphorylation of the latter, the sensitivity of insulin receptors reduces associated with the development of insulin resistance and metabolic syndrome, on the one hand, and on the other hand – simultaneous manifestation of ovarian and adrenal hyperandrogenism. Numerous studies revealed a direct relationship between the level of insulin and androgens, and a conclusion was drawn that hyperinsulinemia causes hyperandrogenism [7,9,10,11]

It is generally believed that the primary cause of acne is composition and amount of sebum, which clogs skin follicles [12] However, the study conducted by the American researchers [13] at Wake Forest University suggests that high stress is one of the factors causing the formation of acne and significantly aggravating the course of disease. In fact, stress associated with an increased level of hormones is an important factor promoting the formation of acne because it affects all body organs and systems triggering their malfunction.

Thus, the development of acne occurs as a result of a comprehensive influence of external and internal causes, among which the disorders of endocrine system with excessive androgen production and estrogen deficiency, associated with genetic predisposition to the disease, play a significant role. A decreased immunological reactivity of the body, gastrointestinal diseases, microcirculatory disorders, nidus of infection in the body or skin, epidermal barrier damage, sebum overproduction (seborrhea), decreased nonspecific skin resistance, carbohydrate metabolism disorders, psychovegetative and hormone imbalance, etc. are the factors triggering and promoting acne.[14,15] However, only isolated reports can be found in the literature sources showing a potential role of stress, neuroendocrine disorders and development of metabolic syndrome in the pathogenesis of acne. Furthermore, the data provided is often contradictory and not sufficiently substantiated. This determines the relevance of further studies with a view to optimize treatment and preventive measures of exacerbation of the skin disease.

THE AIM

Objective - to study a pathogenic role of chronic stress and certain metabolic and neuroendocrine disorders in the development of acne in women depending on the duration of the disease.

MATERIALS AND METHODS

A total of 119 women with acne (range 18-35 years) were examined. The patients were admitted to the hospital or sought outpatient treatment at the Municipal Non-Profit Enterprise of Lviv Regional Council "Lviv Regional Dermatovenerologic Dispensary". A comprehensive survey of patients has been performed in a randomized manner concurrently with BD pre-stratification (Protocol for the Provision of Medical Aid to Acne Vulgaris Patients, Annex to the order of the Ministry of Health No. 312 dated 8 May 2009) upon obtaining written consent in accordance with the principles of Helsinki Declaration of Human Rights, Convention of Council of Europe on Human Rights and Biomedicine, and relevant laws of Ukraine. The study did not include the patients with acne who had active chronic somatic disorders at the moment of examination. Serum cortisol and prolactin levels were determined in a laboratory in all patients using an analyzer and test system Cobas 6000, Roche Diagnostics (Switzerland). The tests were taken on the 3rd - 5th day of a menstrual cycle.

In order to assess insulin resistance, HOMA-IR (homeostatic model assessment for insulin resistance) was calculated by the formula: HOMA = (fasting glucose (mmol/L) x fasting insulin (mU/L)) / 22.5. Blood sugar and insulin levels were determined in a laboratory following standard procedure. The value > 2.7 indicated insulin resistance.

In order to assess anxiety in patients with acne, the Reactivity-Personal Anxiety Inventory developed by Spielberger - Khanin was used. The questionnaire consists of 40 questions: the first 20 questions for assessing reactivity anxiety ("How do you feel right now?" scale) and the next 20 questions for assessing reactivity anxiety ("How do you usually feel?" scale). The responses are rated on a 4-point scale according to intensity (not at all, somewhat, moderately so, very much so) for the reactivity anxiety and a 4-point scale according to frequency (almost never, sometimes, often, almost always) for the personal anxiety. The level of anxiety is determined as follows: after calculating the total intensity of direct and reverse expressions separately, the total score of the reverse expressions is subtracted from the total score of direct expressions and a constant value of 50 is added to the obtained figure for the reactivity anxiety scale and 35 - for the personal anxiety scale. Scores range from 20 to 80 for each scale. Higher scores correlate with greater anxiety (reactivity or personal). The assessment of anxiety is performed based on the scores within the following ranges: 0-30 - mild anxiety, 31-45 - moderate anxiety and above 45 – severe anxiety [16].

The quality of the patients' life was evaluated using the Dermatology Life Quality Index (DLQI) questionnaire, designed for the patients over the age of 16. The measurement of the life quality index was based on the data of the respondents. A psychometric scale consists of 10 questions reflecting general aspects of the changes in the quality of life. The quality of life was evaluated on 5 basic parameters: symptoms, well-being, daily activities, private life and treatment. Each question was assessed by patients according to the number of scores: large effect of the aspect – 3 scores, moderate – 2 scores, small – 1 score, no effect – 0 scores. The sum of scores 0-1 indicated no effect of the skin disease on the patient's life, 2-5 – small effect, 6-10 – moderate effect, 11-20 – very large effect, 21-30 – extremely large effect indicating significant worsening of life quality [17].

The statistical processing of the results was carried out using the methods of statistical analysis and Statistica 6.0 computer program. The results were considered significant if mean difference was p<0.05.

RESULTS AND DISCUSSION

Based on clinical findings, 36 (30.25%) patients were diagnosed with grade I acne, 39 (32.78%) – grade II acne, 44 (36.97%) – grade III acne (Fig.1), at that, only 41 (34.45%) patients with duration of the disease less than 1 year and

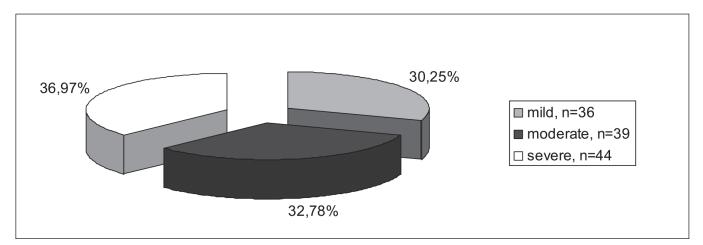


Figure 1. Distribution of patients against acne severity

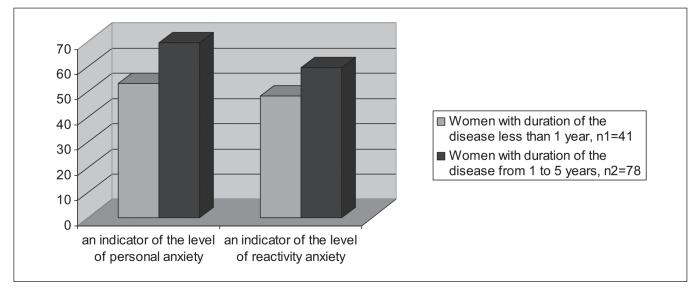


Figure 2. Values of reactivity and personal anxiety in women with acne with different duration of the disease

78 (65.55%) – from 1 to 5 years. (Fig.1) A control group consisted of 35 apparently healthy persons (donors) of similar age.

Acne *vulgaris* has a major impact on quality of life and phycholosocial wellbeing [8]. The Dermatology Life Quality Index (DLQI) was determined in all examined patients. The results meaningfully (p<0,001) differed in the patients with acne depending on duration of the disease: in women with duration of the disease less than 1 year this index was 15.19 ± 0.62 (large effect of the skin disease on the quality of life) and from 1 to 5 years – 22.21 ± 0.68 (very large effect of the skin disease on the quality of life). At that, the largest impact of the disease on patient's life was observed in daily activities and private life (communication with other people, leisure; relationships with partners, relatives, friends; embarrassment and self-consciousness; problems at work or studying).

The reactivity and personal anxiety was assessed using the Spielberger/Khanin questionnaire. Personal anxiety is considered as a relatively stable personal characteristic, which defines the level of person's feelings of unease, worry and tension due to the impact of stress factors. Reactivity anxiety is a reactivity of a person, which characterizes the level of its feelings of unease, worry and tension induced by a specific stressful situation. While personal anxiety is a stable personal characteristic, reactivity anxiety can be quite dynamic by time and level of intensity [10,16]

When measuring the levels of reactivity and personal anxiety, high levels of anxiety (above 45 scores) were observed in all examined women with acne according to the table of interpretation of the results of Spielberger-Khanin test (Table I). At that, the levels of personal anxiety in women with acne, regardless of duration of the disease, were higher, compared with those of the reactivity anxiety. The index of personal anxiety in women with duration of the disease less than 1 year was by 10.10% higher (p>0.05) compared with the index of reactivity anxiety, and in women with duration of the disease 1-5 years – by 16.43% (p>0.05). However, significant differences (p<0.05) in both indices of anxiety were observed in women with duration of the disease.

Values	Women with duration of the disease less than 1 year n ₁ =41	Women with duration of the disease from 1 to 5 years n ₂ =78
Dermatology Life Quality Index	15.19±0.62	22.21±0.68 p ₁₋₂ <0.001
Indices of reactivity anxiety	48.34±2.90	59.65±4.08 p ₁₋₂ <0.05
Indices of personal anxiety	53.22±4.68	69.45±5.34 p ₁₋₂ <0.05

Table I. Values Dermatology Life Quality Index, reactivity and personal anxiety in women with acne with different duration of the disease

Notes: p^{1-2} , – the probability of the difference in the rates in patients with different duration of the disease.

Показники	Women with duration of the disease less than 1 year, n ₁ =41	Women with duration of the disease from 1 to 5 years n ₂ =78	Control group n=35
Serum Cortisol, nmol/l	546,5±16,72 *	376,8±18,33 * p ₁₋₂ <0,001	455,8±25,54
Serum prolactin mMe/l	341,3±7,92	419,2±6,88*** p ₁₋₂ <0,001	315,4±19,34
HOMA index	2,73±0,40	3,79±0,54* p ₁₋₂ >0,05	2,44±0,52

Notes: 1. * – Differences in the degree of probability compared to the control group: * – p < 0.05; ** – p < 0.01; *** – p < 0.001.

2. p^{1-2} – the probability of the difference in the rates in patients with different duration of the disease.

higher by 30.50% and the index of reactivity anxiety was higher by 23.40% compared with the group of women who had acne less than 1 year (Table I, fig. 2).

Chronic stress and increased stress hormones play a significant rate in development and progression of acne [7]. The possible changes in all examined indices (serum cortisol, prolactin and HOMA index) that depended on duration of the disease and meaningfully differed from the values of the control group were detected in women with acne associated with stress (Table II).

It should be noted that cortisol level increased by 19.98%, (p<0.01) was observed in women with duration of disease less than 1 year and cortisol level decreased by 17.36%, (p<0.01) was observed in patients with duration of the disease 1-5 years, compared with the index of the patients from the control group. When measuring the level of prolactin in serum, it was found that its level was increased by 8.21% in women with duration of the disease less than 1 year compared with the index of the patients from the control group (p>0.05) and increased by 32.91%, (p<0.001) in patients with duration of the disease 1-5 years respectively. When calculating HOMA in patients with acne, the changes in the index were revealed compared with the indices of the patients from the control group: increase by 11.89%, (p>0.05) in patients with duration of the disease less than 1 year and increase by 52.87%, (p<0.05) in patients with duration of the disease 1-5 years.

A direct strong positive correlational relationship (+0.8)

between the indices of the cortisol and prolactin levels in patients with acne with duration of the disease less than 1 year was observed. This indicates the correlation between the changes in neuroendocrine indices determined by us and the impact of stress. On the other hand, chronic long-term stress (group 2) leads to a reverse correlational relationship between the mentioned indices of moderate effect and indicates the development of the process of adaptation.

A direct moderate correlational relationship (+0.6) between HOMA index and changes in the levels of cortisol and prolactin indicates the development of metabolic syndrome features in women with acne and can be considered an additional criterion of metabolic syndrome in such patients.

Besides, an increase of HOMA index was observed along with a body weight gain in patients with duration of acne 1-5 years associated with chronic long-term stress and lack of sleep, which is further confirmed by the indices of anxiety, particularly of a personal one.

Thus, the changes in certain neuroendocrine and metabolic indices were determined in the majority of examined patients with acne: possible changes in serum cortisol level depending on duration of the disease (increased in women with duration of the disease less than 1 year and decreased in women with duration of the disease 1-5 years), increased index of serum prolactin and HOMA, with more significant changes in women with duration of the disease 1-5 years. The Dermatology Life Quality Index (DLQI) was determined in all examined patients, at that, the largest impact of the disease on patient's life was observed in daily activities and private life, especially in women with duration of the disease 1-5 years. An increased level of anxiety, characterized by higher levels of personal anxiety, was also observed, especially in a group of women with duration of the disease 1-5 years. All the above justifies the development of comprehensive methods for treatment of patients with acne, taking into account the impact of neuroendocrine and metabolic changes and chronic stress on the formation and course of the disease.

CONCLUSIONS

The changes in certain neuroendocrine and metabolic indices (serum cortisol, prolactin and insulin resistance index), which are the markers of chronic stress, worsening of life quality and significant levels of reactivity and personal anxiety, were observed in women with acne. A strong and moderate correlational relationship between the nature of changes in the abovementioned indices and duration of the disease was detected. This substantiates the necessity to search for new comprehensive treatment of patients with acne, taking into account the neuroendocrine and metabolic changes and consequences of chronic stress.

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PRACA ORYGINALNA ORIGINAL ARTICLE



CHANGES IN THE FUNCTIONAL CONDITION OF THE MASTICATORY MUSCLES WITH INCREASED TEETH ABRASION

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ABSTRACT

Introduction: The term "pathological abrasion" (increased abrasion) can be described as a loss of tooth hard tissue on the occlusal, oral, vestibular surfaces of teeth or in the occlusal area. Treatment of increased abrasion of teeth is a difficult task for the practical work of a dentist. The choice of the optimal treatment plan provides the greatest likelihood of long-term success and minimal probability of complication appearance.

The aim of our work was to study the functional activity of the masticatory muscles in the pathogenesis of the development of increased abrasion of tooth hard tissues.

Materials and methods: In order to achieve the goal of the study, an examination of patients aged between 19 and 69 years old was carried out in order to identify the number of persons with increased abrasion of teeth. During the examination of all patients one control and one researched group were formed. The patients of the control group (30 patients aged from 18 to 60 years) which had intact dental rows with any signs of increased tooth wear. The investigated group consisted of 25 patients, aged from 18 to 60 years. Depending on the complex treatment, the patients of the second group were divided into two subgroups. Subgroup 2A - (10 patients) with increased abrasion of tooth hard tissues with planned complex treatment of the disease without additional use of mouthguards after the end of treatment. For the patients from the 2B subgroup (15 people with increased abrasion of tooth hard tissues) a mouthguard was prescribed after the end of the complex treatment.

In order to study some peculiarities of the muscular activity of the maxillofacial region an electromyogram was taken from all participants before treatment and repeated in a six- and twelve-months term.

Results and conclusions: In our opinion, all manifestations of increased tooth abrasion are associated with changes in the muscular system, the motor apparatus and the nervous activity of the body. Regarding to this, the study of the propria muscular system and the related bone system can justify the usage of one or another prevention or treatment of the pathology. Based on the results of our research, we can conclude that the study of the functional state of the muscle complex is a fairly reliable prognostic sign in the study of such a disease as an increased tooth abrasion.

KEY WORDS: Increased tooth abrasion, electromyography, hard tooth tissues, masticatory muscles

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INTRODUCTION

Pathological abrasion (increased abrasion) has always been described as a state of pronounced loss of tooth hard dental tissues among people that consumed raw, coarse food.

As civilization developed, food products began to undergo thermal and mechanical processing which led to a decrease in the prevalence of dental abrasion, but not to the disappearance of the pronounced loss of tooth hard tissues. Currently, the possible reasons of premature tooth abrasion are being actively discussed.

In the pathogenesis of increased tooth abrasion, the following factors occur:

- exogenous: increased occlusal overload; occupational hazards and dietary habits of patients; irrational prosthetics of teeth (without taking into the account coefficients of friction of the artificial material with tooth enamel and abrasiveness of the material itself);

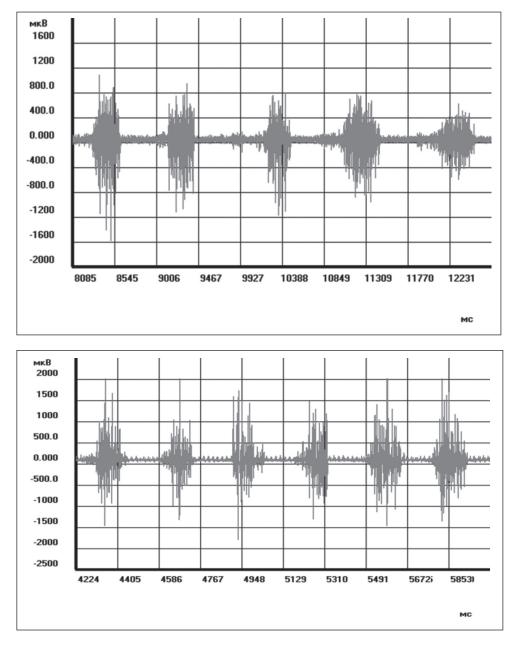
- endogenous: metabolic disorders, endocrinopathy, bruxism, diseases of the gastrointestinal system. The main components that determine the increased abrasion of tooth hard tissues include: mechanical effect of occlusal load and resistance to wear of hard dental tissues. The mechanical effect of the occlusal load depends on the magnitude of the mastication force (pressure), the mechanism of wear of tooth hard tissues and the coefficient of friction.

THE AIM

Based on the information mentioned above, the purpose of our work was to study the functional activity of the masticatory muscles in the pathogenesis of the development of increased abrasion of tooth hard tissues.

MATERIALS AND METHODS

In order to solve the tasks, we conducted a clinical examination of patients aged from 19 to 69 years old, who were



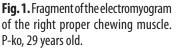


Fig. 2. Fragment of the electromyogram of the left chewing muscle itself. F-va, 23 years

divided according to the age principle according to A. Moystrakh: patients up to 20 years old, 20-29 years old, 30-39 years old, 40-49 years old, 50-59 years and over 60 years.

Also, measurements of the sizes of the teeth of the upper and lower jaws were made in order to establish changes in the sizes of teeth in the age aspect, with various types of bite and with increased abrasion of teeth. Those measurements will determine the optimal average height of the coronal part of teeth to confirm the diagnosis of increased abrasion or prerequisites for its appearance.

In addition to the odontometric parameters, we studied the shape of crowns and cutting edges of upper incisors, canines, premolars and molars in order to establish erasure planes in the area of the chewing (cutting) surface and in the area of the contact surface of the equator. During the examination of all patients two groups were selected. The control group and the investigated one. In both groups, we examined both male and female patients, who were equally divided into groups. It should be noted that majority of male patients was between the ages of 40 and 49, which accounted for 20% of the total number of patients in groups. Female patients were more in the age group of 20-29 years, which also accounted for 20% of the total number of patients in the groups.

The patients of the control group (30 patients aged from 18 to 60 years) had intact dental arches with no visible signs of increased tooth wear.

The researched group consisted of 25 patients, aged from 18 to 60 years. Depending on the complex treatment, the patients of the second group were divided into two subgroups. Subgroup 2A - (10 patients) with increased abrasion of tooth hard tissues with planned complex treatment [1,2] of the disease without additional use of mouthguards after the end of treatment. For the patients

Table 1. The electronityograf	Table 1. The electromyogram parameters of patients in the control group (ii = 50)							
Masseter muscles —		Parameters	s (M±m)					
Masseler muscles	activity (ms.)	rest phase (ms.)	"K" index	Amplitude (mkV)				
lest	148,06±4,95	152,37±4,71	0,98±0,03	207,58±3,38				
right	135,98±3,59	155,02±6,06	0,91±0,06	288,41±22,67				

Table I. The electromyogram parameters of patients in the control group (n = 30)

Table II. Electromyogram parameters of patients of the researched group (n = 25) before treatment

	Masseter –	Parameters (M±m)					
Subgroup	muscle	activity (ms.)	Rest phase (ms.)	«K» index	amplitude (mkV)		
2-A (n=10)	left	226,69 ±35,39	300,57 ±30,93	0,64 ±0,063	284,67 ±34,21		
	right	313,42 ±97,96	307,96 ±49,47	0,74 ±0,060	405,55 ±27,36		
2-B (n=15)	left	305,51 ±14,39	354,35 ±14,75	0,81 ±0,035	482,23 ±50,62		
	right	220,17 ±19,43	226,45 ±20,84	0,91 ±0,050	500,36 ±37,83		

from the 2B subgroup (15 people with increased abrasion of tooth hard tissues) a mouthguard was prescribed after the end of the complex treatment.

For abrasion form verification the classification by Moldovanov A.G. (1992) [3] was used. For a more precise diagnosis the form of abrasion, its distribution and type (with or without decrease in interalveolar height), as well as the presence of hyperesthesia were also determined [4]. The type of occlusion according to Grigorieva [5] was also registered for each participator. Also, an attention was paid to the presence of defects in separate teeth, dentofacial deformities, rationality of prosthetics measures applied. In order to study some peculiarities of the muscular activity of the maxillofacial region an electromyogram was taken from all participants before treatment and repeated in a six- and twelve-months term.

Electromyographic studies are based on the study of action potentials of muscle fibers, which function as part of mobile units, since they are a functional unit of the activity of the neuromuscular apparatus [6]. For the myographic registration a four-channel myograph M-440, a computer and a printer were used. Recording was performed in the following mode:

- calibration signal
- calmness
- compression of jaws
- arbitrary chewing
- swallowing.

Patients of both the groups were examined following this protocol. All electromyograms are analyzed by qualitative and quantitative indicators [6, 7]. Assessing the quality indicators, we considered the presence or absence of activity at rest, the nature of the excitation force during maximal occlusal compression, sequential nature of chewing, the uniformity of alternation of periods of bioelectric activity

and rest. Quantitative data analyzed with Student-Fisher's statistical method using a computer program that included the definition of parameters:

- amplitude of oscillations (minimum and maximum, μV) characterizing the excitation force and the number of motor units involved in muscle contraction;
- activity time, as an indicator of concentration in time of the excitation process, rest period as an indicator of the concentration of inhibitory processes and one dynamic cycle (ms);
- coefficient "K" as an indicator of the ratio of the processes of excitation and inhibition in each «activity" - "rest" dynamic cycle [8,9].

In order to compare the obtained data, indicators of the control group were used, which in the majority correspond to the normal indicators, according to the conducted studies [8].

All work was conducted in accordance with the Declaration of Helsinki (1964) and was approved by the Ethical Committee of the academy.

RESULTS

The quantitative and qualitative characteristics of bioelectric activity of the masticatory muscles of patients from the control group was studied. The state of relative physiological rest on the electromyogram is indicated by an isometric line (Fig. 1.).

For the electromyographic examination of patients from the control group a functional test "free chewing" was applied. The results show the alternation of volleys of activity with periods of relative bioelectric rest (Fig. 2).

Analyzing the digital data of electromyograms of patients from the control group, we noticed that the activity time and rest time of both the right and left masticatory muscles did not differ much.

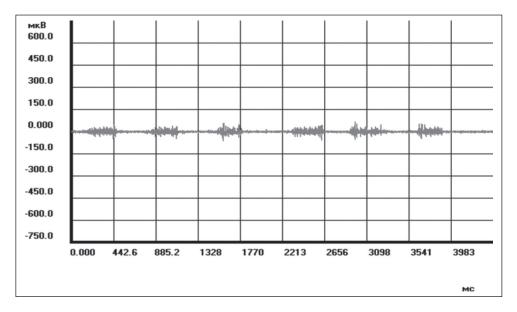


Fig. 3. Fragment of the electromyogram of the chewing muscle of patient N. (47 years old) of the study group before treatment.

Table III. The electromyogram parameters of patients of the researched group (n = 25) one year after treatment

Cubanana	Masseter	Parameters (M±m)					
Subgroup	muscle	activity (ms.)	Rest phase (ms.)	«K» index	amplitude(mkV)		
2 – A (n=10)	left	211,13 ±25,78	224,36 ±15,35	0,84 ±0,014	356,95 ±26,21		
	right	254,89 ±58,68	221,86 ±28,81	0,84 ±0,03	417,44 ±26,99		
2 - B	left	290,69 ±14,98	246,25 ±10,89	0,88 ±0,022	540,65 ±35,20		
(n=15)	right	171,18 ±11,64	211,39 ±16,80	0,91 ±0,03	469,16 ±31,44		

Notable that the activity coefficient "K" for the left and right masticatory muscles is different and is therefore 0.98 \pm 0.03 i 0.91 \pm 0.06, but this difference is not significant and indicates the absence of functional asymmetry.

There is a significant difference in the amplitude of the left and right masticatory muscles. This may indicate a more active movement of the right proper masseter muscle in comparison with the left one.

It can be concluded that during chewing the muscles are capable of instantaneous activation and an equally rapid transition to a state of rest. From the data obtained it is clear that the muscles of both sides take different parts in the act of mastication and differ in functional asymmetry.

Prior to treatment, the data of electromyographic studies in patients of the second group was slightly different from those in the control group. A difference in the indices was also observed in patients and in subgroups of the researched group. In our opinion, this fact indicates a decrease in mastication efficiency, which is associated with the pathology of tooth hard tissues and a decrease of occlusion height in the case of increased abrasion. (Fig.3).

The results of the analysis of electromyograms of the researched group are presented in Table II.

From the data obtained in patients of the researched group, there is a difference between the indicators of the right and left side.

It should be noted that the coefficient of mastication activity in the subgroup 2A is significantly lower in the left muscle than in the right (0.64 ± 0.063 and 0.74 ± 0.060 respectively), while in subgroup 2B the left and right muscles are higher, and equal to 0.81 ± 0.035 ; 0.91 ± 0.050 respectively. This suggests that before treatment the amplitude of the electromyogram of the right masseter muscle is larger, which means that it has performed chewing movements more actively.

A characteristic indicator of the masticatory function recovery is the activity coefficient of the masticatory muscles, which indicates changes in the activity time and rest time of the masticatory muscles when performing their functions. These changes can be traced in patients of the researched group one year after the treatment (table III).

The "K" coefficient in the researched group is gradually approaching the normal results (0.91 ± 0.06 and 0.98 ± 0.03), which indicates an improvement in the adaptation of the patients of this group to therapeutic measures after the treatment.

In our opinion all manifestations of increased abrasion of teeth are associated with changes in the system of muscles, the motor apparatus and the nervous activity of the body. Regarding to this, the study of the directly muscular system and the related bone system can justify the use of one or another plan for the prevention and treatment of pathology, which is being studied.

CONCLUSIONS

Based on our observations, we can conclude that the study of the functional state of the muscle complex is a fairly reliable prognostic sign in the study of diseases such as increased abrasion of teeth.

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THE DYNAMICS OF BLOOD PRESSURE OF DIFFERENT AGE PATIENTS GROUPS WITH HYPERTENSION AND DIABETES TYPE II AFTER CORRECTION OF CAROTID STENOSIS

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ABSTRACT

Introduction: hypertension and diabetes remain the main risk factors for stroke, which leads to premature disability and mortality.

The aim: To study the dynamics of blood pressure (BP) in patients of different age groups with hypertension and diabetes type II before and after carotid endarterectomy. **Materials and methods:** 90 patients with hypertension and diabetes type II were selected for CE. Patients are divided into two age groups: up to 65 years (group 1) and after 65 years (group 2). We assessed the dynamics of ambulatory blood pressure monitoring (ABPM). The examination was carried out 2 days before and 6 months after surgery. CE was conducted under local anaesthesia.

Results: Before operation in patients in group 2, there was a significantly higher level of average systolic BP per 24 hours (p < 0.02), per day (p < 0.01), per night (p < 0.01) and diastolic BP per night (p < 0.01). At the preoperative stage, there was a significant increase in the parameters of the variability of BP, but the increase in the variability of BP with age was not fixed. After surgery, patients with Group 1 observed a more significant positive dynamics of ABPM indices than patients in Group 2. In two age groups, the percentage of patients with an insufficient reduction of BP at night was prevalent.

Conclusions: Surgical treatment of carotid stenosis is associated with a steady decrease in BP in the distant period after CE. Significant regression of BP is characteristic for patients of the younger age group.

KEY WORDS: hypertension, carotid stenosis, diabetes, carotid endarterectomy

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INTRODUCTION

Hypertension is diagnosed in 35-40% of the Earth's population. According to the forecasts of different authors, these figures will increase, and till 2025, the number of people with this pathology will reach to 1.6 billion people [1,2]. The benefit of correction of blood pressure has been proven not only as a result of a large number of multicenter researches but also in a real increase of life expectancy in Western Europe and in the US [3,4]. It is known that hypertension is one of the most common modifying risk factors for cardiovascular disease (CVD) and death rate in the whole of the world. Hypertension is the cause of at least 70-75% of stroke and remains the main risk factor for a number of cardiovascular complications that lead to premature disability and death rate [5]. Another major risk factor for CVD is diabetes. Over 400 million people suffer from diabetes in the world, and more than a million patients in Ukraine [1]. There sults of a twenty-year populations urvey in the Netherlands have shown hat diabetes type II increases the risk of stroke by 2-6.5 times in women and 1.5-2 times in men [6]. According to official statistics, 80% of patients with diabetes type II maturates hypertension [1]. Among patients with hypertension, the prevalence of diabetes is 2-2.5 times higher than in people with normal blood pressure (BP) [2]. Among the patients with hypertension, the prevalence of diabetesis 2-2.5 times higher than in people with normal blood pressure [2]. It has been shown that in patients with diabetes, systolic blood pressure (SBP) correlates with the development on macro- and micro vascular complications. The risk of the stroke, in comparison with hypertension and diabetes, is 66% is higher in men than in isolated people of the hypertension group. At the sametime, the reduction of SBP forevery 10 mmHt. reduces the risk of micro- and macrovascular complications by 12-19% [6,7].

In most cases, acute and chronic impaired cerebrovascular flow is associated with the pathology of the major arteries of the head [5]. Some authors studied the attempt the reducing of blood pressure after carotid endarterectomy (CE) as one of the mechanisms of reduction of blood pressure by surgical intervention in this group of patients [8,9,10,11,12]. However, there is no definite idea about the existence of a central mechanism for the development of hypertension in patients with carotid stenosis.

THE AIM

The aim of the research is to study the features of the dynamics of blood pressure in patients of different age groups with hypertension and diabetes type II before and after surgical treatment of carotid stenosis.

	The average value of M $\pm \sigma$				
ldexes, mmHg	group 1, n= 42	group 2, n= 48			
Middleage, age	57,4±3,17	69,4±4,16*			
SBP per 24 hours	144±11,7	154±13,2*			
SBP per a day	145±11,0	156±13,0*			
SBP per a night	135±14,0	149±14,3*			
DBP per 24 hours	87±9,0	93±10,5			
DBP per a day	90±9,3	95±11,9			
DBP per a night	80±11,1	89±9,8*			
HR	57±11,0	61±10,2			

Table I. Results of preoperative ABPM in two age groups.

Notes: M- mean value; σ - standard deviation; * -confidence of changes between groups 1 and 2, p <0,05.

Table	II. Resu	lts of the	variabilit	y of BP	before surg	jery.
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Idexes Variability of BP, mmHg —	The average value of M $\pm \sigma$				
idexes variability of br, mining	group 1, n= 42	group 2, n= 48			
SBP per 24 hours	17,4±2,81	16,9±3,7			
SBP per a day	16,4±3,22	15,7±3,36			
SBP per a night	14,5±4,0	14,5±3,35			
DBP per 24 hours	13,3±2,10	12,7±2,80			
DBP per a day	12,1±3,11	11,8±2,7			
DBP per a night	11,9±2,65	11,5±3,25			

Notes: M- mean value; σ - standard deviation; * -confidence of changes between groups 1 and 2, p < 0,05.

MATERIALS AND METHODS

Ninety patients with hypertension and diabetes type II were selected for examination in the department of vascularsurgery of the Lviv regional clinical hospital from 05.19.2015 till 25.06.2018 for the purpose of conducting out the KE. The age of patients ranged from 47 to 74 years (the mean age of patients was $60,5 \pm 7,5$ g.). Patients were divided in to two age groups: upto 65 years (group 1) and after 65 years (group 2). The group 1 included 42 patients, the group 2- 48 patients. At the initial stages of the study, a special card was developed the peculiarities of the dynamics of ambulatory blood pressure monitoring (ABPM). The survey was conducted 2 days before the operation – the first survey (1 review), and 6 months after the operation – the second examination (2 review). KE was conducted under local anaesthesia.

ABPM was performed by the oscillometric method with the device AVRM-04 (Hungary). The measurement of BP was performed every 15 minutes during the daily activity and every 30 minutes during the night sleep. The standard in dicators of ABPM were studied: mean systolic blood pressure (SBP) and diastolic blood pressure (DBP) per 24 hours, day (when the patient is awake) and night (during sleep); heart rate (HR); variability of SBP and DBP for 24 hours, day, night; the degree of nightly decrease in blood pressure.

In carrying out the research, we used the regulatory values of blood pressure, as stipulated in the European guidelines for diagnosis and treatment of hypertension (ESH / ESC Guidelines, 2018). The average daily blood pressure <130/80 mmHg was considered normal, the average blood pressure in the day was <135/85 mmHg, at night - <120/70 mmHg.

It was studied the degree of daily oscillation BP, which was calculated by standard methods of variation statistics. According to these recommendations, the increased variability is the value of the standard deviation from the average BP, which exceeded 15/14 mmHg in the daytime, at 14/12 mm Hg at night for SBP / DBP [13].

The nature of the circadian profile of BP was evaluated according to the daily index (DI) of BP. This is expressed as a percentage of decrease in BP in the passive period of a day (during the sleep) compared with the active period. Evaluating the degree of nightly decrease in BP, distinguished the following types of daily profile: dipper - a person with a normal decreasein BP at night, nondipper - a person with insufficient decrease in BP at night, hyperdipper - a person with excessive decrease in BP at night, nightdipper - a person with excessive increasein BP at night. Statistical results of the material were performed using Excel 7.0 and SPSS version 10.0 using Student's t-criterion to establish the reliability of the differences between independent samples and the Wilcoxon-rank test non-parametric t-criterion to determine the reliability of the differences between dependent samples.

		Group 1	Group 2		
ldexes, mmHg	Before surgery, 1review	6 months after surgery, 2 review	Before surgery, 1review	6 months after surgery, 2 review	
SBP per 24 hours	144±11,7	121±11,8*	154±13,2	148±13,0*	
SBP per a day	145±11,0	125±11,9*	156±13,0	149±13,2*	
SBP per a night	135±14,0	112±13,7*	149±16,3	146±14,2*	
DBP per 24 hours	87±9,0	75±9,1*	93±10,5	88±8,7*	
DBP per a day	90±9,3	80±8,9*	95±11,9	90±10,7*	
DBP per a night	80±11,1	67±8,2*	89±9,8	87±8,8	
HR	57±11,0	46±9,7*	61±10,2	60±9,8	

Table III. Results of postoperative ABPM in two groups.

Notes: M - mean value; σ - standard deviation; * - the reliability of the changes between 1 and 2 examinations, p <0,05.

Table IV. Results of the dynamics of the variability of blood pressure 6 months after the operation.

		Group 1	Group 2		
Idexes variability of BP, mmHg	Before surgery, 1review	6 months after surgery, 2 review	Before surgery, 1review	6 months after surgery, 2 review	
SBP per 24 hours	17,4±2,81	14,1±2,54*	16,9±3,7	15,9±3,45*	
SBP per a day	16,4±3,22	14,0±2,98*	15,7±3,36	14,9±3,02	
SBP per a night	14,5±4,0	12,5±3,7*	14,5±3,35	13,4±4,84*	
DBP per 24 hours	13,3±2,10	11,4±1,94*	12,7±2,80	11,2±2,03*	
DBP per a day	12,1±3,11	11,2±2,3*	11,8±2,7	11,1±2,4	
DBP per a night	11,9±2,65	10,0±2,08*	11,5±3,25	10,1±2,01	

Notes: M - mean value; σ - standard deviation; * - the reliability of the changes between 1 and 2 examinations, p <0,05.

RESULTS AND DISCUSSION

In table I is presented the results of ABPM in two groups in the pre-operative period of the survey.

At the stage of preoperative examination in both groups, all indicators of the DBPM went beyond the normative values. For patients in the older age group, higher BP attributes were observed, with a significantly higher level of average SBP per 24 hours (p < 0.02), per day (p < 0.01), per night (p < 0.01). Indicators of average DBP were significantly higher in group 2 only at night (p < 0.01), while in the afternoon and during the day no significant difference was observed. The HR level was higher than the normative values in both groups, but no statistical significance was observed.

In 6 months after CE, no stroke or transient ischemic attact was observed in any patient.

Analysis of variability of blood pressure in two age groups (Table II) during 1 volume. showed a significant deviation from the standards.

At the preoperative stage, there was a significant increase variability of the SBP per 24 hours and a day to a lesser extent, the variability of the DBP. This indicates an excessive degree of fluctuations in BP. It should be noted that the increase in the variability of blood pressure with age was not fixed. The results of the postoperative examination (Table III) showed a significant decrease in systolic and diastolic BP indices in two age groups.

Patients in group 1 had a more significant positive dynamics of ABPM indices than patients in group 2: mean SBP per 24 hours (p < 0.001 group 1 and p < 0.003- group 2), per day (p < 0.001- group 1 and p < 0.004 - group 2), per night (p < 0.002 - group 1 and p < 0.006- group 2); mean DBP per 24 hours (p < 0.002 - group 1 and p < 0.008 - group 2), per day (p < 0.004 - group 1 and p < 0.005 - group 2), per night (p < 0.007 - group 1 and p > 0.05 - group 2), per night (p < 0.007 - group 1 and p > 0.05 - group 2). Taking into account that the decrease in SBP was more significant than the DBP, we received significant positive changes in HR in group 1 (p < 0.05). Patients in the older age group did not have a reliable positive dynamics of the middle night DBP and HR.

Table IV. presents the results of the dynamics of variability of BP in two age groups 6 months after CE.

Patients in the younger age group recorded significant positive dynamics of all indicators of the variability of BP. There was a significant decrease in the average daily values of the variability of SBP (p < 0.002) and DBP (p < 0.001). In the 2nd group, there was a less pronounced positive dynamics of the variability of BP: SBP per 24 hours (p < 0.02), per night (p < 0.01) and DBP per 24 hours (p < 0.03). There



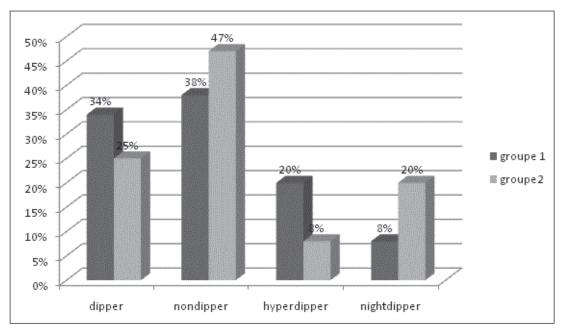


Fig. 1. The distribution of patients of two groups by types of daily profile before surgery.

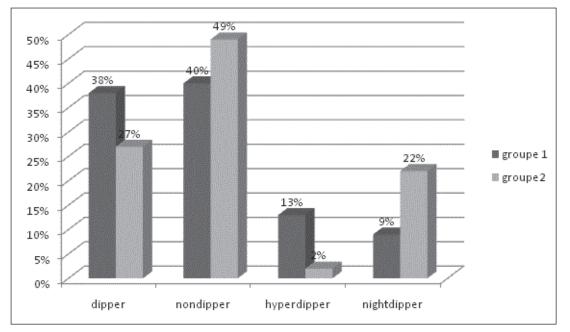


Fig. 2. The distribution of patients of two groups by types of daily profile 6 months after surgery.

was no reliable positive dynamics variability of BP per a day and variability of DBP at night.

Figure 1 shows the distribution of patients in two age groups by type of daily profile, according to the level of the daily BP index during preoperative and postoperative examinations.

In two age groups, the percentage of patients with an insufficient reduction of BP at night was prevalent. Patients in the elderly group had a higher percentage of patients with a nondipper-type daily profile (group 2 -47% of patients, group 1 - 38% of patients) and a significant percentage of patients with nocturnal hypertension (group 2 - 20% of patients, group 1 - 8% of patients), however, patients with excessive reduction of BP at night (hyperdipper) were less (group 2 - 8% of patients, a group 1 - 20% of patients). It is believed that the type of daily hyperdipper profile may be accompanied by an increased risk of stroke.

During the 2nd round (Fig. 2) in two age groups, we observed a slight increase in patients with nondipper's daily profile and a decrease in the percentage of patients with with excessive reduction of BP at night (hyperdipper), but the results were unreliable. In two groups, the percentage of patients with a nightly increase in BP (nightdipper) increased. At the same time, no reliable positive dynamics of the daily BP index in the two age groups was observed. This dynamics of circadian types can be explained by a decrease in the daily values of BP and an inadequate decrease in BP at night.

CONCLUSIONS

Patients older than 65 years with carotid pathology and associated hypertension and typeII diabetes are diagnosed with higher blood pressure than in the younger age group.

The daily profile of BP in two age groups was characterized by a significant proportion of patients with an insufficient reduction in BP at night (nondipper).

Surgical treatment of carotid stenosis is associated with a steady decrease in BP in the distant period after CE. Significant regression of BP is characteristic for patients of the younger age group.

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PRACA ORYGINALNA ORIGINAL ARTICLE



CHRONIC FATIGUE DEVELOPMENT OF MODERN HUMAN IN THE CONTEXT OF V. VERNADSKY'S NOSOPHERE THEORY

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ABSTRACT

Introduction: The existence of the noosphere as a sphere of mind influences human life processes, particularly their physical and mental health, directly. That is why a need arises to consider the biosphere development in the context of the "boom" of scientific thought and noosphere with its processes affecting human health.

The aim: The research purpose is to reveal the influence of noospheric processes on human health, in particular the information flow effects on human morphofunctional state expressed as chronic fatigue.

Materials and methods: A complex of study methods was used in the research: general scientific (analysis, synthesis, comparison, correlation, systematization, generalization) and empirical (observation, conversation, questionnaire). The research was conducted within the framework of "Axia" international project (Innovation in Education). For the stated research purpose achievement subjective state diagnostic technique of "WAM" as used, intended for the qualitative subjective evaluation of three main functional psycho-emotional human states: well-being, activity and mood.

Respondents of three age groups were involved in the research, 347 people in each group. The first group included the responders aged 14 to 19; the second group included the responders aged 19 to 35; the third group consisted of the respondents aged 35 to 60.

Results: The research results confirmed that the noospheric processes are followed by the acceleration of human life pace, information pressure causing the development of human mental fatigue, energy depletion, tiredness and chronic fatigue. The results of empirical studies of the influence of the noospheric processes anthropoprice on the human well-being, activity and mood showed the dependence of the positive integral estimation of human subjective state on the orientation towards life-long learning, personal values regardless of the age. **Conclusion:** The proposed article reveals the influence of noospheric processes on human morphofunctional state, scientifically grounds the connection and dependence of human tiredness on the noospheric processes anthropoprice.

KEY WORDS: biosphere, noosphere, noospheric processes anthropoprice, chronic fatigue

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INTRODUCTION

Modern science, including medicine, considers this or that phenomenon in terms of a particular system. In the vast majority of cases the system includes the components spread within the local territory and on a particular part of the globe. However, the biosphere and its altered form the noosphere — remain neglected as integral formations.

The processes occurring in the biosphere modified as a result of human activity can cause changes in the physical and functional state of a person. The necessity arises for the study of the noosphere processes affecting the human morphofunctional state that results in their chronic fatigue.

THE AIM

The objective of the article is to demonstrate the need to study various aspects of human existence with due account for the processes occurring in the biosphere; to reveal the dependence of modern human chronic fatigue emergence and development on the processes occurring in the noosphere.

The research tasks are: 1) to characterize the process of the biosphere transformation into the noosphere on the basis of the analysis of V. Vernadsky's scientific developments; 2) to find out the processes of the noosphere formation in the conditions of the post-industrial society rapid transition from the information society stage to the knowledge society stage and the rapid development of the latter; 3) to distinguish the noospheric processes adversely affecting human health; 4) to generalize the results of scientific research in the context of psycho-physiological mechanisms of chronic fatigue formation and development; 5) to reveal the essence of the phenomenon of "noospheric processes anthropoprice"; 6) to find out the factors slowing down the chronic fatigue development under the noospheric processes conditions.

MATERIALS AND METHODS

A complex of methods was used in the research: general scientific (theoretical analysis, synthesis, comparison, correlation, systematization, generalization) and empirical (observation, conversation, questionnaire) with the use of subjective state diagnostic technique of "WAM" (V. Doskin, N. Lavrentjeva, V. Sharai, M. Miroshnikov, 1973) intended for the qualitative subjective evaluation of three main functional psycho-emotional human states — well-being, activity and mood — at the moment of examination. The research was conducted within the framework of "Axia" international project.

Respondents of three age groups were involved in the research, 347 people in each group. The first group included the responders aged 14 to 19; the second group included the responders aged 19 to 35; the third group consisted of the respondents aged 35 to 60. The respondents were divided into the age groups as recommended by the psychologist E. Erikson [1].

RESULTS AND DISCUSSION

The notion of "noosphere" was introduced into the scientific discourse by Le Roy [2]. It combines the words "nous" (the Greek for "*mind*") and "sphere" (meaning the "*Earth's envelope*"). The term "noosphere" was introduced into the scientific discourse in the early 20th century by V. Vernadsky who was exploring the biogeochemical foundations of the biosphere and individuated a separate scientific discipline of biogeochemical study of the biosphere served the investigation of biological processes in their elemental composition, since the subject of the study included geological life manifestations in the biosphere and biochemical processes inside the organisms inhabiting the planet.

As defined by V. Vernadsky, the biosphere is presented in biogeochemistry as "a peculiar Earth's envelope, clearly distinct on our planet, consisting of some concentric contiguous formations surrounding the whole Earth, called geospheres. The biosphere has possessed this perfectly definite structure for billions of years. This structure is connected with the active participation of life" [3, p. 137]. According to the scientist, the living matter of the biosphere is a carrier and generator of free energy called biogeochemical energy. This type of energy filling the entire biosphere not only causes the migration of chemical elements, but also dramatically changes their intensity, and therefore generally determines the history of the development of the biosphere, its geological significance and serves as the basis for the transition to the noosphere. In the context of this process human being is considered as a defined function of the biosphere in its defined time space and as a designated regular part of the structure of the biosphere, which will inevitably transfer (one way or another, sooner or later) into the noosphere.

The biosphere transformation into the noosphere occurs during the scientific thought "boom", that is its rapid growth, the development of science and social labor, based by the humanity on scientific results. According to V. Vernadsky, the noosphere is a "biosphere elaborated by the scientific thought that has been prepared for hundreds of millions, or perhaps billions of years, in the process created by Homosapiens. Without stopping and without moving backwards, the process of biosphere transition into noosphere slows down or speeds up in case of a scientific thought «boom»" [4, p. 56].

Under the conditions of the information society development the noosphere is characterized by the absence of time and spatial boundaries, and innovative information and communication technologies provide new opportunities for the "boom" of the 21st century scientific thought and the extension of scientific results to the cultural, industrial, socio-economic and political processes of regional, state and planetary scale.

Noospheric processes are followed by: life pace acceleration, work execution in a compressed time frame, high density of information signals, high responsibility for the quality of work performed, urbanization, information pressure, stress, psychic tension aggravation, adynamia, high labor intensity, tension due to the choice of challenge implementation ways, etc. The stated processes affect the morpho-functional state of human body regardless of their age, gender, social and financial situation.

In the context of noospheric processes with the deficiency of proper rest, complete restoration of efficiency and body functional state a person suffers mental tiredness development, fatigue, chronic fatigue, chronic tiredness "build-up" resulting in chronic fatigue syndrome, burnout syndrome, etc.

According to H. Pyshnov, the occurrence of tiredness is characterized by "a set of temporal changes in the person's physiological and psychological state, developing as a result of intense or prolonged activity, that leads to the deterioration of quantitative and qualitative performance parameters followed by a decrease of the body functional reserves and is characterized by physiological functions discoordination and work physiological cost increase" [5, p. 8]. Scientists have found that the processes of tension and fatigue development occur in the human body with a certain synchronicity initiating each other. Herewith, the tension is aimed at the physiological processes intensification for the activity purpose implementation, and fatigue is targeted at the body functional reserves realization and the body preservation from excessive loads and exhaustion.

Excessive fatigue of systematic nature causes chronic tiredness (chronic fatigue). Herewith morphofunctional changes are observed building up in the human body over a long period of time (months, years) as a result of labor activity and are characterized by body functional reserves gradual exhaustion, stable systemic mental and physiological solaces of nonspecific nature.

In accordance with P. Anokhin's theory of functional systems, the following symptoms are observed during chronic fatigue formation period: 1) synapses hyperactivation (chronic fatigue development is followed by the formation of new neural connections providing morphofunctional alterations relevant to the load levels); 2) neuronal tissue

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degeneration, neurons involution (there is an incoherence between the functional system neural organization and information load requirements).

In the context of the above it is significant to introduce the notion of the "*price of a certain activity*" regarding the "psychophysiological costs of internal resources at the expense wherewith a person performs this activity" [6, p. 4].

A. Karpukhina, V. Rozov [7] reveal the essence of the notion of "price" through the distinction of three concepts: personal "price" (determined by the changes in the person's stable traits); perceived "price" (reflecting the degree of mental comfort-discomfort); 3) somatic "price" (physiological subsystems functioning indicator evident through various somatic symptoms and syndromes).

O. Kokun [8] describes the concept of "adequate price" as an optimum ratio between the activity effectiveness and the cost of the human body psychophysiological resources. An increase of the adequate "price" evidences the activity efficiency preservation at the expense of the body psychical and physical reserves exhaustion, increase of the efficiency restoration period to the normal level that can lead to health deterioration and various diseases occurrence.

The introduction of the notion of "noospheric processes anthropoprice" into the scientific discourse is substantiated by the necessity to explain various manifestations of (optimal, long-term, excessive) human body internal resources psychophysiological cost under the conditions of scientific thought "boom" and the subsequent biosphere intensive elaboration by the scientific thought.

The noospheric processes anthropoprice is characterized by two indicators: 1) optimal; 2) excessive. In the vast majority of cases the noospheric processes anthropoprice is excessive as it causes long-term and undue psychophysiological costs of the human body internal resources caused by the phenomenon called "human gap" by B. Sitars'ka [9]. The phenomenon essence is in permanent retard of the person's acquired knowledge and skills from the pace and effects of changes occurring in the society.

The changes of the human body resulting from long and excessive psycho-physiological costs of its internal resources were investigated by H. Pyshnov. The scientist pointed out that "for the professional activity under the conditions of chronic fatigue development the human body synthesizes new functional systems formed through neural paths reorganization through one of two non-specific mechanisms: of "moderate" type (the body still has functional reserves allowing to maintain certain psychophysiological functions at a high level); "expressed" type (the body functional reserves are mostly decreased, and the levels of all psychophysiological functions become lower) [5, p. 23].

According to the results of O. Yeshchenko's investigation, 40% of respondents smoke 0.5 pack of cigarettes a day, and 20% smoke 1 to 2 packs. The above confirms "the existence of acute need for the body artificial stimulation to overcome fatigue or stress" [10, p. 7]. Other scientist's findings also attract the attention, in particular those stating that the condition of low mood, sadness and apathy cause addiction to unhealthy habits, which, in turn, indicates decrease of the body's resistance to environmental exposure.

H. Zaikina [11] pointed out that the increase of the specific weight of emotional instability cases and marginal neurotic disorders indicates over-strain caused by increased information load; hence consequent body exhaustion resulting from pronounced fatigue.

According to M. Antropova and V. Kozlova's theory mental fatigue development caused by over-strain of the main regulatory systems affected by mental load is evidenced by a decrease in mental performance efficiency combined with diurnal adaptability low negative value [12].

Considerable researchers' attention is given to the issue of the human body internal resources psychophysiological cost reduction under the conditions of modern society. Scientific works propose various approaches, such as: mental activity efficiency forecasting with the use of psychophysiological rating based on the individual typological personal qualities [13]; mathematical calculation of potential of cardiovascular system adaptation to mental load [14]; determination of types of human body response to information load according to the results of heart rate variability spectral analysis [15]; determination of desadaptive body disorders under industrial stress conditions on the basis of the fatty acids ratio in human sweat.

The results of the investigation performed by the authors of the article showed that the presence of a certain indicator of noospheric processes anthropoprice (optimal, excessive) depends on three factors: 1) orientation towards life-long learning (presence/absence); 2) level of life-long learning (active/passive/situational active-passive); 3) life-long learning attribution to certain components of the human psychic phenomena world (personal values /internal motives/external motives).

Respondents aged 14 to 19 (Group I), 19 to 35 (Group II) and 35 to 60 (Group III) were involved in the experimental investigation. The analysis of the respondents' body functional state was performed with the use of subjective state diagnostic technique of "WAM" (hereinafter referred to as the "«WAM» method"). The obtained results were used to calculate the indexes of well-being, activity, mood and for the respondents' subjective state integral assessment.

The cross-correlation analysis conducted allowed to establish the dependence of the positive subjective state integral assessment of three groups of respondents (regardless of their age) on the following: orientation towards life-long learning; active level of life-long learning; lifelong learning attribution to personal values. It should be emphasized that virtually the same results were obtained for the respondents from the three groups, so henceforth we will refer to the average data fully regarding each of the three groups of respondents.

As Figure 1 shows, the above-mentioned correlation was established for 6.1% of respondents. According to the results of the "WAM" method, these respondents showed positive subjective state integral assessment. On the basis of the obtained results they were united into a group called "optimal noospheric processes anthropoprice".

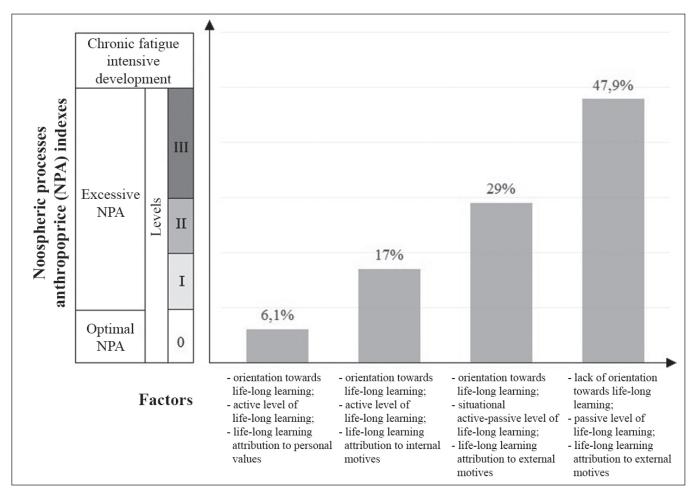


Figure 1. Respondents classification pursuant to noospheric processes anthropoprice in accordance with the indicators (optimal, excessive) and factors (orientation towards life-long learning (presence/absence); level of life-long learning (active/passive/situational active-passive); life-long learning attribution to certain components of the human psychic phenomena world (personal values/internal motives/external motives)).

As to 17% of respondents ("first-level excessive noospheric processes anthropoprice" group) — orientation towards lifelong learning; active level of life-long learning; life-long learning attribution to internal motives. The integral assessment of the subjective state of this category of respondents revealed a decrease of well-being indexes against the background of activity demonstration and psychical states fluctuations (from enthusiastic to working state, and then to fatigue).

29% of respondents ("second-level excessive noospheric processes anthropoprice" group) demonstrated orientation towards life-long learning; situational active-passive level of life-long learning; life-long learning attribution to external motives. The results of the integral assessment of the subjective state of this category of respondents showed significant decrease of well-being indexes against the background of activity fluctuations (active-passive-active) and pronounced psychical states transitions (from working state to depression, and then to fatigue).

47.9% of respondents (third-level excessive noospheric processes anthropoprice) showed the lack of orientation towards life-long learning; passive level of life-long learning; life-long learning attribution to external motives. The integral assessment of the subjective state of this category

of respondents showed low well-being indexes against the background of passivity and accelerated psychical states transitions (from the working condition caused by the actions of others to fatigue).

The investigation results also showed that 6.1% of respondents attributed new knowledge acquisition to personal values. The conversations with these respondents revealed that new knowledge attribution to personal values resulted in motivation to succeed during any activity performance. The sensation of success approach slowed the occurrence of tiredness, thus increasing the duration of optimal efficiency and optimal strain. Other respondents attributed to personal values: self-development (32% of respondents aged 14 to 19); learning (30% of respondents aged 19 to 35); work (87% of respondents aged 35 to 60). These respondents were internally motivated to avoid failure in the activities performing process, which, in turn, expedited the occurrence of tiredness and increased the strain during the activity performance.

CONCLUSIONS

On the basis of the scientific literature analysis it was determined that the noosphere is the biosphere elaborated by the scientific thought. Noospheric processes are followed by such processes as: life pace acceleration, work execution in a compressed time frame, high density of perceived signals, high responsibility for the quality of work performed, urbanization, information pressure, information stress, aggravated psychoemotional tension, high labor intensity, etc.

The notion of "noospheric processes anthropoprice" was introduced into the scientific discourse, the essence whereof the authors explain as the manifestation of (optimal, long-term, excessive) human body internal resources psychophysiological cost under the conditions of scientific thought "boom" and subsequent biosphere intensive elaboration by the scientific thought. The noospheric processes anthropoprice is characterized by two indicators: optimal; excessive.

According to the investigation results the dependence of the person's subjective state positive integral assessment regardless of their age on orientation towards life-long learning, active level of life-long learning, life-long learning attribution to personal values was established.

It was scientifically proven that excessive noospheric processes anthropoprice is observed in the cases when: 1) a person demonstrates orientation towards life-long learning, shows activity aimed at life-long learning, attributes life-long learning to internal motives; 2) orientation towards life-long learning, situational active-passive level of life-long learning, life-long learning attribution to external motives are observed; 3) lack of orientation towards lifelong learning, passive level of life-long learning, life-long learning attribution to external motives.

It has been proven that chronic fatigue development under the conditions of noospheric processes is significantly slowed down if the modern human are oriented towards life-long learning, demonstrate activity aimed at constant new knowledge acquisition, level life-long learning up to the rank of personal values.

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CLINICAL LABORATORY ANALYSIS OF MAXIMUM INTERCUSPATION REGISTRATION RESULTS IN PATIENTS WITH INTACT DENTITIONS

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ABSTRACT

Introduction: In modern dental prosthetic practice, there often occur inconsistencies of occlusion in oral cavity and on cast dental models, leading to search for a solution to the problem of improving the registration accuracy of occlusal relationships of dentitions.

The aim: Clinical laboratory study of bite registration materials selected efficiency.

Materials and methods: Examination of 10 patients was conducted. Registration biomaterials: Consiflex, Aluwax, Futar D were successively placed on occlusal surfaces of each patient. After polymerization of registration materials, determination of biometric deviation of markers from complementary position in the regions of dentitions under study was performed. Clinical measurements of BDM values were performed with an accuracy of ±0,01 mm

Results: During clinical examination using Futar D, BDM index in the region of teeth 16-46 reached (0,055±0,05) mm, 26-36 – (0,065±0,05) mm, 13-44 – (0,075±0,04) mm, 23-34 – (0,075±0,06) mm, 21-31 – (0,015±0,02) mm. In case of using aluwax, BDM index in teeth 16-46 was (0,075±0,04) mm, 26-36 – (0,11±0,07) mm, 13-44 – (0,08±0,04) mm, 23-34 – (0,09±0,07) mm, 21-31 – (0,02±0,03) mm. Application of Consiflex demonstrated BDM index in teeth 16-46 was (0,075±0,06) mm, 26-36 – (0,11±0,07) mm, 13-44 – (0,08±0,04) mm, 23-34 – (0,013±0,06) mm, 23-34 – (0,014±0,07) mm, 21-31 – (0,045±0,04) mm.

Conclusions: Clinical and laboratory research with the use of Futar D registration materials in patients with intact dentitions demonstrated lower optimum of differences between BDM indices in comparison with Consiflex and Aluwax.

KEY WORDS: bite registration material, maximum intercuspation registration, intact dentitions

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INTRODUCTION

At the present stage of development of dental care, patients become increasingly aware of the need to improve the quality of the restoration procedure results, and require longer life expectancy of prosthetic constructions used. It is proved that the quality and functionality of the fabricated dental prostheses are directly related to the restoration of tooth occlusal surface, which provides mastication, the main function of dentofacial system [1,2], whereas area and relief of masticatory surface determine efficiency of mastication in all patients [3,4]. Therefore, the efficiency of prosthetic dental treatment of patients largely depends on the unobstructed occlusal relationships to which patients are rapidly adapted. Wiskott & Belser presented in their study an overview of the development history of various occlusal patterns, and found that the desired occlusion during restoration treatment depends on the number of perfectly positioned occlusal contacts, action of functional and parafunctional forces, directed solely along tooth axis, the position of terminal transverse horizontal axis, the amplitude of lateral free movements, the dependence of tooth position on the duration of low intensity forces. Jenkelson presented research data, according to which stimulation of cranial nerves V and VII with the help of a myomonitor was determined as a method of obtaining the position of "physiological rest" of muscles that substantiated the neuromuscular position of occurrence of usual adaptive occlusion [5]. Slavichek [6], 1983, used the terms "reference position" (RP) and "deranged reference position" (DRP) instead of the terms "centric occlusion" and "adaptive centric position". The term "reference position" (RP) defined the posterior marginal position of the lower jaw in the unloaded state of temporomandibular joint (TMJ).

Reference position of TMJ with disc dislocation was defined as "deranged reference position" (DRP). Some researchers believe that there is no established "gold standard" method for recording the inter-maxillary ratio of patients [7-9]. Ideal occlusion is simultaneous occurrence of contacts in the region of adjacent teeth. It is known that such contacts are less pronounced in the frontal region, because excessive contacts during joining of anterior teeth may result in tooth loosening and an increase in interdental space. In order to optimize the distribution of masticatory load, an increase in the number of occlusal contacts in the region of buccal teeth is required, as studies showed that it is precisely in the region of lateral segments of the jaws where the maximum masticatory effort is developed, regardless of the number of such contacts. Thus, scientific and practical studies of the last century, carried out in the domain of gnathology have shown that in patients with no occlusive disorders in the position of maximum joining of teeth, an adaptive customized positioning of the jaws

with the highest possible number of antagonistic teeth contacts is provided. Also, a significant number of studies demonstrated the presence of pronounced variability among means and methods in registration of inter-maxillary occlusal interaction of antagonistic teeth, as well as the registration materials used in clinical dental practice [10], which requires special attention.

THE AIM

Clinical laboratory study of inter-maxillary relationships formation efficiency in patients in the position of maximum intercuspation (MIC) of jaws with the help of bite registration materials selected, for the improvement of quality of prosthetic treatment of patients with fixed dentures.

MATERIALS AND METHODS

Examination of 10 patients of both sexes aged 19 to 26 years, was conducted at clinical sites of the Department of Surgical and Prosthetic Dentistry of the Faculty of Postgraduate Education at Danylo Halytsky National Medical University of Lviv. Patients underwent general dental examination, and orthognathic bite, absence of dentition completeness defects and objective signs of dysfunctional changes in stomatognathic system according to the "short Hamburg test" (Ahlers H., Jakstat M., 2006) has been identified. Dental impressions of both jaws of all patients were received, their cast dental models were manufactured for laboratory study.

In order to determine clinically the results of recording inter-maxillary relationships in MIC position in patients, marking of antagonistic teeth in the lateral and frontal regions of the jaws was conducted. At this time, markers in the form of vertical complementarity lines on both sides of the dentitions under study (Fig. 1) were placed on vestibular surfaces of the first molars (along the midline of the mesial cusp 16,26), along the midline of the incisal cusp of canines 13-23 and the antagonistic premolars and central incisors (median line).

Vertical markers were immediately transferred on cast dental models according to I. Klineberg et co-work, 2015 technique. For this purpose, we applied molded ultrathin (0,1 mm) Isofolan bite splint, obtained after vacuum pressure on cast dental models with the help of MiniStar apparatus (Scheu Dental, Germany) (Fig. 2).

Then, registration biomaterials: condensed silicone (Consiflex, Ukraine), Aluwax (ADsystems, Germany), polyvinyl siloxane (Futar D, "Kettenbach GmbH & Co. KG") were successively placed in each patient along the regions of marking on occlusal surfaces of upper molars, and patients were asked to join dentitions, and to achieve maximum joining of antagonists (Fig. 3).

After polymerization (hardening) of the registration materials, determination of biometric deviation of markers (BDM) from complementary position in the regions of dentitions under study was performed. Clinical measurements of BDM values were performed using special calibration ruler with an accuracy of ± 0.01 mm (Fig. 4). At

the same time, both sagittal BDM value (in the region of molars and the contacting pair of canines-premolars) on the right and left sides of dentitions, and transversal BDM value (in the frontal region) were determined.

Values of BDM index in the specified regions of dentitions under study served as an objective criterion for expert assessment of the degree of registration accuracy of maximum intercuspation with the materials applied. The lower the index of discrepancy between sagittal-transversal BDM was in comparison with the reference level, the more precisely the registration material reproduced the achieved inter-maxillary relationship in the maximum cusp-fossa contact.

The results of clinical and laboratory measurements of biometric data were processed by variable-statistical analysis methods according to the Student's parametric criterion with confidence interval of representational significance (p < 0,05).

Members of commission noted that the documents submitted for consideration provide for the measures for observance of ethical and moral norms according to the principles of the Declaration of Helsinki, the Convention of the Council of Europe on Human Rights and Biomedicine, ICH GCP, and the respective statutory provisions of Ukraine.

Resolved: to give a positive opinion on carrying out scientific research with the involvement of a man for the preparation of thesis paper by T.R. Hlushko in "Clinical and instrumental substantiation of the efficiency of registration materials for establishing inter-maxillary relationships in patients with fixed dentures" for obtaining scientific degree of a Candidate of Medical Science (PhD).

RESULTS AND DISCUSSION

It was established during clinical examination of 10 patients that in case of application of Futar D registration material, BDM index in the region of teeth 16-46 reached $(0,055\pm0,05)$ mm, in the regions of teeth 26-36 it was $(0,065\pm0,05)$ mm (p<0,67). At the same time, BDM value in the region of teeth 13-44 was $(0,075\pm0,04)$ mm, and in the region of teeth 23-34 it made up $(0,075\pm0,06)$ mm (p<1,0). Study of the region of teeth 21-31 established that the value of BDM index was within the range of $(0,015\pm0,02)$ mm (Tab. I).

When using Aluwax as a registration material, the BDM index in the region of molars on the right was $(0,075\pm0,04)$ mm, while BDM index in the region of molars on the left reached $(0,11\pm0,07)$ mm (p<0,18). According to the results of our study, the BDM index in upper canines – lower premolars region on the right was $(0,08\pm0,04)$ mm, on the left side between these pairs of antagonists the index was $(0,09\pm0,07)$ mm (p<0,72). In the region of teeth 21-31, BDM index was determined within the range of $(0,02\pm0,03)$ mm (Tab. I).

When using Consiflex as a registration material, the BDM index in the region of molars on the right was (0,075±0,06) mm, while BDM index in the region of molars

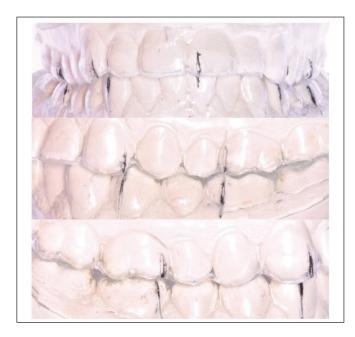


Fig 1. Markers on cast dental models in the form of vertical complementarity lines in maximum joining of teeth.



Fig 2. Preparation and pressing of ultrathin bite splint with the help of MiniStar apparatus.

on the left reached $(0,11\pm0,07)$ mm (p<0,26). According to the results of our study, the BDM index in upper canines – lower premolars region on the right was $(0,13\pm0,06)$ mm, on the left side between these pairs of antagonists the index reached $(0,14\pm0,07)$ mm (p<0,75). In the region of teeth 21-31, BDM index was determined within the range of $(0,045\pm0,04)$ (Tab. I).

Comparative study of BDM with the use of Futar D and Aluwax registration materials allowed to establish the absence of significant differences in the regions of teeth 16-46 (p<0,35), teeth 26-36 (p<0,11), teeth 13-43/44 (p<0,79), teeth 23-34 (p<0,63), teeth 21-31 (p<0,18). Comparison of Futar D and Consiflex registration materials applied, revealed an absence of significant differences in the regions of teeth 16-46 (p<0,42), teeth 26-36 (p<0,14), teeth 13-43/44 (p<0,06), and teeth 23-34 (p<0,06). In the region of teeth 21-31, a statistically significant intergroup difference between BDM parameters (p*<0,048) was revealed. Comparative study of BDM indices with the use of Consiflex and Aluwax registration materials allowed to establish the absence of significant differences in the regions of teeth 16-46 (p<1,0), teeth 26-36 (p<1,0), teeth 13-43/44 (p>0,08), teeth 23-34 (p<0,18), teeth 21-31 (p<0,10).



Fig 3. Marker on cast dental models (left) and in clinical conditions (right) during application of registration materials selected.

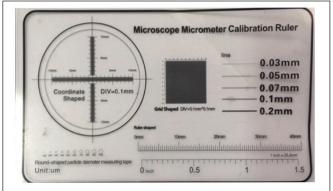


Fig 4. Calibration ruler for biometric determination of BDM indices.

During the laboratory study of cast dental models of 10 patients, it was found in MIC position that with the use of Futar D registration material, the BDM index in the region of teeth 16-46 was $(0,06\pm0,05)$ mm, and in the region of teeth 26-36 it reached $(0,07\pm0,05)$ mm (p<0,64). At the same time, the BDM index in the region of teeth 13-44 was $(0,085\pm0,03)$ mm and, respectively, in the region of teeth 23-34 it reached $(0,085\pm0,05)$ mm (p<1,0). In the region of teeth 21-31, the BDM index amounted to $(0,015\pm0,02)$ (Tab. II).

BDM index on cast dental models using Aluwax reached $(0,085\pm0,03)$ mm in the region of molars on the right, and

		Groups of teeth			
Registration biomaterial	right molars	canines (3)	central incisors (1)	canines/ premolars (3,4)	left molars
Futar D	0,055±0,05	0,075±0,04	0,015±0,02	0,075±0,06	0,065±0,05
Consiflex	0,075±0,06	0,13±0,06	0,045±0,04	0,14±0,07	0,11±0,07
Aluwax	0,075±0,04	0,08±0,04	0,02±0,03	0,09±0,07	0,11±0,07

Table I. Results of clinical comparative analysis of BDM index in inter-maxillary MIC position when using the registration materials under study (mm).

Table II. Results of laboratory comparative study of BDM indices in inter-maxillary MIC position with the use of the registration biomaterials under study (mm).

	Groups of teeth				
Registration biomaterial	right molars	canines (3)	central incisors (1)	canines/ premolars (3,4)	left molars
Futar D	0,06±0,05	0,085±0,03	0,015±0,02	0,085±0,05	0,07±0,05
Consiflex	0,085±0,05	0,14±0,05	0,05±0,03	0,15±0,05	0,12±0,06
Aluwax	0,085±0,03	0,09±0,04	0,02±0,03	0,10±0,06	0,12±0,05

 $(0,12\pm0,05)$ mm (p<0,10) in the region of molars on the left. According to the results of our research, BDM index in upper canines – lower premolars region on the right reached (0,09±0,04) mm, while it reached (0,10±0,06) mm (p<0,67) between these pairs of antagonistic teeth on the left side. In the region of teeth 21-31, BDM value is determined within the range of (0,02±0,03) mm (Tab. II).

BDM index on cast dental models using Consiflex registration material reached $(0,085\pm0,05)$ mm in the region of molars on the right, and $(0,12\pm0,06)$ mm (p<0,18) in the region of molars on the left. According to the results of our research, BDM index in upper canines – lower premolars region on the right reached $(0,14\pm0,05)$ mm, while it reached $(0,15\pm0,05)$ mm (p<0,67) between these pairs of antagonistic teeth on the left side. BDM index value in the region of teeth 21-31 was $(0,05\pm0,03)$ mm (Tab. II).

Comparative study of BDM with the use of Futar D and Aluwax registration materials allowed to establish the absence of significant differences in the regions of teeth 16-46 (p<0,18), teeth 13-43/44 (p<0,76), teeth 23-34 (p<0,57), teeth 21-31 (p<0,66). Presence of significant intergroup difference of BDM parameters (p*<0,04) was found only in comparison group in the region of teeth 26-36.

Comparison of BDM indices during application of Futar D and Consiflex registration materials, revealed an absence of significant differences in the regions of teeth 16-46 (p<0,25), teeth 26-36 (p<0,06). Presence of significant intergroup difference in BDM parameters was found, however, in comparison group in the regions of teeth 13-43/44 (p<0,01), teeth 23-34 (p<0,01), and teeth 21-31 (p<0,02).

Comparative study of BDM indices with the use of Consiflex and Aluwax registration materials allowed to establish the absence of significant differences in the regions of teeth 16-46 (p<1,0), teeth 26-36 (p<1,0), teeth 23-34 (p<0,07). Presence of significant intergroup difference in BDM parameters was found in comparison group in the regions of teeth 13-43/44 (p*>0,03) and teeth 21-31 (p*<0,04). We believe that the demonstrated statistical review of BDM indices requires further in-depth study by way of increasing the number of clinical studies of spatial characteristic of maximum intercuspation position, the habitual occlusion of patients with intact dentitions, as a representational tool for an appropriate assessment of modern registration materials.

CONCLUSIONS

- Clinical intergroup research with the use of Futar D and Consiflex registration materials in the region of antagonistic teeth 21-31 found the presence of significant representational difference (p*<0,048) between BDM indices, what should be taken into account during clinical monitoring of complementarity of inter-maxillary relationships with the use of the registration biomaterials under study.
- 2. Laboratory intergroup research with the use of Futar D and Consiflex registration materials in the region of antagonistic teeth 13-43/44, 23-34, 21-31 found the presence of significant representational difference (p*<0,01), (p*<0,01), (p*<0,02); presence of significant representational difference (p*<0,04) was established with the use of Futar D and Aluwax registration materials in the region of antagonistic teeth 26-36; presence of significant representational difference (p*<0,03), (p*<0,04) between BDM indices was found with the use of Consiflex and Aluwax registration materials in the region of antagonistic teeth 13-43/44, 21-31, what should be taken into account during clinical monitoring of complementarity of inter-maxillary relationships with the use of the registration biomaterials under study.
- 3. It was found that in the clinical study of patients with intact dentitions with the use of Futar D registration material, a lower optimum (lower limit 0,015 mm,

upper limit – 0,075 mm) of differences between BDM indices was observed, indicating a better complementarity during recording the maximum intercuspation of this material in comparison with Consiflex (lower limit – 0,045 mm, upper limit – 0,135 mm) and Aluwax (lower limit – 0,020 mm, upper limit – 0,11 mm).

4. It was found that in the laboratory study of patients with intact dentitions with the use of Futar D registration material, a lower optimum (lower limit – 0,015 mm, upper limit – 0,085 mm) of differences between BDM indices was observed, indicating a better complementarity during recording the maximum intercuspation of this material in comparison with Consiflex (lower limit – 0,05 mm, upper limit – 0,15 mm) and Aluwax (lower limit – 0,02 mm, upper limit – 0,12 mm).

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Authors' contributions:

According to the order of the Authorship

Conflict of interest:

The Authors declare no conflict of interest

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PRACA ORYGINALNA ORIGINAL ARTICLE



PSYCHOLOGICAL ASPECTS OF EXAMINATION OF OPHTHALMIC PATIENTS WITH DIABETIC RETINOPATHY

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ABSTRACT

Introduction: Nowadays there are a number of questionnaires with a score assessment of mental disorders. However, they are not adapted to the specific manifestations of DRP and require additional correction.

The aim: To determine the criteria of necessity of psychological help for the patient with DRP.

Materials and methods: 96 patients with DRP. The methods of the study were as follows: functional diagnostic examinations (visometry without correction and with optimal correction, direct and indirect ophthalmoscopy, optical coherent tomography of the retina and the optic disc); the assessment of mental state of patients using original and adapted tests.

Results: The criteria of necessity of specialized psychological help for the patient with DRP are: level of fatigue manifestations in points is higher than 33 for patients with NPDRP, 49 with PPDRP and 56 with PDRP (according to the mean values of the total score of MFI at the corresponding stage of DRP); veracity of at least 2 statements from the additional questions and/or high values (>12) of at least 2 MFI subscales; changes in cognitive function, classified as severe or moderate.

Conclusions: The integrated, modified questionnaire for patient's mental condition assessment, based on MFI for fatigue manifestations, MMSE for cognitive impairment and the additional questions provides a reliable way to determine the criteria for specialized psychological help necessity.

KEY WORDS: diabetic retinopathy, psychological help

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INTRODUCTION

Diabetic retinopathy (DRP) is a widespread and threatening problem. Of all registered cases of diabetes mellitus (DM) (366 million in 2011 with an estimated growth to 552 million in 2030 [1]) it develops in 30-60% [2]. After 10 years of the disease, most patients with DM have manifestations of DRP [3, 4]. DRP is a disruption of the retina functions, which leads to blindness and simultaneously to severe psychological complications in the patient due to progressive reduction of vision with a combination of diabetic encephalopathy signs. The clinical picture of diabetic encephalopathy is manifold, it is a pattern of cognitive impairments such as reduced memory and attention, worsening of orientation in time and space, decreased mental and physical capacity, sleep disturbance, emotional lability or depression, autonomic neurological disorders [5]. Similarly, any disruption of the visual function can be associated with a number of social and emotional complications [6, 7]. Up to 1/3 of people with various visual impairments have significant depressive manifestations [7]. Working adult population with vision impairments of any genesis often report general decrease in mental health, socialization and a lower quality of life compared to their healthy peers [8]. With DRP, this reduction in vision is progressive and more pronounced. Mental discomfort is also caused by the specificity of DRP treatment: vitrectomy, intravitreal administration of drugs,

a large amount of laser coagulation. The patient is afraid of the procedures and their complications, often doubts their effectiveness and is significantly frustrated after the smallest treatment failures. Also, the financial burden is a considerable problem due to the high cost of ophthalmic interventions. The combination of such mental complications with the progression of DRP and, consequently, steady loss of vision, contributes to the formation of a vicious circle, reducing the motivation to treatment and its effectiveness through all of the above mentioned problems [9]. Today professional psychological examination of patients in ophthalmology departments and hospitals is not provided, therefore it is important for ophthalmologists be able to singly and quickly assess the emotional and cognitive disturbances to determine whether a psychotherapist is required. With a timely detection of such manifestations and adequate elimination of them, it is possible to significantly improve the quality of life of the patient with DRP, to motivate for the necessary medical procedures, which will positively affect the outcome of treatment.

Nowadays there are a number of questionnaires with a score assessment of mental disorders. However, they are not adapted to the specific manifestations of DRP and require additional correction. All this determines the relevance of the problem of timely diagnosis of psychological disorders in patients with DRP.

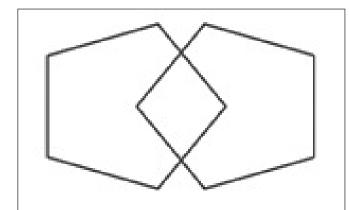


Fig. 1. 1 point

THE AIM

To determine the criteria of necessity of psychological help for the patient with DRP.

MATERIALS AND METHODS

On the basis of the Department of Otorhinolaryngology with Ophthalmology of the Ukrainian Medical Stomatological Academy and the Ophthalmology Department of the Poltava Regional Clinical Hospital named after M.V. Sklifosovsky 96 patients with DRP at different stages of development were examined, and were divided into three groups of observation. The study was conducted in compliance with ethical norms, and the norms of the Helsinki Declaration. All respondents filled out an informed consent to participate in the study. The age of patients was from 43 to 67 years (56 ± 0.7 years on average), there were 57 men and 39 women. The methods of the study were as follows: functional diagnostic examinations (visometry without correction and with optimal correction, direct and indirect ophthalmoscopy, optical coherent tomography of the retina and the optic disc); the assessment of mental state of patients using original and adapted tests.

The assessment of visual acuity was conducted in a welllit room, from a distance of 5 meters, using the EDTRS tables with Ukrainian optotypes (patent for utility model №117908 dated 10.07.2017) according to modified ETDRS tables №1, №2 (copyrights №73733, №73742 respectively). Indirect ophthalmoscopy was performed in a darkened room using the ophthalmoscope OZ-5. The examiner was at a distance of 40-50 cm from the patient, in the right arm took an ophthalmoscopic mirror, and in the left - a 13 D lens. The mirror was placed to the patient's eye, directing the reflected beams from the light source located behind and somewhat to the left from the patient, to the pupil of the examined eye, viewing it through the hole of the ophthalmoscopic mirror. After an even glow of the pupil is recieved, the examiner placed a magnifying glass at a distance of 7-8 cm from the eye (ophthalmoscope opening, center of loupe and the pupil should have been on one axis). Accommodating to the frontal plane, which is located in 5-8 cm from the loupe, the investigator could see as if in the air a true reverse and enlarged image of the fundus (in order to improve the observation, the pupil of the examined eye was dilated with mydriatics). For a detailed examination of the eye fundus, a direct ophthalmoscopy with an electric handheld ophthalmoscope HEINE mini 3000 was performed, also in a darkened room. The researcher pressed the device tightly to their eye and approached the eye of the patient (to a distance of 2-3 cm), directing a beam of light through the dilated pupil. After the image of the fundus appeared, a lens was adjusted by turning a large refractive disc, correcting the ametropia of the investidator and the patient to obtain a clear image. For ophthalmoscopy in a red-free light, a blue-green filter was introduced into the optical system by rotating the disk. Optical coherent tomography (OCT) of the retina and the optic nerve disk (Fig.1) was performed on the TOPCON 3D OCT-2000 Series device, mapping in the «Macula: 3D Scan» mode of 512x128, 6x6 mm. To analyse and measure the structure of the retina, the following reflections of the retina layers were used:

- the vitreoretinal interface,
- the nerve fibres layer,
- the ganglionic layer,
- the inner and the outer nuclear layers,
- the inner and outer plexiform layers,
- membrana limitans externa,
- the layer of rods and cones;
- the neuroepithelium,

- the pigmented layer and the layer of choriocapillaries. For the assessment of mental disorders we used the Multidimensional Fatigue Inventory (MFI, E.M. Smets et al., 1995) and the Mini-Mental State Examination (MMSE, M.F. Folstein et al., 1975). The Multidimensional Fatigue Inventory (MFI) by E.M. Smets, B. Garssen, B. Bonke, J. De Haes, 1995 includes 20 questions.

Table I. Results

Subscale	Statement Nº	Result (normal)
General Fatigue	1, 5 ,12,16	
Reduced Activity	3, 6, 10, 17	
Reduced Motivation	4, 9,15, 18	Not more than 12 points for each subscale
Physical Fatigue	2, 8, 14, 20	
Mental Fatigue	7, 11,13,19	
Total scor	e	Not more than 30

A patient evaluates their condition and grades each statement according to its truthfulness with a 5-point scale. 1. I feel fit.

- Yes, that is true 1 2 3 4 5 No, that is not true
- 2. Physically I feel only able to do a little.
- Yes, that is true 5 4 3 2 1 No, that is not true 3. I feel very active.
- Yes, that is true 1 2 3 4 5 No, that is not true
- 4. I feel like doing all sorts of nice things.
- Yes, that is true 1 2 3 4 5 No, that is not true 5. I feel tired.
- Yes, that is true 5 4 3 2 1 No, that is not true 6. I think I do a lot in a day.
- Yes, that is true 1 2 3 4 5 No, that is not true
- 7. When I am doing something, I can keep my thoughts on it.
- Yes, that is true 1 2 3 4 5 No, that is not true 8. Physically I can take on a lot.
- Yes, that is true 1 2 3 4 5 No, that is not true 9. I dread having to do things.
- Yes, that is true 5 4 3 2 1 No, that is not true 10. I think I do very little in a day.
- Yes, that is true 5 4 3 2 1 No, that is not true 11. I can concentrate well.
- Yes, that is true 1 2 3 4 5 No, that is not true 12. I am rested.
- Yes, that is true 1 2 3 4 5 No, that is not true
- 13. It takes a lot of effort to concentrate on things.
- Yes, that is true 5 4 3 2 1 No, that is not true 14. Physically I feel I am in a bad condition.
- Yes, that is true 5 4 3 2 1 No, that is not true 15. I have a lot of plans.
- Yes, that is true 1 2 3 4 5 No, that is not true 16. I tire easily.
- Yes, that is true 5 4 3 2 1 No, that is not true 17. I get little done.
- Yes, that is true 5 4 3 2 1 No, that is not true 18. I don't feel like doing anything.
- Yes, that is true 5 4 3 2 1 No, that is not true 19. My thoughts easily wander.
- Yes, that is true 5 4 3 2 1 No, that is not true
- 20. Physically I feel I am in an excellent condition.

Yes, that is true 1 2 3 4 5 No, that is not true (Table I) Mini-Mental State Examination (MMSE), M.F. Folstein, S.E. Folstein, P.R. McHugh, 1975.

- The patient must complete the task or answer the questions.
- "What is the year (1 point)? Season (1)? Month (1)? Date (1)? Day of the week (1)?"
- 2. "Where are we now: Region (1)? County (1)? Town/city (1)? Hospital (1)? Floor (1)?"
- 3. The examiner names three unrelated objects clearly and slowly, then asks the patient to name all three of them (like ball, man, car; flower, dog, table etc). 3 points.
- 4. "Spell WORLD backwards." 5 points.
- 5. "Earlier I told you the names of three things. Can you tell me what those were?" 3 points.
- 6. Show the patient two simple objects, such as a wristwatch and a pencil, and ask the patient to name them. 2 points.

- 7. "Repeat the phrase: 'No ifs, ands, or buts.". 1 point.
- 8. "Take the paper in your right hand, fold it in half, and put it on the floor." (The examiner gives the patient a piece of blank paper.) 3 points.
- 9. "Please read this and do what it says." (Written instruction is "Close your eyes.") 1 point.
- 10. "Make up and write a sentence about anything." (This sentence must contain a noun and a verb.) 1 point.
- 11. "Please copy this picture." (The examiner gives the patient a blank piece of paper and asks him/her to draw the symbol below. All 10 angles must be present and two must intersect (Fig. 1)). Results:
- 24-30 points No cognitive impairment;
- 22-23 Minor cognitive impairment (conditionally absent if the individual has only a general secondary education); 18-21 – Mild or moderate cognitive impairment;

0-17 – Severe cognitive impairment.

The tests were combined during the patients' examination. We conducted the MFI orally because of the decrease in visual acuity in most patients. Furthermore, to increase the sensitivity of the study, the following additional questions were used (randomly asked during the examination), or similar phrases were tracked in patients' statements: My doctor does not pay enough attention to my suffering. Yes, that is true. I do not know. No, that is not true.

Yes, that is true I do not know No, that is not true My treatment is too complicated and uncomfortable. Yes, that is true I do not know No, that is not true My vision can not be saved

- Yes, that is true I do not know No, that is not true
- I do not have to worry about my health at all Yes, that is true I do not know No, that is not true

I am sure that treatment will not be beneficial Yes, that is true I do not know No, that is not true I do not trust my doctor

Yes, that is true I do not know No, that is not true My finances are not enough for minimal treatment Yes, that is true I do not know No, that is not true

We have also modified several MMSE questions:

 \mathbb{N}^{0} 6: Show the patient one simple object, such as a wristwatch, a pencil, a paper, or a pen, and ask the patient to name it. 1 point. \mathbb{N}^{0} 9: If a patient has problem with reading, the examiner closes their eyes and asks to repeat after them.

 $\mathbb{N}^{\mathbb{Q}}$ 10: If a patient has problem with writing, the sentence could be spoken aloud.

 \mathbb{N}^{0} 11: We asked a patient to divide a large square, which is already depicted on paper (or imaginary, if necessary, but then without a point in the centre), on nine small identical squares by drawing four straight lines and to put a dot in the centre. 2 points.

Modified question number 11 evaluates simultaneously the presence of metamorphopsia in a patient with DRP and the ability to estimate the geometry of the figure only by the examiner's instructions.

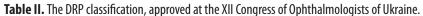
Statistical analysis of the results is done using descriptive statistics of the EXEL software. The arithmetic mean value (M), standard error of mean (mM), the probability value (p), the determination coefficient (R2), the Pearson correlation coefficient (r) were calculated. The probability value in the work is taken as p<0,05.

PSYCHOLOGICAL ASPECTS OF EXAMINATION OF OPHTHALMIC PATIENTS WITH DIABETIC RETINOPATHY



Fig. 2. Nonproliferative (a), Pre-proliferative (b) and Proliferative (c), DRP on OCT.

Stage	Form	Degree of severity
	Ischemic	Mild
Nonproliferative	Exudative	Moderate
	Hemorrhagic	Severe
Pre-proliferative	Exudative	
	Hemorrhagic	-
Proliferative		First
	Neovascular	Second
	Glious	Third
		Fourth



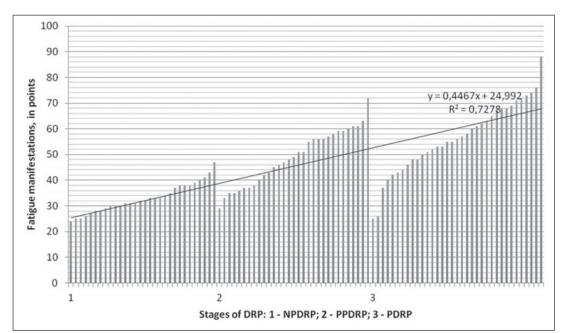


Fig. 3. Dependence of increase in fatigue manifestations (total score) from the stage of DRP.

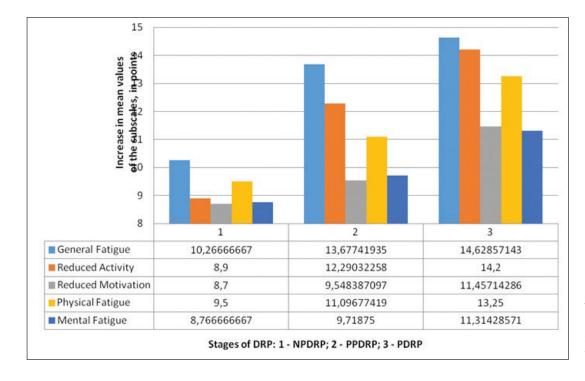


Fig. 4. Evaluation of fatigue manifestations in patients with different stages of DRP by mean values of MFI subscales.

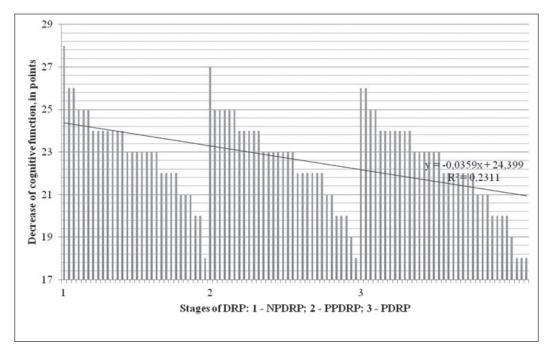


Fig. 5. Dependence of decrease in cognitive function from the stage of DRP.

Stage	Points	Prevalence
	24-28	43,3% (n=13)
NPDRP (n=30)	22-23	37,7% (n=11)
	18-21	20% (n=6)
	24-28	35,5% (n=11)
PPDRP (n=31)	22-23	41,9% (n=13)
(1-51)	18-21	22,6% (n=7)
	24-28	31,4% (n=11)
PDRP (n=35)	22-23	37,1% (n=13)
(11-55)	18-21	31,4% (n=11)

Table III. Evaluation of cognitive impairment in patients with different stages of DRP.

RESULTS AND DISCUSSION

In our country the most up-to-date DRP classification is the one proposed by Pasechnikova N.V. and Naumenko V.O., which was approved at the XII Congress of Ophthalmologists of Ukraine (Odessa, 2010) (Table II). We used this classification to analyse the changes in the eye fundus of the examined patients.

Nonproliferative DRP (NPDRP) - group I (Fig.2, a)

Patients with this stage did not have complaints on vision. However, on ophthalmoscopy, the following changes were observed: burciform protuberances of the capillaries (microaneurysms) – 30 patients (60 eyes, 100%), intraretinal punctate or dashed haemorrhages – 23 patients (39 eyes, 65%), intraretinal microvascular anomalies (shunts between arterioles and venules) – 12 patients (18 eyes, 30%), solid exudates – 18 patients (30 eyes, 50%).

Pre-proliferative DRP (PPDRP) – group II (Fig.2, b)

For 31 patients (62 eyes) this stage was characterized by: accumulated haemorrhages in 28 patients (56 eyes, 90.3%), diffuse retinal oedema in 13 patients (20 eyes, 32.3%), venous loop formation in 25 patients (43 eyes, 69.4%), as well as ischemic areas of the retina – 8 patients (16 eyes, 25.8%). The veins of the retina were beaded, unevenly enlarged in 31 patients (62 eyes, 100%).

Proliferative DRP (PDRP) – group III (Fig.2, c)

On the eye fundus 35 patients (70 eyes, 100%) had zones of ischemia with neovascularization, oedema of the retina, fibrous changes of the posterior hyaloid mebrane; preretinal haemorrhages were observed in 15 patients (28 eyes, 40%), hemophthalmus in 11 patients (11 eyes, 15.7%), tractional detachment of retina in 7 patients (9 eyes, 12.9%).

The results of visometry by ETDRS tables were as follows: in patients of the group I – 0.72 ± 0.14 , of the group II – 0.34 ± 0.02 , in the group III – 0.09 ± 0.005 .

Patients were interviewed using a modified mental test. Duration of mental state examination of one person was 15-17 minutes. Due to the combined application of the tests and their modifications, we were able to adapt them to the characteristics of patients with DRP. A correlation analysis was performed with the severity of fatigue and cognitive manifestations compared to the stages of DRP.

We studied the dependence of the aggravation of fatigue manifestations, which we evaluated in points (Y) from the stage of DRP, which was determined clinically (X). To test the hypothesis, all the obtained data was processed statistically. On the basis of these findings, correlation fields (Fig.3) were constructed and the regression equation was chosen to estimate the relationships between the above described parameters. Thus, there is a direct strong correlation between the increase in fatigue manifestation (total score) and the stage of DRP. The determination coefficient (R2) is 0,73; the correlation coefficient (r) is 0,66 (p<0,05).

We also noted the increase in mean values of the MFI subscales by the stages of DRP (Fig.4). Furthermore, the answers "yes, this is true" to additional questions or the presence of similar personal phrases in the amount of at least 2 coincide with no less than 2 values of the MFI subscales above 12 points.

At the same time, we studied the dependence of cognitive impairment severity, which was evaluated in points (Y) from the stage of DRP, which was determined clinically (X). To test the hypothesis, all the obtained data was processed statistically, the sampling is indicated in Table III. On the basis of these findings, correlation fields (Fig.5) were constructed and the regression equation was chosen to estimate the relationships between the above described investigated parameters. Thus, there is a tendency, but a low correlation between the decrease of cognitive function and the DRP stage. The determination coefficient (R2) is 0,23; the correlation coefficient (r) is -0,17.

Based on the obtained data we have formulated the criteria of necessity of specialized psychological help for the patient with DRP.

At least one of the following may be a criterion:

- The level of fatigue manifestations in points is higher than 33 for patients with NPDRP, 49 with PPDRP and 56 with PDRP (according to the mean values of the total score of MFI at the corresponding stage of DRP).

- Veracity of at least 2 statements from the additional questions and/or high values (>12) of at least 2 MFI subscales.

- Changes in cognitive function, classified as severe or moderate.

CONCLUSIONS

- 1. The integrated, modified questionnaire for patient's mental condition assessment, based on MFI for fatigue manifestations, MMSE for cognitive impairment and the additional questions provides a reliable way to determine the criteria for specialized psychological help necessity.
- 2. A modified test is adapted to the features of patients with diabetic retinopathy.
- 3. A strong correlation was found between the severity of fatigue manifestations and the stage of diabetic retinopathy, the result is reliable (the determination coefficient is 0,73; the correlation coefficient is 0,66, p<0,05). A

tendency with a low correlation between the decrease in cognitive function and the stage of DRP was found (the determination coefficient is 0,23; the correlation coefficient is -0,17).

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DYNAMICS OF INFECTIOUS AND PARASITOGENIC MORBIDITY AT THE CHILDREN POPULATION IN THE RURAL DISTRICTS AND CORELATION WITH WATER FACTOR

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ABSTRACT

Introduction: Intestinal parasites are important enteric pathogens. Poverty, low quality of food and water supply and poor sanitation systems are the important factors associated with intestinal parasitic infections. These kinds of infections can be a good index for hygienic and sanitation status of the society.

The aim: To study dynamics of infectious and parasitic diseases (for 2008-2013 years) among the children population in Dnipro region and to define influence of water factor on the disease and prevalence given class of illnesses.

Materials and methods: Retrospective study of infectious and parasitogenic diseases (I class by ICD-10) among children population from rural districts of Dnipropetrovsk region for 2008-2013 years was carried out.

Results: It was spent correlation analysis between some indicators of potable water quality of diseases of the given class in all districts. In the majority of rural districts, was shown increasing I class of diseases from (1.4 to 1.63) times in dynamics. In some districts was reveled an average correlation link between content in water of the dry residue, chlorides, sulphates, calcium, magnesium, except rigidity and iron and prevalence I class of diseases (r=0.50, p<0.001). Prevalence of the given class of diseases was correlated with pH, nitrates, oxidability in the three rural districts of Dnipropetrovsk region (r=0.74-0.89, p<0.001).

Conclusions: It has been shown that the composition of drinking water consumed by the rural population remains one of the basic factors in the formation of public health in the conditions of small exposure of the influence individual indicators of salt and chemical composition. The children's cohorts were the most sensitive to these indicators.

KEY WORDS: water factor, correlation link, morbidity, children population, infectious and parasitic diseases

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INTRODUCTION

In the late 19th Century, cities in Western Europe and the United States suffered from high levels of infectious disease [1]. Over a 40 year period, there was a dramatic decline in infectious disease deaths in cities [2]. At that time newspapers were the major source of information educating urban households about the risks they faced. By constructing a unique panel data base, it was finding that news reports were positively associated with government announced typhoid mortality counts and the size of this effect actually grew after the local governments made large investments in public water works to reduce typhoid rates [3]. News coverage was more responsive to unexpected increases in death rates than to unexpected decreases in death rates [4]. A cross-sectional study of the prevalence of intestinal parasitic infections at eight schools in Bo Klau district and four schools in Chalerm Prakiet district in Nothern Tailand was carried out [5].

Intestinal parasites are important enteric pathogens [6]. Poverty, low quality of food and water supply and poor sanitation systems are the important factors associated with intestinal parasitic infections [7]. These kinds of infections can be a good index for hygienic and sanitation status of the society [8-10]. The burden of gastrointestinal illness (GII) associated with drinking water supplies in the United States (US) is not precisely known [10-15]. Although available surveillance data suggest declining numbers of outbreaks, aging infrastructure and distribution system deficiencies represent persistent challenges that may be associated with increased risks. Estimates of the endemic attributable disease burden of acute gastroenteritis associated with public water supplies in the US range from 4.3–16.4 million cases annually.

THE AIM

To study dynamics of infectious and parasitogenic morbidity (for period 2008-2013 years) among children population in the rural districts of Dnipro region and define influence of water factor on the morbidity and prevalence this class of diseases.

MATERIALS AND METHODS

Retrospective research of the infectious and parasitogenic diseases (I class by ICD-X) was conducted on children population in the rural districts of Dnipro region for 2008-2013

years, on a basis of official statistical documents Ministry of Public Health of Ukraine. A cross-correlation analysis was carried out between separate indicators of drinking-water quality and the morbidity indexes I class of diseases in all rural districts of region. Estimation of intercommunication between the given signs was conducted by coefficient of correlation Spearmen (r). Level of statistical meaningfulness was accepted (p<0.05; p<0.001). Research methods: physical and chemical (for determination indexes of drinking-water quality from the sources of water-supply); medical-statistical (for mathematical calculations of the given quantitative indexes, methods of variation statistics). Bioethics Commission on the protocol of Committee on Biomedical Ethics in the Dnipropetrovsk Medical Academy Ministry of Health of Ukraine (№ 5 from April 10, 2019) were not revealed any violations of the moral and ethical norms during research work.

RESULTS AND DISCUSSION

Analysis indexes of morbidity I class (infectious and parasitogenic diseases) among children population for 2008–2013 years found out the greatest level of morbidity in the majority rural districts of Dnipro region in 2008 year: Vasylkivskyi (442.6 cases), Verkhniodniprovskyi (1260.5), Dnipropetrovskyi (308.5), Krynychanskyi (854.2), Magdalynivskyi (460.2), Novomoskovskyi (952.3), Petropavlivskyi (638.0), Pokrovskyi (769.9), Synelnykivskyi (468.2), Solonyanskyi (673.3) and Sofievskyi (638.1) cases on 10 000 of children population. Thus, in the majority of rural districts level of morbidity I class of diseases was decline in dynamics for 6 years, except Petrykivskyi (561.4), Tsarychanskyi (338.5) and Yurievskyi districts (490.7) cases per 10 000 of children. In the given districts, the greatest level this class of diseases was observed in 2013 years. In particular, middle level I class of diseases in all rural districts was decline in dynamics in 1.6 times: from 564.2 cases (in 2008) to 358.7 cases on 10 000 children (in 2013).

The greatest level of infectious and parasitogenic diseases, in comparison with all rural districts, was found out in Verkhniodniprovskyi district: 1260.5 cases on 10 000 children at the 14 years old (in 2008), with a tendency to decline in 2013 – 239.9 cases, i.e. in 5.25 times.

In some rural districts was revealed dynamics of increasing I class of diseases for 2008-2013 years. For example, in Kryvorizkyi district level of morbidity was increased in 1.4 times: from (253.2 to 357.6) cases on 10 000 of children. In the Petrykivskyi district morbidity this class of diseases increased in 3.07 times: from (182.8 to 561.4) cases; in Piatykhatskyi district – in 1.07 times: from (518.1 to 554.4) cases; in Solonyanskyi district – in 1.01 times: from (673.3 to 682.7) cases; in Sofievskyi district – in 1.1 times: from (638.1 to 704.3) cases; in Tomakivskyi district – in 2.0 times: from (178.5 to 342.8) cases; in Tsarychanskyi district – in 1.4 times: from (239.4 to 338.5); in Yurievskyi district – in 1.63 times: from (300.5 to 490.7) cases on 10 000 children.

Generally, in Dnipro region was found out a dynamic to decline level of diseases for this class in 1.4 times: from

(722.5 to 501.4) cases on 10 000 children. It should be noted, that in some districts level of infectious and parasitogenic morbidity exceeded the middle level by the districts and Dnipro region at whole. Firstly, in Verkhniodniprovskyi district morbidity I class of diseases was higher, than a middle level for rural districts in 2.23 times (in 2008); in 2009 – 1.68 times; in 2010 – 1.66 times; in 2011 – 1.48 times.

Similar tendency was observed in Krynychanskyi district in 2008 – 2010 years; in the Mezhivskyi and Nikopolskyi districts in 2009 and 2011 years; in the Novomoskovskyi and Pokrovskyi districts in 2008 year; in the Pavlohradskyi district in 2009-2011 years; in the Petrykivskyi district in 2013 years; in Piatykhatskyi district in 2009, 2011-2013 years; in Solonyanskyi district in 2012-2013 years; in the Sofievskyi district in 2013 year (figure 1).

Consequently, the most favorable dynamics of morbidity (below middle level in Dnipro region) was observed in the following rural districts for 2008-2013 years: Vasylkivskyi, Dnipropetrovskyi, Kryvorizskyi, Magdalynivskyi, Petropavlivskyi, Synelnykivskyi, Tomakivskyi, Tsarychanskyi, Shyrokivskyi, Yurievskyi.

It was discovered a middle cross-correlation link between infectious and parasitogenic morbidity at the children, which consumed drinking-water from the centralized sources of water-supply in the Nikopolskyi and Pavlohradskyi districts with such chemical indexes: Zn, Cu, Mn, F, Al, nitrogen ammonia, nitrates and oxidableness (r=0.30-0.31, p<0.05). In Kryvorizskyi and Novomoskovskyi districts was found out a middle correlation between content of dry remain, chlorides, sulfates in the centralized water sources and prevalence of infectious and parasitogenic diseases among children population (r=0.50, p<0.001).

Tendency with a middle cross-correlation link had been shown between all chemical indexes, which influence on the salt composition of drinking-water, except rigidity and iron, and prevalence this class of diseases among peasants children (r=0.50, p<0.001) in the Kryvorizskyi, Novomoskovskyi, Nikopolskyi, Pavlohradskyi, Dnipropetrovskyi, Vasylkivskyi, Krynychanskyi, Synelnykivskyi, Verkhniodniprovskyi, Mezhivskyi, Petrykivskyi, Piatykhatskyi, Sofievskyi and Shyrokivskyi districts.

It should be noticed, that water from the centralized sources of water-supply, which were taken in the given rural districts: Verkhniodniprovskyi, Mezhivskyi, Petry-kivskyi, Piatykhatskyi, Sofievskyi and Shyrokivskyi having a middle correlation with all indexes of salt composition and prevalence of infectious and parasitogenic diseases (r=0.50, p<0.001).

Results of research demonstrated that on the prevalence I class of diseases among children population influenced the followings indexes, such as salt composition of water, taken from the decentralizing sources: in Kryvorizskyi, Novomoskovskyi, Nikopolskyi, Pavlohradskyi districts – dry remain, chlorides, sulfates (r=0.87, p<0.001). In the territory of Vasylkivskyi, Krynychanskyi and Synelny-kivskyi districts the same tendency was revealed for the

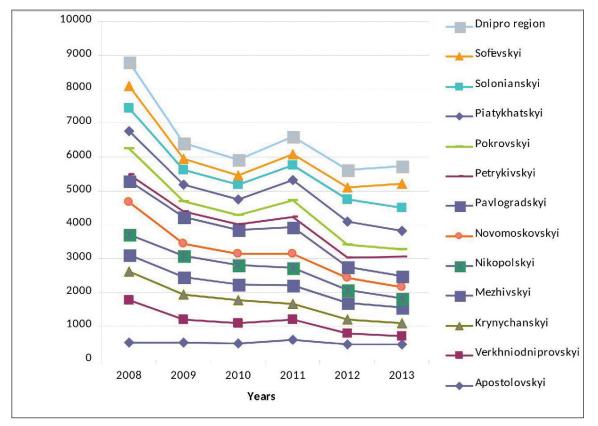


Figure 1. Dynamics of morbidity I class of diseases at the children population in some rural districts of Dnipro region for 2008-2013 years.

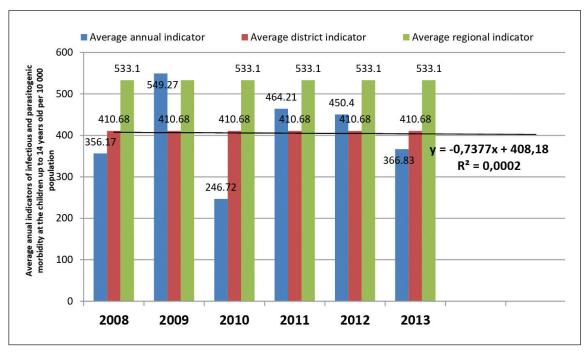


Figure 2. Average annual indicators of infectious and parasitogenic morbidity at the children up to 14 years old in the Kryvorizhskyi rural district of Ukraine in the dynamics for 2008-2013 years and its prognoses.

general rigidity, dry remain, chlorides, sulfates, calcium, magnesium (r=0.73-0.89, p<0.001). In the majority of districts – Verkhniodniprovskyi, Mezhivskyi, Petrykivskyi, Piatykhatskyi, Sofievskyi, Shyrokivskyi, Apostolivskyi, Mag-

dalynivskyi, Petropavlivskyi, Pokrovskyi, Solonyanskyi, Tomakivskyi, Tsarychanskyi, Yurievskyi was determined correlation between a general rigidity and prevalence of I class of diseases (r=0.82, p<0.001). Prevalence I class of diseases was correlated with pH, nitrates, oxidableness in such rural territories: Vasylkivskyi, Krynychanskyi and Synelnykivskyi districts (r=0.74-0.89, p<0.001) and in the Verkhniodniprovskyi, Mezhivskyi, Petrykivskyi, Piatykhatskyi, Sofievskyi, Shyrokivskyi districts (r=0.70-0.83, p<0.001).

A high average anual level of incidence infectious and parasitogenic morbidity among the children in Kryvorizhskyi rural districts of Dnipropetrovsk region has been established. The frequency of infectious and parasitogenic morbidity was on 10-30% higher than the average regional indicator (p < 0.001). In (fig. 2) average anual levels of infectious and parasitogenic morbidity among the children's population in Kryvorizhsky rural district is presented and calculation of its forecast level, which indicates about probable decrease in the dynamics incidence for this class of diseases in the rural settlements and villages of Kryvorizhsky district.

CONCLUSIONS

- It has been shown that the composition of drinking water consumed by the rural population remains one of the basic factors in the formation of public health in the conditions of small exposure of the influence individual indicators of salt and chemical composition. The children's cohorts were the most sensitive to these indicators.
- 2. It was determined that the greatest determinant influence on the incidence of infectious and parasitogenic morbidity among the children is caused by the saline composition of drinking water (18%) due to a high calcium-magnesium water hardness in rural wells (in decentralized water supply systems).
- 3. The predicted level of incidence for the infectious and parasitogenic morbidity among the children of Kryvorizhskyi rural district, which indicates a possible decrease in the incidence rate this class of diseases in the countryside, which can be calculated with using the following formula: y = -0.7377x + 408.18, $R^2 = 0.0002$.

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ANALYSIS OF THE RESULTS OF THE QUESTIONNAIRE OF ORTHODONTISTS AND CHILDREN DENTISTS OF POLTAVA-CITY ON THE OPTIMIZATION OF ORTHODONTIC AIDS FOR CHILDREN

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ABSTRACT

Introduction: In the course of the study, we identified high prevalence rates of orthodontic pathology and identified organizational aspects regarding the provision of orthodontic care for children, and identified the need for their optimization.

The aim: The purpose of the study was to analyze the results of the questionnaire of orthodontists and children's dentists, who provide dental care to the children of the Poltava region, about the importance of optimization of orthodontic care for children and improving the knowledge of doctors about the risk factors for the onset of orthodontic pathology. **Materials and methods:** Methods: Sociological (questionnaire), medical-statistical, bibliosemantic. We analyze 39 questionnaires, which filled out by orthodontists and children's dentists who provide dental care to children of the Poltava region.

Results: A questionnaire was conducted for 39 children's dentists of different specialties, and the subject for study of which was the knowledge of doctors about the risk factors for the occurrence of orthodontic pathology; the opinion of specialists on optimization of the system of prevention, dyspanserization, screening and sanitary-education work. The results of the questionnaire were processed with using of statistical methods and analyzed.

Conclusions:

1. Most doctors consider the most important influencing risk factors that relate to behavioral, informational and medical-demographic, that is, those that are managed.

2. Most doctors determine the existing system of orthodontic care as ineffective, recognize the effectiveness of a joint prevention, dispensary and screening program; consider it advisable to create a single electronic medical card for the child from birth; the level of awareness of the population is low; it is expedient to involve in the preventive and sanitary-educational work of dental hygienists to reduce the burden on doctors.

3. In the training of students and interns in the specialty "Dentistry", more attention should be paid to the study of the risk factors of the occurrence of orthodontic pathology and the importance of primary prevention and dyspansery control to reduce its level.

KEY WORDS: orthodontic care, risk factors, awareness, prevention, dispensary

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INTRODUCTION

At the stage of reforming of the healthcare sector in today's socio-economic conditions in Ukraine there are significant difficulties in organizing of the provision of orthodontic care for children and adults due to the lack of a legal regulatory framework and clear principles for functioning in modern conditions, lack of budget funding and the required number of skilled staff (doctors and dental technicians), outdated and insufficient material and technical base, low standards of living of the population [1, 2].

It is also relevant to improve the reporting system of medical dental institutions of state and non-state ownership in order to obtain full and reliable information about their activities that are necessary for an adequate assessment of the situation with dental health of the adult and infant population of Ukraine, the appropriate planning and organization of the dental service. A diverse reforming process of the dental service, the lack of modern regulations - the main reasons for the receipt of regions of insufficiently reliable data. There is a lack of information from non-governmental organizations. This does not allow health authorities to have an adequate understanding of the situation in the field of dental care. In connection with this, there is an urgent need to develop and implement new principles for the organization and planning of all types of dental care, including orthodontic [3, 4].

Nowadays, it is extremely important to determine the place of orthodontic care in the system of pediatric service, and the development of a comprehensive system of prevention and early treatment of it [5]. To eliminate most of the dental anomalies it is necessary that the dentist-pediatrician in the organized children's collectives systematically carries out the preventive work with the active assistance of parents, relatives, teachers who involved in the upbringing of children [6]. Often, the tooth-jaw pathology is combined with another pathology of the oral cavity, as well as other organs and systems [7, 8, 9]. The combination of pathologies always leads to complicated disorders in the

child's body, so early detection, prevention and the correct approach to treatment are of great importance in orthodontic practice. Timely removal of tooth-jaw abnormalities is the prevention of both local and general disorders of the body, in this regard, orthodontic service is of great social importance.

According to WHO standards, sanitary education is a basic part of prevention. Therefore, it is necessary to pay more attention to the knowledge of dental practitioners and other specialists regarding modern methods and ways of preventing of tooth-jaw pathology. This in turn requires the revision of curricula and programs for dental practitioners. In addition, it is necessary to increase the level of knowledge of parents and teachers about methods of prevention of dental disease [10].

THE AIM

The purpose of the study was to analyze the results of the questionnaire of orthodontists and children's dentists, who provide dental care to the children of the Poltava region, about the importance of optimization of orthodontic care for children and improving the knowledge of doctors about the risk factors for the onset of orthodontic pathology.

MATERIALS AND METHODS

Methods: Sociological (questionnaire), medical-statistical, bibliosemantic. We analyze 39 questionnaires, which filled out by orthodontists and children's dentists who provide dental care to children of the Poltava region.

RESULTS

According to the qualification category, the doctors were distributed as follows: with the highest category - 18 (46.2%), with the first - 7 (17.9%), with the second - 3 (7.7%) and without category - 11 (28.2%). Postgraduate education have: clinical residency - 3 (7.7%), graduate school - 2 (5.1%), doctorate - 1 (2.6%), specialization - 15 (38.5%), retraining - 6 (15.4%), internship - 11 (28.2%), not having postgraduate education - 1 (2.6%).

We have grouped the risk factors in the following categories: on behavioral and informational, medical-demographic, organizational, socio-economic and environmental factors. The answers of orthodontists and children's dentist regarding the influence of factors are given in the tables.

As can be seen from table number I, according to the opinion of the vast majority of doctors (from 74,4 to 92,3%), almost all behavioral and information risk factors have a significant influence on the forming of orthodontic pathology (except for father's smoking, which is considered by only 38.4% of physicians and insufficient sanitary-and-hygienic awareness of parents - 59.0%).

Of the medical and demographic risk factors, all physicians recognized the heredity as a weighty factor (100%), the presence of early removed teeth through the caries - 94,9%; the majority of doctors (from 69.2 to 84.6%) consider the presence of caries (complicated caries), complications during parturitions, the diseases transmitted by a child (79.5%), the presence of endocrine pathology in a mother, mother's illness during pregnancy, complications, the presence of stress during pregnancy, professional harm to the mother during pregnancy. Other risk factors consider it weighty by the smaller number of physicians (from 28.2 to 59.0%) (Table II).

From organizational factors, the prevailing number of physicians (from 79.5 to 87.2%) highlights the importance of presence an orthodontist (specialist), providing doctors with orthodontists, work on prevention, medical examinations, dispensary, hygienic education, late untimely review by a dentist, and others (staffing of health care institutions by doctors, secondary and junior medical personnel, provision of health care institutions with equipment, medicines, tools, staffing, personnel qualification) consider it weighty by the smaller number of physicians (from 56.4 to 61.5%) (Table III).

From the socio-economic factors, the majority of doctors consider as significant only the cost of orthodontic services (69.2%) and the distance of the necessary medical institution (74.4%), while other (the composition and social structure of the family, living conditions, financial support of the family, education and place of work (position) of parents) were considered as significantly influenced from 20.5 to 41.0% of physicians (Table IV).

From environmental factors, the content of microelements in drinking water is considered to be a significant risk factor for 71.8% of physicians, and other factors (type of water supply, atmospheric and radiation pollution, pesticide load) from 38.5 to 51.3% of physicians (Table V).

In the continuation of the analysis of the need for optimization of the dental orthodontic industry, we conducted a survey of orthodontists regarding their assessment of the organization of the dental orthodontic service. The questions were structured according to the main directions: 1. Prevention.

- The importance of conducting medical examinations by a pediatric dentist-therapist for the detection of orthodontic pathology was assessed as follows: very effective - 9 (32.1%), effectively - 25 (64.1%), little effective - 4 (10.3%), ineffective - 1 (2.6%).
- The question is whether the existing system of prevention of orthodontic pathology is effective: yes, it's effective 13 (33.3%); yes, but it's little effective 21 (53.8%); no, it's ineffective 5 (12.8%).
- Do changes in the system of prevention of dental anomalies require: 28 (71.8%) doctors gave a positive answer, 11 (28.2%) - negative.
- Are there preventive measures that are not used but necessary: 16 (41,0%) respondents answered - yes, no - 23 (59,0%).
- Is it expedient to introduce mandatory five-minute exercises for myogymnastics for the correct formation of the maxillofacial area in organized children's teams: yes, this will improve the quality of medical care 33 (84.6%), nor is it appropriate 6 (15.4 %)

	Weighty absolute (%)	Imponderable absolute (%)
Low level of sanitary and hygienic awareness of parents	23 (59,0)	16 (41,0)
Low awareness of parents about the risk factors for orthodontic pathology	32 (82,1)	7 (17,9)
Artificial feeding	35 (89,7)	4 (10,3)
Nutrition of a baby	32 (82,1)	7 (17,9)
Using of a nipples	29 (74,4)	10 (25,6)
Mother's smoking during pregnancy	33 (84,6)	6 (15,4)
The nature of mother's nutrition during pregnancy	30 (76,9)	9 (23,1)
Smoking of a father	15 (38,4)	24 (61,5)
Mother's alcohol abuse during pregnancy	36 (92,3)	3 (7,7)
Drug use during pregnancy	36 (92,3)	3 (7,7)

Table II. Medical-demographic risk factors of the orthodontic pathology

	Weighty absolute (%)	Imponderable absolute (%)
Demographic situation	11 (28,2)	28 (71,8)
The presence of caries (complicated caries)	35 (89,7)	4 (10,3)
Heredity	39 (100,0)	0 (0)
Complications during parturitions	32 (82,1)	7 (17,9)
Diseases transmitted by a child	31 (79,5)	8 (20,5)
The presence of early removed teeth through the caries	37 (94,9)	2 (5,1)
Disease of the mucous membrane, periodontal disease	27 (69,2)	12 (30,8)
Number of children in the family	12 (30,8)	27 (69,2)
Age of parents	19 (48,7)	20 (51,3)
The presence of endocrine pathology in the mother	33 (84,6)	6 (15,4)
Mother's disease during pregnancy	33 (84,6)	6 (15,4)
Complications, the presence of stress during pregnancy	31 (79,5)	8 (20,5)
The regime of work and rest during pregnancy	23 (59,0)	16 (41,0)
Gynecological diseases during pregnancy	20 (51,3)	19 (48,7)
Professional harm to the mother during pregnancy	32 (82,1)	7 (17,9)

Therefore, pediatric dentists supports the conduction of the preventive measures, but they believe that not all steps in it are necessary. Pay special attention to the creation of a general prevention system, which would bring together teachers and doctors.

- 2. Dispensary and screening.
- The necessity of conducting the dispensary examination of children with orthodontic pathology was estimated as follows: very necessary -14 (35.9%), required -18 (46.2%), not decisive 4 (10.3%), not needed 3 (7.7%).
- The quality of the examination of children with tooth-maxillary anomalies was assessed as high 2 (5.1%) specialists, sufficient 24 (61.5%), low 8 (20.5%), extremely low 5 (12, 8%).
- Effectiveness of clinical examination for reducing the incidence of orthodontic pathology was estimated: very effective 4 (10.3%), effective 16 (41.0%), average

efficiency - 10 (25.6%), low efficiency - 9 (23,1%).

- The need for screening (active detection of tooth-abdominal anomalies and risk factors) was assessed as follows: extremely necessary - 21 (53.8%), necessary - 12 (30.8%), not decisive - 6 (15.4%).
- The need to create a single screening program in collaboration with pediatricians, family doctors and general dentists was appreciated: 35 (89.7%) recognized the need for improving the quality of medical care, 4 (10.3%) argue that this is not appropriate.

According to the results of the survey, the recognition by doctors of the effectiveness of the prophylactic examination, as well as screening, for children with orthodontic pathology.

3. Assessment of the level of public awareness about the risk factors for orthodontic pathology by orthodontists and pediatric dentists.

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Table III. Organizational risk factors of the orthodontic pathology

	Weighty absolute (%)	Imponderable absolute (%)
The presence of an orthodontist (specialist)	33 (84,6)	6 (15,4)
Provision by doctors orthodontists	31 (79,5)	8 (20,5)
Work on prevention, medical examinations, dispensary, hygienic education	31 (79,5)	8 (20,5)
Staffing of medical institutions by doctors, secondary and junior medical personnel	23 (59,0)	16 (41,0)
Provision of medical facilities with equipment, etc.	24 (61,5)	15 (38,5)
Personnel structure, degree of personnel qualification	22 (56,4)	17 (43,6)
Untimely (late) review by a dentist	34 (87,2)	5 (12,8)

Table IV. Socio-economic risk factors of the orthodontic pathology

	Weighty absolute (%)	Imponderable absolute (%)
Composition and social structure of the family	14 (35,9)	25 (64,1)
Living conditions	8 (20,5)	31 (79,5)
Financial support of the family	16 (41,0)	23 (59,0)
Cost of orthodontic services	27 (69,2)	12 (30,8)
Distance of the necessary medical establishment	29 (74,4)	10 (25,6)
Level of education and place of work (position) of parents	11 (28,2)	28 (71,8)

Table V. Environmental risk factors of the orthodontic pathology

	Weighty absolute (%)	Imponderable absolute (%)
Type of water supply	20 (51,3)	19 (48,7)
The content of microelements in drinking water	28 (71,8)	11 (28,2)
Atmospheric and radiation pollution	20 (51,3)	19 (48,7)
Pesticide load	15 (38,5)	24 (61,5)

- The level of knowledge of the population about risk factors, ways and methods of treatment of orthodontic pathology was estimated as follows: high 4 (10.3%), medium 9 (23.1%), low 18 (46.2%), very low 8 (20.5%); about means of prevention, ways of forming a healthy lifestyle: high 2 (5,1%), medium 14 (35,9%), low 19 (48,7%), very low 4 (10,3%).
- Is it expedient to involve dental hygienists in preventive and sanitary-educational work to reduce the burden on doctors: yes 34 (87.2%), no 5 (12.8%).
- Asked about the need for changes in the provision of orthodontic care 21 (53.8%) suggested adding measures that are not enough to optimally function the service, 18 (46.2%) decided that there was no need to change anything.

In the distribution of responding physicians in terms of their experience, they revealed significant differences only in the answers to the question whether the work on prevention, medical examinations, dyspanserization, hygiene education (OR 8,6 [CI 1,4-51,7], p = 0,016) and mother's nutrition during pregnancy (OR 5.5 [CI 1.1-27.3],

p = 0.038). That is, more experienced physicians whose seniority exceeds 10 years attach more importance to the alimentary factor for the incidence of orthopedic care and better understand the importance of preventive and dispensary work to reduce dental morbidity.

CONCLUSIONS

1. According to the results of the questionnaire, the majority of doctors (74,4-92,3%) consider important factors influencing the risk of orthodontic pathology, which are attributed to behavioral and informational, that is, the negative influence of which may be reduced by sanitary and educational work. Also, the most significant risk factors were identified: the presence of early removed teeth through the caries (94.9%), presence of caries (complicated caries) (89.7%), complications during parturitions (82.1%) , complications, the presence of stress during pregnancy (79.5%), which coincides with the results of our own research. Heredity was recognized as a major risk factor for all physicians (100%), and while this risk factor is unmanageable, it is possible to reduce the negative impact by early observation (screening) and detecting orthodontic pathology.

- 2. Analyzing the results of the questionnaire of orthodontists and children's dentists in order to optimize the organization of orthodontic care, the following was shown: doctors support preventive measures, but consider the existing system to be ineffective; they pay attention to a general prevention system that could combine the influence of teachers and doctors; recognize the application of health-saving technologies; recognize the effectiveness of the preventive examination, as well as screening, to reduce the level of orthodontic pathology; consider it advisable to create a single electronic medical card for the child from birth; the majority of them consider the low level of awareness of the population about the risk factors, ways and methods of treatment of orthodontic pathology, means of prevention, ways of forming a healthy lifestyle; it is expedient to involve in the preventive and sanitary-educational work of dental hygienists to reduce the burden on doctors.
- 3. In the training of students and interns in the specialty "Dentistry", more attention should be paid to the study of the risk factors of the occurrence of orthodontic pathology and the importance of primary prevention and dyspansery control to reduce its level.

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FACTORS OF WORKING ENVIRONMENT INFLUENCING OCCUPATIONAL STRESS AMONG PRIMARY HEALTH CARE DOCTORS IN UKRAINE

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ABSTRACT

Introduction: Stress is considered to be a very common pathology among primary care doctors, since practically any professional activity requires significant emotional, mental and practical efforts.

The aim has determined the factors associated with occupational stress and compare the difference of behavior patterns which is used to reduce stress among primary care doctors in Ukraine.

Materials and methods: The authors used medical-statistical methods as well as analyzed questionnaires of the sociological survey conducted among general practitioners and family doctors of the primary care level from various regions of Ukraine.

Results: Occupational stress is a common symptom among primary care physicians of different ages and genders in Ukraine. For primary care doctors the most common symptoms related to occupational stress were found to be burnout (n=93), poor night's sleep (n=84) and tiredness (n=84). Female doctors experience more often symptoms such as frequent headaches tiredness, burnout, whilst for male doctors feelings of irritation and anxiety are more common indicators of occupational stress.

Work experience also has a strong association with experiencing stress related to "unrealistic expectations from their patients with complex medical and social problems" (s.df=.082). Young doctors with work experience of less than 5 years and those who have worked for more than 20 years in the industry similarly find it stressful to deal with such "complex patients".

Conclusions: Primary care doctors in Ukraine, from many different demographic backgrounds, experience high levels of occupational stress; this is a common health condition, which can have devastating personal and professional consequences.

KEY WORDS: primary care doctor, occupational stress, professional consequences

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INTRODUCTION

Physical health is impossible without emotional stability and it has a great importance at the workplace where people spend a big part of their professional life. As such, the challenging task of every person is to maintain mental and psychological balance, to be ready to face and overcome stressful situations, not be afraid to seek help, and not allow symptoms of overload, depression, or emotional instability to take place [1,2].

If a person's psychological wellbeing is harmed it can create potentially harmful physical conditions and increase the risks of stress-related psychological morbidity and developing emotional burnout syndrome which is known as a specific professional deformation. Interestingly, over the last decade the topic of professional burnout syndrome has become increasingly interesting to medical researchers since it cannot be easily evaluated as a differentiated type of pathology.

According to H. Freudenberger's [3] definition of "burnout syndrome" who was one of the first to study this phenomenon in 1974 defined burnout as a physical, emotional or motivational exhaustion characterized by a disruption of performance in work and fatigue, insomnia, increased susceptibility to somatic diseases, and the use of alcohol or other psychoactive substances in order to obtain temporal relief that has a tendency to the development of physiological dependence and (in many cases) suicidal behaviors.

Causes of professional burnout syndrome are different, but as usual they are a complex of unmanageable long-lasting stresses at the workplace, disturbances of work-life balance and reduction of professional achievements [4].

In any case, professional burnout syndrome can have a very large effect on overall psychological wellbeing, which is, first and foremost, the most crucial aspect of life for each individual.

It is particularly important for primary care physicians, who care for the most of illnesses in society, to avoid stress. All around the world people trust doctors to care for them when they are ill so it is extremely important that doctors are healthy and have good emotional stability and do not suffer from emotional or professional burnout. Without good mental health, doctors are at risk of providing poor healthcare to other people – this is especially true when doctors have a lot of long lasting contact with patients on a daily basis. As such it is clear that one of the groups of doctors for whom the lack of suffering from emotional burnout is particularly important is the group of primary healthcare doctors (family doctors).

THE AIM

The objective of the study aimed to determine the factors associated with occupational stress and compare the difference of behavior patterns which is used to reduce stress among primary care doctors in Ukraine.

RESEARCH HYPOTHESIS

Stress is one of the main factors that significantly influences the development of professional-emotional burnout. Primary care professionals (doctors) are those who have a very stressful and difficult environment to work in, and they are at risk of many mental health problems because of various patterns that are related to stress in the workplace and can finally lead to the development of professional-emotional burnout. Doctors need dedicated support to deal with this stress and make sure that they maintain good mental health, which reduces their risk of professional burnout and allows them to perform their duties to the public effectively.

MATERIALS AND METHODS

Primary care doctors, who play an important part in the healthcare process, are at the frontline of their professions and at risk of rapid changes, which could potentially have a negative impact on their psychological wellbeing in the case that they suffer from stress and/or develop professional burnout syndrome. This is particularly true in the Ukrainian healthcare system which, in recent years, has placed a lot of emphasis on strengthening the provision of primary medical care – an area which is considered to be the most challenging and stressful (and therefore most likely to suffer from burnout due to stress) of the three levels of care in the Ukrainian health care system.

The complex range of current economic problems in the Ukrainian health care system as well as socio-economic factors associated with the decline of the prestige of primary care doctors is one of the key factors that leads to this situation. However, there are also many other factors, which make the work of primary care doctors in Ukraine extremely psychologically challenging and emotionally tense. Also, the vertical hierarchical organization of work in the Ukrainian healthcare system has an effect on the level of stress experienced by PHC doctors and the deterioration of their mental health.

Furthermore, primary care doctors in Ukraine often suffer from professional dissatisfaction with their jobs due to the negative public perception of their work [5]. Specifically, in Ukraine primary care doctors are often regarded as "unimportant" in comparison with other medical specialists like surgeons and consultant physicians who work in the higher levels of the healthcare system (secondary and tertiary levels). For this research, the quantitative method of research was used in order to determine the workplace factors (independent variable) that affect the mental health of primary care doctors (a dependent/outcome variable). The data was gathered through a questionnaire which was then transformed into a statistical and numerical measurement.

In order to achieve the desired goals and tasks of this study a quantitative, descriptive study design methodology has been used for the field stage. A structured questionnaire has been prepared to enable the researcher to identify the main factors which increase doctor's level of stress the most, and damage the psychological wellbeing of these primary care doctors, how doctors evaluate their own emotional health and the level of stress they experience at work.

The field stage of the research was conducted between November, 30th and December 15th in 2017 in Kyiv.

The survey results of this research make it possible to enable dissemination not only within participants of the study but also expand this to the whole population of primary care doctors within Ukraine.

The main criteria of selection for the participants for this research focused on the aspects of professional work activity. Respondents had to be practicing medicine on the primary level of care in Ukraine. All of the potential candidates who met the criteria of the research were chosen randomly and asked to fill a questionnaire provided to them in a paper form.

The procedure for calculating the sample size was based on compromises between the accuracy of the achieved results and the limited financial and human resources available in order to conduct this research as well as lack of time and difficulties of reaching primary care doctors to take part in this study. In accordance with all the considerations of this research it was decided that the structured paper based questionnaire should be printed on one side of a single paper and distributed as a paper form to no less than 200 primary care doctors from the various regions of Ukraine the exception of Zaporizhia oblast, Sevastopol city (Municipality) and Crimea.

The main selection of indicators included in the questionnaire were focused on demographics (age, sex, place of living, number of years worked), self-evaluation (symptoms and the level of depression or any other mental disease, satisfaction with work-life balance, ways of dealing with such symptoms, and other main factors which have the greatest influence on psychological well being).

The last question in the questionnaire required an open-ended answer so respondents had an option to add anything he or she wanted in order to more precisely indicate the main causes of their stress at work

RESULTS

Respondents who were selected for this study and took a part in the quantitative research were general physicians, family doctors who work specifically in the primary care level of medicine in the public sector of health care in Ukraine. Also, the research made sure that respondents came from work a variety of geographical locations such as big cities as well as towns, villages and rural settlements with low population density.

Those participants who met the criteria based on their profession were randomly chosen without gender considerations. But in general, the proportion of women working in the primary care level of medicine in Ukraine is greater that the proportion of men. Considering such gender inequality in the primary level of care and in the Ukrainian medical profession as a whole, the number of female respondents was predominant in this research. Male respondents formed a minority group however this was expected.. In total, the number of female respondents in this research consisted of 141 individuals which is 79.7% of the total 177 sorted questionnaires received back to the interviewer. Male respondents numbered just 36 i he age distribution of the respondents varied between 25 and 55 and older. The purpose of establishing a respondents age is to determine if there are any differences in responses between age groups. For example, an outcome may be different between the youngest group and its respondents (who are just on the starting point of their professional carriers) to those who are several decades older and have many years of experience. Also, the reason for dividing respondents was to form an understanding of which age group was most happy to complete the questionnaire and participate in this research.

Participants of the research sample in this this came from all the 23 regions of Ukraine except with the exception of Zaporizhia oblast, Sevastopol city (Municipality) and Crimea. In order to generalize the presentation of some of the main results of this research, the regions of Ukraine were subdivided into the regional groups: Eastern, Western, Northern and Southern, depending on their location within Ukraine. Only particularly insightful and outlier findings gained from the research questionnaire are highlighted individually, all other findings are included in the main results which are reported by regional group. ndividuals which equals to 20.3%.

A significant difference has been found in the gender differences of the respondents; significantly more female physicians participated in this study (with the participation rate 79.1%) than males (20.9%). The age of the respondents ranged from 25 years to >55 years and can be divided into four different age groups. The vast majority of subjects in this research are young primary care professionals (43.5%) who fit into the age group 25-34 years. The age distribution by gender is rather proportional in each age category and seems to be representative for both genders. Most of the respondents (70.1%) live in cities, whilst a minority lives in villages (29.9%). Also, the largest number of respondents came from the western part of Ukraine (34.5%) and the least from the South (6.2%). The survey was conducted to cover all 23 oblasts (regions) of Ukraine with the exception of Zaporizhia oblast, Sevastopol city (Municipality) and Crimea.

Occupational stress is widespread among primary care doctors. The results of this study show that a significant number of doctors (84.6%) were found to often suffer from stress at work. In order to investigate further, the scores on the stress scale have been classified in three categories namely, "low stress group (incl. scores 0-3), medium stress group (incl. scores 4-7), and high stress group (incl. scores 8-10). From the Table 1.2 it can be pointed out that most doctors (62%) experience a medium level of stress; the group of doctors who experience a high level of stress (29%) then follow this group. Only 27% of doctors fall into the category of 'low level of stress' group. (Mean=5.5/ Median=6.0).

According to the analysis of the level of stress, female doctors are more stressed at work than male doctors. The mean value (of the total scores) on the stress scale for female doctors is 5.75 whilst for male doctors it is 4.70.

When we compared the Mean score of the level of stress in different age groups, it can be pointed out that the lowest stress level was found in doctors aged 55 and older (n=27, Mean=5.22). This was followed by the youngest age group 25-34 (n=77, Mean=5.36), then 45-54 (n=31, Mean=5.94). The stress level in the age group 35-44 (n=42, Mean=7.74) is significantly higher, so we can consider that doctors of this age experience more stress at work than the other age groups

The most commonly encountered symptoms of stress related to psychological and emotional changes were found to be: "burnout" (n=93), "poor night's sleep" (n=84) followed by "tiredness" (n=84), "irritation" (n=78) and behavioural changes such as "frequent headaches" (n=78). On the other hand, the least commonly encountered ones are "eating disorder" (n=20), "depression" (n=28) and "anxiety" (n=40). Meanwhile, female doctors more often experience symptoms such as frequent headaches, tiredness and/or emotional burnout, whilst male doctors more commonly feel irritated or suffer from anxiety. Stress coping strategies among doctors are mostly associated with emotion-focused coping. This involves attempts to reduce the negative emotional responses (such as anxiety, depression, irritation) associated with stress. Such methods include distraction and suppressing negative emotions or dealing with them through talking about how they feel. An absolute majority of male and female respondents prefer to shift their attitudes to positive beliefs, to be an "optimist" or to devote their free time to a hobby or something they really enjoy. Also, respondents often feel better when they try to share their feelings and problems with their family members in order to seek support. The results also show that regular physical exercise is not a very common coping mechanism among respondents. Similarly, regular use of drugs/food supplements are considered necessary by just 4% of family doctors and 4.5% of interns.

The factor "Large amount of paper documentation has to be filled, no electronic system" was considered as one of the most important work factors associated with stress; it affects most primary care doctors and had a mean score of 2.5. This work stressor was on average reported as "very important" by 68.4% of the primary care doctors who responded to the survey. Moreover, 50.3% of the respondents reported that they feel stressed a lot when they have a clear work-life imbalance or experience impossibility of development and/or training opportunities. The lack of public and professional understanding of the importance of primary care was also considered to be a major stress factor, with a mean score of 2.1. Furthermore, the results revealed that the role of "conflict with colleagues in the workplace" (with a mean of 1.5) and of "recognition of own weakness in competitive work environment" (with a mean score of 1.4) can be considered to be the least important of all the work stressors affecting primary care doctor's emotional stability.

Male doctors (n=37, mean "level of stress" =4.70) are overall less stressed than female doctors (n=140, mean "level of stress" =5.75) (sig df.=.024). Also, the table showed that the highest mean level of stress can be found in the South of Ukraine (mean=6.73) whilst the lowest mean level is in the West of Ukraine (mean=4.67).

The results of a Chi-Square Test that was used to check whether there is any association between specific demographic determinants of factors that affect the emotional stability of doctors. The results showed that age, work experience and location of work of doctors are statistically significantly (p<0.05) associated with their adaptation to the recent changes in the reform of the primary level of health care in Ukraine. Doctors with work experience of more than 20 years, who are in the age group 45-55 years, or who live in the eastern or central parts of Ukraine are more likely to feel stressed during the period of reforms in the primary health care sector.

Moreover, doctors from the eastern and central parts of Ukraine were found to be experiencing more stress than doctors from any other region of Ukraine because of the "large amount of paper documentation which has to be filled by hand" (s.df=.082).

Interestingly, some results showed that doctors' work experience also has a strong association with stresses related to "unrealistic expectations from their patients with complex medical and social problems". Young doctors with work experience of less than 5 years and those who have worked for more than 20 years in the industry similarly found it stressful to deal with such "complex patients".

Also result shows that there is not a big difference between whether the reforms were considered important or not depending on whether a doctor's region already had the reforms implemented or not ('not important' was chosen by 43.1% in 'no' regions and by 46.7% in 'yes' regions).

However, there is a difference in the level of importance that doctor's ascribed to the need to adapt between 'yes' (reforms implemented already) and 'no' (reforms not yet implemented) regions. In the case of 'yes' regions more respondents chose the top level 'very important' (33.3%) than in 'no' regions (24.5%). On the other hand, more respondents chose the middle option 'important' in 'no' regions (32.4%) than in 'yes' regions (20.0%).

DISCUSSION

Occupational stress is a common symptom among primary care physicians of different ages and genders in Ukraine. Eighty six percent of respondents experience "medium" and "high" level of stress. When considering gender, female doctors (mean = 5.75) in this study indicated they are more stressed at work than male doctors (mean = 4.7). On age, doctors who fall into the age group "35 to 44 years" experience significantly more stress at work than the other age groups (mean = 7.74). By region, the highest mean level of stress was found in the South of Ukraine (mean=6.73) whilst the lowest mean level is in the West of Ukraine (mean=4.67).

For primary care doctors the most common symptoms related to occupational stress were found to be burnout (n=93), poor night's sleep (n=84) and tiredness (n=84). Female doctors experience more often symptoms such as frequent headaches tiredness, burnout, whilst for male doctors feelings of irritation and anxiety are more common indicators of occupational stress.

An absolute majority of male and female respondents preferred to shift their attitudes to positive beliefs in order to reduce stress; to be an "optimist" (79%) or to devote their free time to a hobby or something they really enjoy (75%) were common answers. One respondent noted that he likes to spend time doing and this helps to calm his emotions down. Also, respondents often feel better when they try to share their feelings and problems with their family members (57%) in order to seek support.

In addition to this, it seems that the most factors which cause stress can be attributed to the large amount of desk work doctors have and activities like filling documentation and medical records by hand, imbalance between the daily amount of work with doctors' capabilities, and feeling their profession is not respected by the public. The experience of stress is more common in the eastern and central parts of Ukraine, where doctors feel more stressed because of large amount of paper documentation which has to be filled by hand (s.df=.082). Similarly, doctors whose work experience is more than 20 years, who are in the age group 45-55 years (N=31), or who live in the eastern or central parts of Ukraine are more likely to feel stressed during the period of reforms in the Ukrainian primary care sector.

Work experience also has a strong association with experiencing stress related to "unrealistic expectations from their patients with complex medical and social problems" (s.df=.082). Young doctors with work experience of less than 5 years and those who have worked for more than 20 years in the industry similarly find it stressful to deal with such "complex patients".

It was also found that, the older a primary care doctor becomes, the more stress he/she experiences due to feeling undervalued compared to other medical professionals from the other levels of care (sig. df=.081). However, this seems to be less important for doctors aged 55 years and above, who saw a decrease in the importance of this factor.

Finally, whether a doctor's region already had the primary care reforms implemented or not did not play a big role in doctors' responses on whether the health care reforms were important or not ('not important' was chosen by 43.1% in 'no' regions and by 46.7% in 'yes' regions).

CONCLUSIONS

- 1. Primary care doctors in Ukraine, from many different demographic backgrounds, experience high levels of occupational stress; this is a common health condition, which can have devastating personal and professional consequences. What is more, aside from primary care doctors' own health, there is also a serious risk that such conditions could reduce the quality and safety of care provided to patients and also lead to serious medical errors. For this reason, addressing the poor psychosocial and working conditions that doctors experience is very important to ensuring that they remain healthy and can provide effective medical services.
- 2. In addition to this, it seems that the most factors which cause stress can be attributed to the large amount of desk work doctors have and activities like filling documentation and medical records by hand, imbalance between the daily amount of work with doctors' capabilities, and feeling their profession is not respected by the public.
- 3. Understanding the influence of working conditions on the health of doctors is an important step in developing strategies to optimize the overall wellbeing of workers in the medical profession. This study identified that Ukrainian primary care doctors develop occupational stress through a number of work related factors related, amongst others, to factors like: patients' care, work flow, service provision, organization of primary care doctors' work and work schedule, employee benefit package and low income, relations with leadership and management teams, impossibility of qualitative continuous education and development, and access to world leading academic sources. In each case, this research identified the relative importance of the factor and explained the relevance of its impact on doctors and their levels of occupational stress.
- 4. Combatting occupational stress and reducing the effect of these factors will come down to a combination of multidisciplinary actions that various parties will have to implement. These include changes in the workplace environmental factors that lead to occupational stress as

well as the development of stress management programs that teach people how to cope better with stressful events and solutions to help manage doctors' stress levels. More interventional research targeting medical doctors is needed in order to identify the specific actions required to improve the psychological wellbeing of doctors, increase their professional career satisfaction and ensure continued high quality of care. Creation of such conditions should undoubtedly help increase levels of job satisfaction amongst medical personnel and therefore help prevent the development of professional burnout syndrome.

5. Finally, whilst this research has provided insight into the situation faced by primary health care doctors currently working in Ukraine, it should not be seen as a final, conclusive report, but instead as a starting point for future research.

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EMG-CHARACTERISTIC OF MASTICATORY MUSCLES IN PATIENTS WITH CLASS II MALOCCLUSION AND TEMPOROMANDIBULAR DISORDERS

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ABSTRACT

Introduction: A stable state of musculoskeletal system is provided by harmony of occlusion, the anatomy of temporomandibular joints, and the activity of the masticatory muscles under the control of peripheral and central nervous system. Surface electromyography (EMG) is a well-used modality and is used in dentistry to access the status of the muscles of mastication.

The aim of the research was to evaluate the EMG-characteristic of masticatory muscles in patients with TMD and Angle Class II malocclusion.

Materials and methods: The study comprised 23 patients with Angle Class II malocclusion and TMD. The average age of the subjects was $26,5 \pm 2,3$ years. Malocclusion was evaluated according to Angle classification, TMD – according to the Research Diagnostic Criteria (RDC/TMD). Registration of EMG-activity of masseter and anterior temporalis muscles was performed during maximum voluntary clenching, clenching on the right and left sides.

Results: EMG-activity of masticatory muscles are characterized by: 1) increased values of EMG-activity of temporal and masseter muscles – peak and average amplitude in tests of unilateral clenching and maximum clenching (values are greater than 2000 µV); 2) in unilateral clenching of jaws (on the left or right) the increased EMG-activity was detected on the balancing side; 3) in unilateral clenching of jaws (on the left or right) the increased EMG-activity load distribution between masseter and temporal muscles has been found.

Conclusions: Patients with Angle Class II malocclusion and TMD were found features of EMG-activity of masticatory muscles.

KEY WORDS: Angle Class II, temporomandibular disorders, masseter, temporalis muscles

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INTRODUCTION

The main goal of orthodontic treatment of patients is to provide functional, morphological and esthetic balance in facial skeleton in the connection with healthy holistic organism [1, 2]. A stable state of musculoskeletal system is provided by harmony of occlusion, the anatomy of temporomandibular joints, and the activity of the masticatory muscles under the control of peripheral and central nervous system. Healthy function of temporomandibular joints (TMJ) should be accompanied by stable dental occlusion, freely entered and exited without interferences, dictated and directed by healthy relaxed masticatory muscles for long-term stability of all of the interrelated structures. Healthy TMJ adapt to functional demands and dental occlusion, because form follows function: the shape of hard structures results from the performed function [1].

Temporomandibular disorders (TMD) comprise a group of masculoskeletal disorders that affect alteration in the stricter and/or function of one or more of the following: TMJ, masticatory muscles, the dentition and its supporting structures, and the complex neuromuscular system. Each TMD patient has a unique composite of different elements, which can involve the TM joint and masticatory muscles and often cause the pain or dysfunction leading to manifestation of psychological stress. The causes of TMD are different. Some studies have documented the role of malocclusion as a destabilizing and predisposing factor of TMD. The other studies investigated not the cause-effect relationship of dental occlusion in patients with TMD [1, 3].

Surface electromyography (EMG) is a well-used modality and is used in dentistry to access the status of the muscles of mastication. Numerous study have substantiated the reliability and reproducibility of surface EMG in the evaluation of muscle function. The data of surface EMG of masticatory muscles is a clinically useful and objective method of quantifying the functional status of dentofacial region, especially TMJs. The TMD patients have an elevated resting EMG muscle activity and weak or asymmetrical functional EMG muscle activity. There is considerable agreement among both clinicians that masticatory muscles activity is increased in symptomatic patients [1, 3-5].

At the same time, the issues on the functional state of the masticatory muscles in patients with malocclusion, namely Angle Class II malocclusion and TMD are not fully elucidated in the publications to date.

THE AIM

The aim of the research was to evaluate the EMG-characteristic of masticatory muscles in patients with TMD and Angle Class II malocclusion.

MATERIALS AND METHODS

The study group of the research consists of 23 patients aged 21 to 28 years with Angle Class II malocclusion and symptoms of TMD without previous orthodontic treatment. The average age of the subjects was $26,5 \pm 2,3$ years. The patients were assigned into groups according to the divisions of the Class II malocclusion: II-1 (11 patients) and II-2 (12 patients). Women were 16 (69,6%), men were 7 (30,6%).

Clinical examination of all patients was performed according to the standard algorithm of the examination of the orthodontic patient with evaluation of all parameters of the aesthetic, morphological and functional status. The class of occlusion was determined according to the Angle's classification (1899). The vertical overlap (OB-Overbite) was diagnosed according to Proffit (1996) and 4 degrees were distinguished: OB = 0-2 mm; 3-4 mm; 5-7 mm; more than 7 mm. The overjet (OJ) was also evaluated according to Proffit (1996), classifying into 4 groups: -0-3,5 mm; 3,5-6 mm; 6-9 mm; more than 9 mm [6]. The TMJ functioning has been studied by the static and dynamic clinical examinations. Symptoms of dysfunction were considered as follows: in static examination: pain in the joints and muscles; in dynamic examination: lateral deviation of the mandible from the mesial-sagittal plane in mouth opening, restricted mouth opening; articular noise (cracking and clicking) on palpation, and auscultation; pain or tension in masticatory muscles (masseter, anterior muscle, lateral pterygoid muscle) on palpation [6]. Diagnosis of TMD was determined according to the Research Diagnostic Criteria (RDC/TMD) on the base of clinical symptoms [7]. EMG of masticatory muscles was performed according to the recommendations Sforza et al. and Tartaglia et al [3, 4]. The masseter and anterior temporal muscles of both sides (left and right) were examined. Disposable silver chloride bipolar surface electrodes (diameter 10 mm, Neirosoft, Russia) were positioned on the muscular bellies parallel to muscular fibers [3]. The skin was cleaned with 70% alcohol prior to the placement of the electrodes. In particular, on the anterior temporalis muscles, the electrodes were positioned vertically, 3 cm of the zygomatic arch, just lateral to the eyebrow (lateral to the orbit of the eye); on the masseter muscles, the electrodes were parallel to muscular fibers, between the cheek bone and the corner of the jaw, with the upper pole of the electrode at the intersection between the tragus-labial commissure and the exocanthion-gonion lines. A disposable reference electrode was applied to the forehead. sEMG activity was recorded using a computerized instrument Synapsis and software by Neirotech (Russia). The analog EMG signal was amplified and digitized. Patients were sitting in a natural position without muscular tension, arms, legs were not crossed, head was held equally without support. Lips were kept closed slightly, tooth - in

physiological rest. To avoid the effect of fatigue, there was three minutes-rest between each test. EMG-activity was recorded in 3 tests, lasted 10s for each one. The first test or the maximum voluntary clenching (MVC) was performed in intercuspal position (without any material placed on the molar teeth) for evaluation of symmetry of the masseter and anterior temporalis muscles of the left and right sides. The second and third tests were one-side clenching, using cotton rolls on right and left sides respectively for evaluation of EMG-activity of masticatory muscles on working and balancing sides [3, 4].

The procedures received approval from the Bioethics Committee of the Ukrainian Medical Stomatological Academy (Poltava, Ukraine). All patients signed a statement of informed consent.

The obtained data was statistically analyzed using the Student's t-test and the Fisher's criterion X2. The hypotheses were verified at the level of significance p<0,05.

RESULTS

Among 23 selected subjects with distal occlusion (Angle Class II), 11 (47,8%) patients were with Class II-1 malocclusion and 12 (52,2%) patients with Class II-2 malocclusion. The overjet in patients with Class II-1 was on the average of $7,3 \pm 1,5$ mm. Patients with Class II-2 were characterized by deep overbite and retrusion of the upper incisors. In all examined patients we found specific clinical symptoms of TMD. More detailed analysis of the structure of the TMD symptoms proved that articular noises (cracking and clicking) occurred more often during the mouth opening and closing. In 13 observations (56,5%) clicking was registered in combination with other symptoms of dysfunction and in 4 subjects (17,4%) it was diagnosed as individual symptom. A fairly high rate of the lateral deviation of the lower jaw during mouth opening was observed in 7 cases (30,4%). Pain In the maxillofacial area was diagnosed in 10 (43,5%) patients. Noteworthy, we diagnosed not a single but the combination of several symptoms of dysfunction, accounting for 65,2% of cases (15 patients). Such symptoms as restricted mouth opening and pain in the joint on palpation was diagnosed only in combination with other symptoms in 5 (21.7%) subjects of the group Class II-2, and 3 subjects (13.3%) of the geoup II-2 Class of malocclusion. 10 (43,5%) patients had TMD of group Ia (myofacial pain), 4 (17,4%) – of group IIa (disk displacement with reduction), 9 (39,1%) subjects had combination of Ia and IIa groups.

The combination of TMD with disorders of function of masticatory organ (breathing, swallowing, speech, mastication) was observed in 17 patients (73,9%). The largest number of cases with the symptoms of TMD was revealed in mastication, speech and swallowing disorders.

The analysis of the resulting EMG-data is presented in Tables I, II, III.

The results of the EMG of masticatory muscles of patients with Class II-1 and II-2 of malocclusion showed that in the test of clenching on the left side the bioelectrical activity of the muscles on the balancing (right) side was almost equal

Indices -		M.masseter M.masseter M.temporalis dextra sinistra dextra				•		
indices -	ll-1 (n=11)	ll-2 (n=12)	ll-1 (n=11)	ll-2 (n=12)	ll-1 (n=11)	ll-2 (n=12)	ll-1 (n=11)	ll-2 (n=12)
Peak ampl. (µV)	1441,01 ±98,75	1347,65 ±58,55	2988,45 ±48,34	2876,35 ±88,55	1054,34 ±65,74	1834,09 ±87,72	1334,3 ±65,43	2034,02 ±93,52
a e) -	p≥(0,05	p≥	0,05	p≤0	,001	p≤(0,001
Average ampl. (µV)	223,33 ±28,25	219,22 ±18,05	434,22 ±37,55	421,31 ±12,13	207,44 ±26,10	288,33 ±24,53	212,33 ±21,44	334,45 ±11,98
ar ar	p≥(0,05	p≥(),05	p≤(),01	p≤	0,001

Table I. EMG-activity of masticatory muscles in the test of clenching of teeth on the left side (μ V)

Table II. EMG-activity of masticatory muscles in the test of clenching of teeth on the the right side (μ V)

Indices –		sseter ktra		sseter stra	M.tem dex	poralis (tra		nporalis istra
indices -	ll-1 (n=11)	ll-2 (n=12)	ll-1 (n=11)	ll-2 (n=12)	ll-1 (n=11)	ll-2 (n=12)	ll-1 (n=11)	ll-2 (n=12)
Peak ampl. (µV)	2886,31 ±68,05	2547,45 ±62,34	1683,45 ±53,343	1506,15 ±79,66	1634,19 ±99,43	1954,23 ±68,88	1356,32 ±65,43	1890,04 ±32,52
- be	p≤(0,01	p≥(),05	p≤(),01	p≤	0,001
Average ampl. (µV)	426,43 ±18,25	402,21 ±23,05	234,25 ±44,15	220,13 ±24,13	228,28 ±19,53	297,41 ±13,11	210,33 ±26,11	289,15 ±21,98
Av.	p≥(0,05	p≥(0,05	p≤(),01	p≤	≤0,05

to values on the working (left) side that was not typical for normal functioning of the masticatory muscles ($p \le 0,01$). At the same time high indices of bioelectrical muscle activity up to 2000 μ V and more have been observed on the working (left) side. The comparison between the study groups showed higher values of the amplitude of the temporal muscles (peak and average) in patients with Class II-2 malocclusion in compare to similar values in patients with Class II-1 malocclusion ($p \le 0,001$).

In the most cases in the test of clenching on the right side statistically significant difference of muscles amplitude of the balancing and working sides was found. The indices on the working side prevailed ($p \le 0,05$), that is shown in Table II.

At the same time the high indices of bioelectrical activity of masticatory muscles on the working (right) side with values greater than 2000 μ V were noted. The amplitude of EMG-activity of the temporal muscles (peak and average) was higher in patients with Class II-2 malocclusion as compared to patients with Class II-1 malocclusion (p \leq 0.05).

The example of the EMG of the masseter and temporal muscles in the test of teeth clenching on the right side of 25-year-old patient K. is presented in Figure 1.

The indices of the EMG-activity of the masseter muscles in the test of maximum voluntary clenching are presented in Tables III.

The results of EMG study during the test of maximum clenching showed higher values of the amplitude (peak

and average) of the masseter and temporal muscles on the different sides. There was discovered statistically significant difference in EMG-activity in patients with Class II-1 and II-2. Higher values of the right masseter muscle (its prevalence in the Group II-1; $p \le 0,001$), temporal muscle (its prevalence in the Group II-2 on the right and left sides; $p \le 0,001$) were found. These facts proved the occurrence of certain disproportions in the functioning of the musculo-masticatory apparatus of the examined patients. Thus, in patients with Class II-1 and TMD a certain disproportion of the activity of masseter muscle was noted. In patients with Class II-2 malocclusion and TMD the prevalence of EMG-activity of temporal muscles was occurred.

Discussion. Issues on achieving of the stable functional occlusion are widely elucidated in recent publications on orthodontics [6]. Long-term existence of occlusal disharmony causes displacement of the articular heads and occurrence of functional loads, which can lead to injury of the articular tissues, change of the shape of temporomandibular joint elements [8]. The analysis of publication data shows that Class II malocclusion causes TMD more often than normal occlusion [9]. According to [1, 8], the symptoms of TMD in patients with Angle Class II occur in 72% of cases.

Publications report about the variable etiology of TMD in Class II malocclusion. Functional disorders are crucial

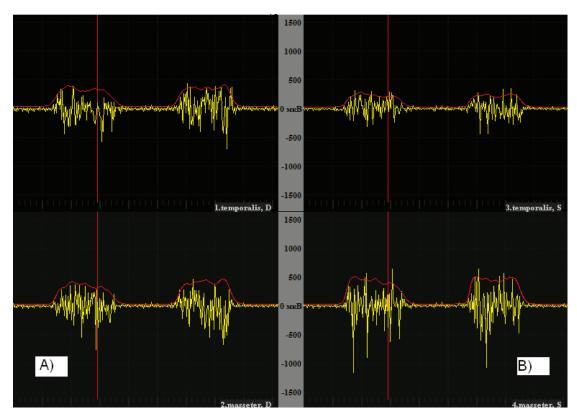


Figure 1. Fragment of EMG of 25-year-old patient K. during the test of clenching on the right side. EMG of muscle activity: a) on the right; b) on the left. The m. masseter amplitude prevails over the m.temporalis ampitude; insignificant difference between the indices of the working (MD, TD) and balancing (MS, TS) sides.

in the occurrence of pathological states of the TMJ [8, 9]. Symptoms of TMD in patients with distal occlusion, are observed in almost all cases, and associated with the following factors: palatine inclination of the anterior teeth of the upper jaw, deep anterior overbite, exaggerated curve of Spee, high and prominent cusps of the lateral teeth [1, 2, 8].

To sum up, the publications report that Angle Class II malocclusion is associated with changes in the state and function of TMJ. The authors highlight the worsening of the functional state of masticatory muscles both in TMD and Class II malocclusion. The relationship between the lateral pterygoid, temporal, masseter muscles and the articular disc through the muscle or connective tissue fibers influences on displacement of the disc during the movements of the mandible [10]. At the same time some authors hypothesize that neither temporal, nor masseter and lateral pterygoid muscles have a direct action on the articular disc, and only participate in signaling of its position [8, 11]. Consequently, data about EMG-activity of masticatory muscles in subjects with distal occlusion (Angle Class II malocclusion) and TMD are of great importance. The abovementioned can further promote objective validation of the methods of functional reorganization in the muscles during functional therapy.

Ultimately, publications show that distal occlusion is associated with TMD. However, no comparative characteristic of the structure of functional disorders of dento-jaw system was made, and their relationship with TMJ state in patients depending on the subdivision of malocclusion has not been proved to date. The authors observe the worsening of the functional state of masticatory muscles both in TMD and Class II malocclusion. Consequently, the purpose of our research was the enhancement of the efficacy of the TMJ dysfunction diagnosis in patients with Angle Class II malocclusion by the determination of the status of the electromyographic activity of the masseter muscles.

To summarize, the study of the dental status of patients with Angle Class II malocclusion revealed various clinical signs of TMD. It should be noted that, generally, we diagnosed not a single but the combination of several symptoms of dysfunction, accounted for $65,1\pm0,9\%$ (in 28 individuals out of 43). Among the latter the following combinations of symptoms prevailed: cracking and clicking with lateral deviation of the mandible, as well as cracking and clicking, restricted mouth opening with pain in the maxillofacial area. At the same time cracking and clicking in the joint has been diagnosed as the individual symptom the most frequently (18, $6\pm1,4\%$).

A detailed analysis of the structure and frequency of TMD proved, that clinical symptoms depends on the state of other functions of the dento-jaw area. It was found, that TMD occurred more frequently in patients with swallowing, chewing and speech dysfunctions, and, therefore, we hypothesize that the latter can act as the risk factors for occurrence of TMD.

Indices -		sseter «tra		sseter stra		poralis ctra		poralis stra
indices	ll-1 (n=11)	ll-2 (n=12)	ll-1 (n=11)	ll-2 (n=12)	ll-1 (n=11)	ll-2 (n=12)	ll-1 (n=11)	ll-2 (n=12)
Peak ampl. (µV)	2713,35 ±52,38	1956,33 ±55,05	2083,35 ±48,43	1996,75 ±69,66	1867,39 ±59,12	2314,43 ±44,81	1659,12 ±45,14	2079,44 ±62,45
a a	p≤0	,001	p≥(),05	p≤0	,001	p≤0	,001
Average ampl. (µV)	419,43 ±16,25	292,41 ±43,05	354,21 ±56,18	298,23 ±54,13	287,49 ±19,56	398,22 ±10,51	266,32 ±19,11	344,15 ±21,98
an an (µ	p≤0	,001	p≥(),05	p≤0	,001	p≤	0,05

Table III. EMG-activity of masticatory muscles in the test of maximum voluntary clenching (μ V)

CONCLUSIONS

Certain features of EMG-activity of masticatory muscles were found in patients with Angle Class II malocclusion and TMD, which are characterized by: 1) increased values of EMG-activity of temporal and masseter muscles – peak and average amplitude in tests of unilateral clenching and maximum clenching (values are greater than 2000 μ V); 2) in unilateral clenching of jaws (on the left or right) the increased EMG-activity was detected on the balancing side; 3) in unilateral clenching of jaws (on the left or right) the increased muscle activity on the working side with disproportional (asymmetric) load distribution between masseter and temporal muscles has been found.

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PHYSICAL INDICES OF THE ORAL FLUID IN CHILDREN WITH CARIES AND INTACT TEETH AT DIFFERENT AGE PERIODS

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ABSTRACT

Introduction: Caries occurs most frequently among dental diseases of the hard dental tissues in children. Its occurrence and intensity do not decrease, although scientists and practitioners make much efforts directed to the reduction of these indices

The aim: Therefore, the objective of our study was to investigate the indices of rate salivation and viscosity of the oral fluid in children at different age periods with caries and intact teeth.

Materials and methods: 134 children, 7-9 years old, and 89 children, 10-12 years old, studying at Poltava schools were examined. Dental examination was conducted according to the common methods. Caries intensity in all the children was determined by Caries Filling Extraction (CFE) Index, and CFE+cfe. To determine salivation rate the oral fluid was collected on empty stomach in the morning into sterile calibrated tubes during 5 minutes.

Results and conclusions: Investigations of physical indices of the oral fluid in children of 7-9 and 10-12 years of age did not find their reliable difference considering the child's age. Meanwhile the indices of salivation rate and oral fluid viscosity in children with caries and without it were found to differ much. That is, the course of carious process in children is associated with reduced salivation rate and increased index of the oral fluid viscosity, which in its turn deteriorates hygienic state of the oral cavity enabling to activate the activity of dental deposit microflora and its effect on enamel demineralization followed by occurrence of carious defect of temporary and especially permanent teeth recently erupted and poorly mineralized. The results obtained were calculated by variation statistics method. The indices were considered to be reliable with p<0,05.

KEY WORDS: children, caries, intact teeth, salivation rate, oral fluid viscosity

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INTRODUCTION

Caries occurs most frequently among dental diseases of the hard dental tissues in children. Its occurrence and intensity do not decrease, although scientists and practitioners make much efforts directed to the reduction of these indices [1,2]. There are a number of factors of the disease that should be drawn attention to - homeostasis of the oral fluid having continuous contact with the hard dental tissues located in the oral cavity. Caries resistance of the enamel of the erupted teeth depends much on its characteristics [3]. Salivation rate and viscosity of the oral fluid are important indices. In case of hypersalivation the rate of salivation is 0,61-2,40 ml/ min, in case of normal salivation rate - 0,31-0,60 ml/min, and in case of hyposalivation – 0,03-0,30 ml/min [4,5,6,7]. Reduced amount of the oral fluid and its increased viscosity result in accumulation of dental deposit affecting the dental resistance to caries [8,9].

THE AIM

Therefore, the objective of our study was to investigate the indices of rate salivation and viscosity of the oral fluid in children at different age periods 3 with caries and intact teeth.

MATERIALS AND METHODS

134 children, 7-9 years old, and 89 children, 10-12 years old, studying at Poltava schools were examined. Dental examination was conducted according to the common methods. Caries intensity in all the children was determined by Caries Filling Extraction (CFE) Index, and CFE+cfe.

To determine salivation rate the oral fluid was collected on empty stomach in the morning into sterile calibrated tubes during 5 minutes. Salivation rate (SR) was calculated according to the formula

$$SR = \frac{V}{T}$$

vwhere V- volume of the oral fluid in the tube,

T- time of collecting oral fluid.

Oral fluid viscosity was determined by Ostwald's viscosimeter according to the formula

$$\eta x = \frac{\eta 0 \cdot \frac{\mathrm{tx}}{\mathrm{t0}}}{10}$$

where ηx – viscosity of non-stimulated oral fluid (relative units),

 $\eta 0$ – relative water viscosity at the given temperature (relative units),

	Salivation rate index, ml/min				
Age in years	Mean value	In children with intact teeth	In children with caries (CFE+cf)	р	
7-9(l) 0,37±0,00 n=134		0,42±0,009 n=39	0,35±0,006 n=95	<0,001	
10	0,35±0,014 n=24	0,42±0,029 n=5	0,33±0,013 n=19	<0,05	
11	0,36±0,013 n=25	0,44±0,03 n=3	0,36±0,013 n=22	<0,05	
р ₁₀₋₁₁	>0,05	>0,05	>0,05		
12	0,37±0,009 n=40	0,41±0,013 n=7	0,37±0,011 n=33	<0,05	
р ₁₀₋₁₂	>0,05	>0,05	>0,05		
р ₁₁₋₁₂	>0,05	>0,05	>0,05		
10-12(II)	0,36±0,007 n=89	0,42±0,012 n=15	0,35±0,007 n=74	<0,001	
p _{I-II}	>0,05	>0,05	>0,05		
Total	0,37±0,004 n=223	0,42±0,007 n=56	0,35±0,005 n=167	<0,001	

Table 1. The mack of satisfation rate in children with calles of temporary and permanent teeth $(m \pm m$	on rate in children with caries of temporary and permanent teeth (M=	±m)
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Table II. Viscosity index of the oral fluid in children with caries of temporary and permanent teeth (M±m)

	Viscosity index of the oral fluid, relative units					
Age in years	Mean value	In children with intact teeth	In children with caries (CFE+cf)	р		
7-9(I)	1,82±0,03 n=134	1,45±0,02 n=39	1,98±0,03 n=95	<0,001		
10	1,90±0,06 n=24	1,52±0,05 n=5	2,01±0,05 n=19	<0,01		
11	2,03±0,06 n=25	1,50±0,06 n=3	2,11±0,04 n=22	<0,05		
р ₁₀₋₁₁	>0,05	>0,05	>0,05			
12 n=40	1,99±0,05	1,54±0,04 n=7	2,08±0,04 n=33	<0,001		
р ₁₀₋₁₂	>0,05	>0,05	>0,05			
р ₁₁₋₁₂	>0,05	>0,05	>0,05			
10-12(II) n=89	1,98±0,03	1,53±0,02 n=15	2,07±0,03 n=74	<0,001		
P _{I-II}	>0,05	>0,05	>0,05			
Total	1,89±0,02 n=223	1,49±0,02 n=54	2,02±0,02 n=167	<0,001		

 $\eta 0$ H2O with 20° C= 1* 1⁻³ Пa*C, tx – time of saliva outflow;

t0 – time of water outflow (10).

The results obtained were calculated by variation statistics method. The indices were considered to be reliable with $p \le 0.05$.

RESULTS

Investigation of salivation rate in children from 7 to 9 years (1st period of transitional dentition) conducted earlier did not show a reliable difference of the index available. But

comparison of children with intact teeth and afflicted by caries has found a reliable difference in all the age categories (8). Further investigation of the age periods from 10 to 12 years (2nd period of transitional dentition) demonstrated similar tendency in relations of caries and salivation rate (Table I). Therefore, children of the examined ages did not differ in the values of the examined index considering their age. Although a reliable difference of salivation rate was found in children with caries and without it.

All the average values of salivation rate were within the norm, that is, they corresponded to the normal salivation. It is indicative of the fact that in every particular case

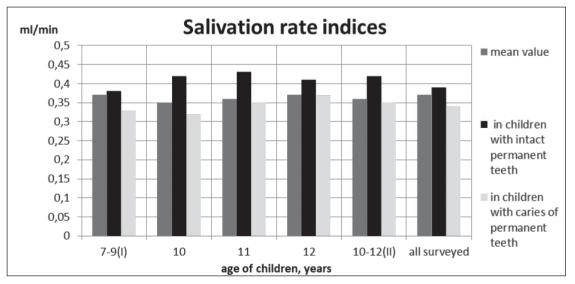


Fig. 1. Salivation rate index in children with caries of permanent teeth (M±m)

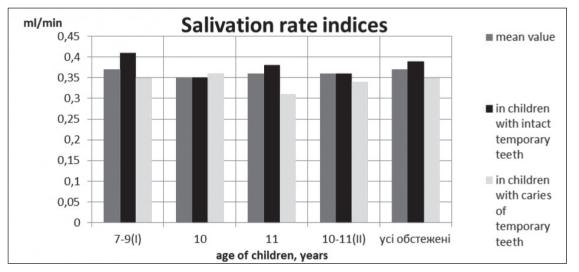


Fig. 2. Salivation rate index in children with caries of temporary teeth (M±m)

during examination of a patient this index should be paid attention to, since its decrease is a risk factor promoting occurrence of caries in children, especially during the first years after eruption of teeth, when active processes of enamel mineralization continue, it is not mature and possesses low caries resistance.

Examination of salivation rate in children considering caries of temporary and permanent teeth (separately) has found a tendency similar to that of children with a combined lesion of temporary and permanent teeth. Thus, children with caries had reliably lower indices of salivation rate than children with intact teeth. In all the groups of observation mean values were within the normal salivation rate (Fig. 1, 2).

Oral fluid viscosity is an important index to predict caries in children. Increased viscosity promotes a great amount of dental deposits provoking focal demineralization. Examination of viscosity index of the oral fluid in children of different ages did not find age differences, but it differs greatly in children with caries and without it (Table II).

In children with caries of temporary and permanent teeth viscosity index of the oral fluid is reliably higher than in children with intact teeth at all the examined age periods. It considers those children having caries of temporary or permanent teeth. Thus, in spite of the fact what teeth are afflicted (temporary or permanent, or both) viscosity is always higher in children with caries than in those without it (Fig.3, 4).

CONCLUSIONS

Therefore, our investigations of physical indices of the oral fluid in children of 7-9 and 10-12 years of age did not find their reliable difference considering the child's age. Meanwhile the indices of salivation rate and oral fluid viscosity in children with caries and without it were found to differ much. That is, the course of carious process in children is associated with reduced salivation rate and increased

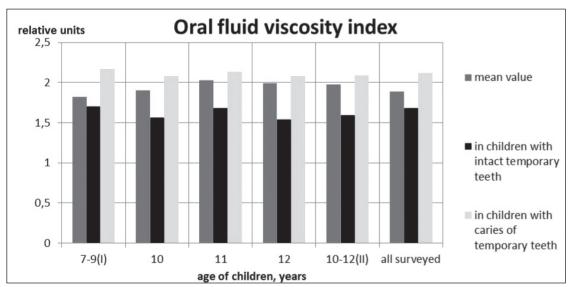
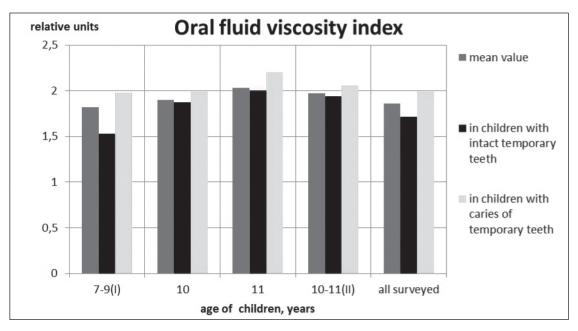


Fig. 3. Oral fluid viscosity index in children with caries of permanent teeth (M±m)





index of the oral fluid viscosity, which in its turn deteriorates hygienic state of the oral cavity enabling to activate the activity of dental deposit microflora and its effect on enamel demineralization followed by occurrence of carious defect of temporary and especially permanent teeth recently erupted and poorly mineralized.

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PECULIARITIES OF THE INTERACTION OF THE INDICATORS OF PSYCHOPHYSIOLOGICAL ADAPTATION OF MODERN STUDENTS IN THE CONTEXT OF THE EFFECTIVE MONITORING OF INDIVIDUAL HEALTH OF YOUNG WOMEN AND YOUNG MEN

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ABSTRACT

Introduction: Creation of modern information systems for supervision of the state of health of the population is impossible without effective monitoring of the state of individual health, the implementation of a comprehensive assessment of risk factors and the development of recommendations for the preservation of the health of individuals. The aim: Determination of the peculiarities of the interaction between the indicators of the psychophysiological adaptation of students during the academic year and throughout the period of stay in a higher medical education institution in the context of providing effective monitoring of the individual health of young women and young men.

Materials and methods: A set of psychophysiological functions of the organism of the students was investigated by instrumental techniques and computer diagnostic complex "Effecton Studio", applying of standardized t questionnaires the characteristics of the person were determined, and the prognostic evaluation of the obtained data was carried out with factor analysis procedures.

Results: It was determined that the following factors should be noted as the main factor formations during the analysis of the physiologically-determined correlates of processes psychophysiological adaptation: peculiarities of dynamic performance, balance of nervous processes and mobility of nerve processes, and mentally-determined correlates of processes psychophysiological adaptation: peculiarities of temperament and anxiety, character properties, level of subjective control of personality, aggressive manifestations of personality and emotional burnout.

Conclusions: In the study were determined the most peculiarities of the interaction of the indicators of psychophysiological adaptation of modern students in the context of providing efficient monitoring of individual health.

KEY WORDS: students, psychophysiological adaptation, individual health, interaction, factor analysis

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INTRODUCTION

Creation of modern information systems for supervision, monitoring and controlling the health of the population of the state is completely impossible without ensuring effective monitoring of the state of individual health, the establishment and implementation of a comprehensive assessment of both external (environmental factors, social living conditions etc.) and internal (the course of processes of psychophysiological adaptation, the level of development of psychophysiological functions of the organism and personality traits etc.) risk factors, as well as the definition of adequate ways to motivate the healthy way of life, the development of individually significant recommendations for the preservation and strengthening of health of various categories of the population, especially the most vulnerable, such as pupils and students [1, 2, 3, 4].

In this context, particular importance is attached to the approaches aimed at the effective implementation of a comprehensive analysis of extremely large in its scope of information arrays, which actually have data on the functional capabilities of the organism and the state of health of the subjects, to determine the number and nature of the primary, virtually significant factors, determinants and risk factors to be eliminated or to be influenced, act in a particular direction, modify etc [3, 5, 6, 7, 8].

It is precisely this that offers factor analysis procedures that allow a quantitative assessment of the characteristics of the investigated indicators to be directly determined on the basis of the evaluation of the characteristics, the level of expression of which is established and, therefore, provide an opportunity to identify a rather narrow set of properties for a significant part of the initial characteristics that characterize the connection between the groups of these signs and certain generalized factors. In general, factor analysis is attributed to statistical methods that allow for a completely correct statistical description of multidimensional objects that are characterized by the presence of a plurality of quantitative attributes, and, therefore, a redundancy of the initial characteristics of the system under study, based on the definition of the depth indicators that actually form them and determine [9, 10, 11].

THE AIM

The aim of the scientific research was to determine the peculiarities of the interaction between the indicators of the psychophysiological adaptation of students during the academic year and throughout the period of stay in the institution of higher medical education in the context of providing effective monitoring of the individual health of young women and young men.

MATERIALS AND METHODS

Scientific research was carried out on the basis of National Pirogov Memorial Medical University is among the students of the third course of the medical faculty during the academic year and among students of first, third and fifth courses of the medical faculty in the dynamics of the educational process at the institution of higher medical education. In total, during the observation period, there were 567 students, including 282 young women and 285 young men.

The methodological basis of the research carried out was fully consistent with the bioethical standards, the requirements of the current legislation and international standards, which was confirmed by the conclusion of the Ethics and Bioethics Committee of the National Pirogov Memorial Medical University. In particular, in the course of performing research work on the basis of the use of instrumental techniques and the use of the computer diagnostic complex "Effecton Studio", a complex of psychophysiological functions of the organism of students was subjected: indicators of functional peculiarities of higher nervous activity (latent period of simple and differentiated visual-motor reaction, mobility (MNP) and balance (BNP) of nerve processes), characteristics of attention, dynamic performance (DP) and tepping-testing), functional indicators the possibilities of the visual sensor system (the critical frequency of fusion of light blinkings) and the characteristics of the somatosensory analyzer (coordination of movements).

At the same time, a complex of psychodiagnostic research envisaged the definition of such peculiarities of the personality of young women and young men as characteristics of temperament (according to Eysenck Personality questionnaire and Rusalov questionnaire), indicators of state (SA) and trait (TA) anxiety (according to Spielberger state-trait anxiety inventory), characteristics of character (according to Mini-mult questionnaire and Schmieschek questionnaire (Schmieschek Fragebogen)), the level of subjective control (LSC) according to the Rotter's Locus of Control Scale questionnaire), peculiarities of asthenic and depressive states (according to Malkova questionnaire and Zung self-rating depression scale), indicators of social-psychological adaptation (according to "Social-psychological adaptation" test by Rogers and Diamond), characteristics of psychological protection mechanisms (PPM) (according to Life Style Index questionnaire by Plutchik, Kellerman and Conte), peculiarities of aggressive manifestations (according to the Bassa-Darkness questionnaire), characteristics of emotional burnout (EB) (according to Boyko

questionnaire).

In order to carry out a prognostic assessment of the data obtained and, in particular, to establish the peculiarities of communication and interdependence of the characteristics of the level of development of psychophysiological functions, peculiarities of the person and indicators of the state of health of students, statistical processing of the received data was carried out using the standard package of applied programs of multidimensional statistical analysis "Statistica 6.1" (license number BXXR901E245722FA) using descriptive statistics and factor analysis procedures.

RESULTS AND DISCUSSION

Considering the results obtained, it should be noted that at the beginning of the academic year the patterns of relationships between the studied parameters and the physiologically-determined correlates of the success of the processes of psychophysiological adaptation (y) that have been established should be presented as the following relationships (1-2):

- among young women: $y = 0,408f_1 + 0,236f_2 + 0,298f_3$; (1) where the factor f_1 was to be defined as "peculiarities of the DP" (the fraction of dispersion – 42,27%) and, above all, united in its structure the indicators reflecting the characteristics of the DP in monotony conditions and the data on the performance of the tepping-test during all the studied ones intervals; the factor f_2 was to be defined as "the characteristics of the MNP" (the fraction of dispersion – 25,10%) and combined both the actual characteristics of the BNP and the data on the number of premature reactions and latency; the factor f_3 was to be defined as "the characteristics of the MNP" (the fraction of dispersion – 19,22%) and included in its structure only the indicators of the actual MNP;

- among young men: $y = 0.517f_1 + 0.243f_2 + 0.192f_3$; (2)

where the factor f_1 was to be defined as "the characteristics of the DP" (the fraction of dispersion – 43.27%) and, in the first place, united in its structure the indicators reflecting the characteristics of the DP in the conditions of monotony and the data on the performance of the tepping-test during all the studied intervals apart from the last; the factor f_2 was to be defined as "the characteristics of the BNP" (the fraction of dispersion – 26,10%) and combined both the actual characteristics of the BNP and the data with respect to the amount of premature reactions and delayed reactions; the factor f_3 was to be defined as "the characteristics of the MNP" (the fraction of dispersion – 21,22%) and included in its structure the indicators of the actual MNP.

At the same time, at the end of the academic year, the regularities of the interactions between the studied indicators and the physiologically-determined correlates of the success of the processes of psychophysiological adaptation (y) that have been established should be presented in the form of such interactions (3-4):

- among young women : $y = 0,430f_1 + 0,226f_2 + 0,200f_3$; (3) where the factor f, was to be defined as "the characteris-

tics of the DP" (the fraction of dispersion - 44,22%) and,

above all, united in its structure the indicators reflecting the characteristics of the DP in the conditions of monotony and data on the performance of the tepping-test throughout all the subjects intervals; the factor f_2 was to be defined as "the characteristics of the BNP" (the fraction of dispersion – 25,96%) and combined both the actual characteristics of the BNP and data on the number of premature reactions and latency reactions; the factor f_3 was to be defined as "the characteristics of the MNP and the speed of the visual-motor reactions" (the fraction of the dispersion – 18,98%) and included in its structure the indicators of the MNP and, unlike the initial stage of observation, characteristics of the speed of the simple and differentiated visual-motor reactions;

- among young men: $y = 0,400f_1 + 0,271f_2 + 0,203f_3;$ (4)

where the factor f_1 was to be defined as "peculiarities of the DP" (the fraction of dispersion – 40,17%) and united in its structure the indicators reflecting the characteristics of the DP in the conditions of monotony and the data on the performance of the tepping-test during all the studied intervals; the factor f_2 was to be defined as the "characteristics of the BNP" (the fraction of dispersion – 25,88%) and combined both the actual characteristics of the BNP and data on the number of premature reactions and latency reactions; the factor f_3 was to be defined as "the characteristics of the MNP and the speed of the visual-motor reactions" (the fraction of the dispersion – 17,19%) and included in its structure the indicators of the MNP and, unlike the initial stage of observation, characteristics of the speed of the simple and differentiated visual-motor reaction.

Consequently, regardless of the nature of the training load, the organization of daily activities and sexual characteristics, the main determinants identified were the following factors: "peculiarities of the DP" and "peculiarities of the BNP", as well as at the beginning of the training period, the factor "peculiarities of the MNP", which included in its structure only the indicators of the MNP, and at the end of it – the factor "peculiarities of the MNP and the speed of the visual-motor reactions", which included in its structure as indicators of MNP, and in contrast to the initial stage of observation, the speed of a simple and differentiated visual-motor response.

At the same time, analyzing the results obtained, it should be noted that at the beginning of the academic term the regularities of the interaction between the studied indicators and the mentally-determined correlates of the success of the processes of psychophysiological adaptation (y) that have been established should be presented as the following interaction (5-6):

- among young women:

 $y = 0.567f_1 + 0.249f_2 + 0.216f_3 + 0.231f_4 + 0.146f_5;$ (5)

where the factor f_1 was to be defined as "the peculiarities of the personality of the LSC" (the fraction of dispersion – 29,00%) and, above all, united in its structure the indicators reflecting the characteristics of the general internment of the LSC and LSC in the field of educational relations and relations of health and illnesses; the factor f_2 was to be defined as "the peculiarities of temperament and anxiety" (the fraction of dispersion - 19,18%) and, first of all, combined the indicators of neuroticism, SA and TA; the factor f₃ was to be defined as "the peculiarities of the character properties" (the fraction of dispersion – 15,32%) and included in its structure, first of all, characteristics of the character properties of the hysteria (Hy), psychopathy (Pd) and hypomania (Ma); the factor f, was to be defined as "the peculiarities of aggressive manifestations of personality" (the fraction of dispersion - 14,38%) and united in its structure, first of all, the indicators of irritation, feeling of insult and the index of aggressiveness; factor f_5 was to be defined as "the peculiarities of EB and PPM" (the fraction of dispersion – 8.96%) and combined the leading characteristics of the EB in accordance with the phases of stress, resistance and exhaustion, and such PPM, as mechanisms of its protection on the scale regression, substitution and projection;

- among young men:

 $y = 0,449f_1 + 0,338f_2 + 0,247f_3 + 0,167f_4 + 0,101f_5;$ (6)

where the factor f, was to be defined as "the peculiarities of the character properties" (the fraction of dispersion -24,78%) and included in its structure, first of all, of the character properties on the scales of hypochondria (Hs), hysteria (Hy), psychopathy (Pd), paranoid (Pa), psychasthenia (Pt) and schizoid (Se); the factor f₂ was to be defined as "the peculiarities of aggressive manifestations of personality" (the fraction of dispersion - 17,30%) and united in its structure, first of all, indicators of indirect aggression, irritation, feelings of insult and indices of aggressiveness and hostility, the factor f_3 was to be defined as "the peculiarities of temperament and anxiety" (the fraction of dispersion - 16,30%) and combined the indicators of neuroticism, SA and TA; the factor f, was to be defined as "the peculiarities of the personality of the LSC" (the fraction of dispersion - 15,62%) and, above all, united in its structure the indicators reflecting the characteristics of the general internment of the LSC and LSC in the field of failures, educational relations and relations of health, and illnesses; the factor f₅ was to be defined as "the peculiarities of EB and PPM" (the fraction of dispersion – 9,23%) and, first of all, combined the leading characteristics of EB in accordance with the phases of stress, resistance and exhaustion, as well as such PPM, as its mechanisms on scale protection regression, substitution, negation and projection.

At the same time, at the end of the academic year, the regularities of the interactions between the studied indicators and the mentally-determined correlates of the success of the processes of psychophysiological adaptation (y) that have been established should be presented in the form of such interactions (7-8):

– among young women:

 $y = 0,500f_1 + 0,324f_2 + 0,146f_3 + 0,215f_4 + 0,152f_5;$ (7)

where the factor f_1 was to be defined as "the peculiarities of EB and asthenic and depressive states" (the fraction of dispersion – 29,54%) and included in its structure the leading characteristics of EB in accordance with the phases of stress, resistance and exhaustion, as well as indicators of the degree of expression of asthenic and depressive states; the factor f, was to be defined as the "peculiarities of the personality of the LSC" (the fraction of dispersion - 17,57%) and, above all, united in its structure the indicators reflecting the characteristics of the general internment of the LSC and LSC in the field of achievements, educational relation and relations of health and illnesses; the factor f_{1} was to be defined as "the peculiarities of the character properties" (the fraction of dispersion - 16,04%) and combines, first of all, of the character properties on the scale of the hypochondria (Hs), depression (D), hysteria (Hy), psychopathy (Pd) and hypomania (Ma); factor f_4 was to be defined as "the peculiarities of aggressive manifestations of personality" (the fraction of dispersion – 15,13%) and included in its structure, first of all, indicators of negativism, irritation and indices of aggressiveness and hostility; factor f_{s} was to be defined as "the peculiarities of temperament and anxiety" (the fraction of dispersion – 9,39%) and, above all, united in its structure indicators of neuroticism, SA and TA;

- among young men:

 $y = 0.451f_1 + 0.148f_2 + 0.339f_3 + 0.260f_4 + 0.146f_5;$ (8)where the factor f, was to be defined as "the peculiarities of EB and asthenic and depressive states" (the fraction of dispersion - 26.19%) and included in its structure the leading characteristics of EB in accordance with the phases of stress, resistance and exhaustion, as well as indicators of the degree of expression of asthenic and depressive states; the factor f₂ was to be defined as "the peculiarities of the character properties" (fraction of dispersion - 18.47%) and united in its structure, first of all, of the character properties on the scales of hypochondria (Hs), depression (D), psychopathy (Pd), psychasthenia (Pt) and hypomania (Ma); factor f_{a} was to be defined as "the peculiarities of aggressive manifestations of personality" (fraction of dispersion – 15.90%) and, above all, combined the indicators of verbal and indirect aggression, irritation and indices of aggression and hostility; the factor f_4 was to be defined as "the peculiarities of the personality of the LSC" (the fraction of dispersion – 14,68%) and, first of all, included in its structure the indicators reflecting the characteristics of the general internment of the LSC and LSC in the field of failures, educational relations and relations of health and illnesses; factor f_5 was to be defined as "the peculiarities of temperament and anxiety" (fraction of dispersion -10,17%) and, above all, united in its structure indicators of neuroticism, SA and TA.

Thus, regardless of the period of study, the nature of the training load, the organization of daily activities and sexual characteristics as the main factor entities that were identified, the following factors were noted: "peculiarities of temperament and anxiety", "peculiarities of character properties", "peculiarities of the personality of the LSC", "peculiarities of aggressive manifestations of personality", as well as "peculiarities of the EB", which at the beginning of the educational period was closely and inseparably linked with a number of peculiarities of the PPM, at the end of it – with the indicators ac tense and depressive states.

However, the application of factor analysis procedures to carry out a psychophysiological assessment of the patterns of interdependence between the characteristics of the state of health and indicators of the development of personality characteristics of young women and young men who were at different stages of obtaining higher medical education showed an extremely stable picture of the interaction between the investigated indicators, as well as the presence of peculiar "migrating" components of factors that have been established. Thus, among the young women and young men, the most significant influence on the leading characteristics of the level of health during the entire training period was made by factors that, above all, should be interpreted as: "peculiarities of social-psychological adaptation" (the fraction of dispersion - 19,00-27,65% for young women and 19,00-29,87% for young men), "peculiarities of the level of EB" (the fraction of dispersion – 19,00-22,02% for young women and 18,78-29,87% for young men), "peculiarities of aggressive manifestations of personality" (the fraction of dispersion - 8,86-17,52% for young women and 8,86-17,56% for young men), "peculiarities of anxiety and character" (the fraction of dispersion - 9,17-20.06% for young women and 4,69-8,86% for young men), "peculiarities of temperament and LSC" (the fraction of dispersion - 4,29-8,56% in young women and 4,69-4,89% in young men).

One should pay attention to the presence of such a component of the factors that have been identified as "migratory peculiarities" of the PPM, joining the various stages of higher medical education to other factor groups. Thus, among the students, who studied at the first year, the mentioned component joined the factor "peculiarities of anxiety and character" forming the factor "peculiarities of anxiety, character and PPM", among students, who studied at the third year, – to the factor "peculiarities of social-psychological adaptation", forming the factor "peculiarities of social-psychological adaptation and PPM", among students who studied at the fifth year – to the factor "peculiarities of the level of EB", forming the factor "peculiarities EB level t and PPM".

In addition, attention and changes in the content of the factor grouping "peculiarities of the PPM". Thus, among first-year students its structure included indicators such as regression, negation, and projection, among third-year students its structure consisted of indicators of such an PPM as compensation and rationalization, which are considered to be the most constructive, among graduate students its structure the indicators of such PPM as displacement and projection, which considered the least constructive.

CONCLUSIONS

1. Application of the leading procedures of multidimensional statistical analysis, which include factor analysis procedures, allowed to determine the most significant and extremely important in the context of providing effective monitoring of the individual health of young women and young men the interaction between the characteristics of the psychophysiological adaptation of student youth during the academic year and throughout the period of stay in a higher medical education institution.

- 2. During the use of factor analysis procedures, the leading factors that exert a pronounced influence on the peculiarities of the processes of adaptation transformation processes and the interactions established between a number of nominal indicators of the level of development of psychophysiological functions and the formation of the peculiarities of the student's personality and the level of psychophysiological adaptation during the academic year are revealed. It was determined that regardless of the nature of the training load, the organization of daily activities and sexual peculiarities, as the main factor formations that were identified during the analysis of the physiologically-determined correlates of the progress of the processes of psychophysiological adaptation, it was noted the following factors: "the peculiarities of dynamic performance, peculiarities of the balance of the nervous processes", as well as at the beginning of the training period, the factor "peculiarities of the mobility of the nerve processes", which included in its structure only oscillation the mobility of the nervous processes, and in the end it is a factor "the peculiarities of the mobility of the nerve processes and the speed of the visual-motor reactions", which included in its structure as indicators of the mobility of the nerve processes and, unlike the initial stage of observation, characteristics of the speed of a simple and differentiated visual-motor reaction. At the same time, it should be noted that regardless of the period of study, the nature of the training load, organization of daily activities and sexual peculiarities, as the main factor entities identified during the analysis of the mentally-determined correlates of the success of the processes of psychophysiological adaptation, the following factors were noted: "peculiarities temperament and anxiety", "peculiarities of character properties", "peculiarities of the level of subjective control of personality", "peculiarities of aggressive manifestations of personality" and "peculiarities emotional burnout" that at the beginning of training time was closely and inextricably linked with a number of psychological defense mechanisms, at the end of it – with those asthenic and depressive states.
- 3. The use of factor analysis procedures to carry out a psychophysiological assessment of the patterns of interdependence between the characteristics of the state of health and the indicators of the development of the peculiarities of the personality of young women and young men who were at different stages of obtaining higher medical education showed an extremely stable and stable picture of the interaction between the investigated indicators and the presence peculiar "migrating" components of the factors that have been established. Thus, in young women and young men, the most significant influence on the leading characteristics of the level of health throughout the entire period of time was made by factors that, first of all, should be interpreted as: "peculiarities of social-psychological adaptation", "peculiarities of the level of emotional burnout", "peculiarities of aggressive manifestations

of personality", "peculiarities of anxiety and character", "peculiarities of temperament and level of subjective control". One should pay attention to the presence of such a component of the factors that were identified as "peculiarities of the mechanisms of psychological protection" that "migrated", joining the various stages of obtaining higher medical education in other factor groups.

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THE PHYSIOLOGICAL CHARACTERISTIC SYSTEM CONTROL OF WORKING ACTIVITY IN THE PROCESS OF TRAINING PROSPECTIVE HEALTHCARE PROFESSIONALS

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ABSTRACT

Introduction: In this article the authors 0.V. Petryshyn, E.Ya. Shapoval and S.M.Novik claim that nowadays the scientists do not pay enough attention to the development of the essential professional psychophysical qualities of a healthcare professional and do not ascertain the influence of Physical Education on personality features. That is why the study of the problem which provides the adequate level of adaptation, health strengthening and the development of professional psychophysical competence is relevant. Practical research value lies in the development of the program by the authors of the article (which is based on the authentic ideas, henceforth we further will call it as Program) and methodological support material for Physical Education course in order to have an efficient impact on systematic development of students' psychophysical qualities while using experimental diagnostic methods of estimation of perspective specialists' technical and tactical background and physical one respectively. We are speaking about the professional physical trainings for students who pursue their degree while studying at the following faculties as Medical Faculty, Pediatrician and Stomatological Faculties where sports playing technics are implemented.

The aim - is to define an effectiveness of methodology for diagnostic and estimation of perspective specialists' physical qualification.

Materials and methods: 180 students of UMSA took part in the experiment. They were divided into two groups: the experimental group (EG – 91 students) and the control group (CG – 89 students). To define the level of students' (EG) readiness index the range of the effective certificated medical biological methods were used.

Results and conclusions: The influence on general physical state index was studied during the implementation of the Program PPPT which stands for Practical Professional Physical Training. This index shows the functional state and psychophysical abilities that is important for professional activity of medical workers. The tests gave us an opportunity to diagnose individual level of physical abilities and control the effectiveness of physical education during PPPT. It is proved that Program implementation propels an improvement of each component of students' (EG) practical professional physical abilities and functional preparation as well. The effectiveness of given PPPT model was confirmed with the help of statistic changes of general functional preparation. Average index increase is by 25% in students from EG and only by 7,5% in those from CG.

KEY WORDS: higher medical education, professional preparation, psychophysical qualities, Program, diagnostic techniques

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INTRODUCTION

The scientists M.M. Bobyrieva [1], V.I. Mandrykov [2], I.Yu. Nikolaichuk [3] are studying the issue of the influence of Physical Education on medical specialists' personal development nowadays. According to the modern qualification requests the Program PPPT includes harmonic integral development of physical, moral and esthetic qualities. The main task for medical workers is to form personal psychophysical qualities on the basis of humanism, ethics, and skills for effective and caring communication with the sick in order to create the atmosphere of optimism, freshness and bravery. So, Physical Education is important not only for students to keep fit but also to develop a well-balanced qualified personality.

Physical and mental abilities of a student have the same physiological basis of support systems which are interdependent. These abilities require adaptation, physical health and the development of moving skills and knowledge. That is why the low level of psychophysical preparation can have a bad influence on the effectiveness of studying process and on the ability to be a competent specialist in medical sphere.

The main feature of modern system of training specialists in higher education institutions is characterized by the intensive process of studying and psychological strength which resulted in the lack of moving activities that consequently will lead to the bad health conditions for professional medical working activity [1].

A person in order to be successful during their working life must be a goal-targeted individual so that to achieve their aim. Actions are closely connected with physiological and psychological activity, which determine and control their actions. So, working activity is a combination of practical, physiological and psychological aspects.

Practical activity involves aspects which are dealt with the performance of a certain system of movements aimed at the changes in physical states or in properties of the working object in order to turn it into the product of working. Practical activity - involved aspect is seen as an external (physical) side. Physiological aspect is revealed in its social nature in order to use worker's physiological functions to create social values. All organs and their systems (brain, muscles, vessels, heart, lungs etc.) are involved in the working process. While working physiological functions are being mobilized and muscles energy as well as nervous are worn out. So, the group of muscles assures working moves and actions. Their contractions are regulated by a neuronal excitation that comes to the neuronal center. A blood flow is directed to these muscles and transports nutrients, oxygen and takes back the products of decomposition which provide the energy. The intensive heart and respiratory system work enables blood circulation and metabolism. All these processes, which are connected with vital functioning of the worker's organism, are organized according to the working conditions. The bad environment can cause overextension of physiological system and pathological changes, in contrast to good one that cause productivity increasing [2, 4].

At the same time physiological processes governed by working activity keep particular independence (daily biological rhythm, speed of reaction, muscle power and endurance etc.) and special constants of vital activity (homeostasis).

Thus, the working process is a physiological process of spending human energy. A person's working potential is determined by his level of education and qualification preparation, knowledge, skills, abilities, attitude to the work, enthusiasm, activity and workability.

The worker's potential resources are not involved automatically into the action, but they are regulated by a person consciously. Personal views, motives and interests regulate his working concept. It is the working concept that forms the basis for increasing worker's competitiveness and mobility on job market, career choice and form of occupation (employment, self-employment, full, part-time etc.) [3].

During the working process a worker's tension is caused by two types of capacity: mental and muscular. The muscular capacity is revealed in the form of dynamic movements and static tension, while the nerves capacity is clear in the form of mental, emotional and sensory (on senses) loads.

A working purpose is characterized by the ratio of the muscular and nervous energy, by different performing and creative functions, by mechanical and mental operations. Each type of work is characterized by a certain level of the general employee's motor activity, which may be sufficient or insufficient (lower than the biological need for movement). Thus, favorable working conditions satisfy a human's need for motor activity, train his functional systems, develop his cognitive and communicative abilities, promote the realization of creative potential during the fulfillment of the main function as the creation of material and spiritual goods for an individual's needs and society as a whole.

The analysis of the educational qualification characteristics and PPPT Program for pursuing a degree on the faculties as Medical faculty, Pediatrician and Stomatological Faculties states the necessity to develop a widely educated personality who takes care of preserving and strengthening their own health as well as their patients and to up rise mental and physical workability of the patients. However, the study of literary sources showed that the scientists do not pay enough attention to the substantiation of a doctor's professional psychophysical qualities and do not cover the impact of Physical Education on the education and development of these qualities when the tasks of the subject Physical Education are set for the students of higher medical schools [5].

THE AIM

The aim is to define a peculiar impact of experimental diagnostic method of estimation of technical, tactical and physical preparation of future specialists at Medical, Pediatrician and Stomatological Faculties. The method is based on the implementation of sport playing techniques in the process of PPPT and its influence on students' psychophysical qualities.

MATERIALS AND METHODS

180 students of Ukrainian Medical Stomatology Academy (UMSA, Poltava, Ukraine) took part in the experiment. They were divided into two groups: experimental group (EG – 91 students) and control group (CG – 89 students). Effective certificated medical biological methods and motor tests of physical abilities were used for the diagnostic of students' (EG) preparation.

RESULTS AND DISCUSSION

Having analyzed the theory and practice of Physical Education we found out that the effectiveness of working operations depends on the physical and functional readiness of a person's body for work. Each profession requires a certain level of worker's psychophysiological potential. Thus, forming of psychophysical qualities must be one of the main tasks of qualification preparation. PPPT as a branch of Physical Education can fulfill this task. Based on the physicians' working characteristics we have set a list of requirements for future specialist's health, their physical qualities, motor skills and psychophysiological functions. These are qualities that are related to successful mastery in medical profession and they are to be developed and improved [6].

In our opinion, it is necessary to identify the key components of PPPT - the physical (biological) and psycho-physiological components of Physical Education for full understanding of the importance of the concept of PPPT for workers' health.

Physical (biological) component of Physical Education implies a person's ability to develop the physical component of his health; awareness of one's own physicality as a person's quality, ability to listen to the functioning of the organism, its systems and organs, and at the first sign of deviation from the norm fix it. For a successful professional acting, the future specialists need to have a sufficient level of strength, endurance, flexibility, speed, and brisk performance. According to the works written by H.Vlasov, O.Zaplatin, V. Mandrykov and to our opinion as well the most important quality of a perspective doctor is his physical endurance, which implies a low level of tiredness and fatigue but a high level of workability. Coordination and muscle sensitivity are also important due to the specifics of the doctors' professional activity: a working day with long hours (night long hours and unscheduled duties);serious workload (difficult work of ambulance workers, doctors of the Ministry of Emergencies, family and district doctors, medical workers in rural areas, hours of tedious surgery, first medical aid, transportation of patients or victims, accuracy of movements and muscular coordination (important to the work of vertebrologists, anesthesiologists, cardiologists and neurosurgeons, obstetricians, traumatologists and orthopedists)).

Psychophysiological component of Physical Education depends on the functional state of the brain; it is characterized by the level and quality of mental ability, the development of attention and memory, the degree of emotional stability, the development of volitional qualities. As it is known, in medicine, the human factor is critical, therefore doctor's psychophysiological features, psycho-physiological self-analysis, optimization of functional states that manifest in professional activities, have a crucial effect on the quality of work and as a result patients' health and life. In addition, the psycho-physiological component contributes to solving the tasks of professional specialization and suitability for a particular sphere of medical activity as well as to identifying and forming important psychological qualities for professional activity.

In our opinion, this fact mentioned above will promote more effective production activity, increase general efficiency, rise health level and prevent professional diseases. Therefore, PPPT course involves the development of appropriate knowledge and skills which are necessary for specialists' practice [7]. For medical universities, the main task of professional Physical Education is to make students take care of their physical form, show more autonomy and activity even at the stage of admission to higher educational institutions as well as during their study period. In our opinion the most relevant issue is to define an effectiveness of the diagnostic method for assessing future specialists' technical, tactical and physical readiness. The problem of professional physical preparation diagnostics is solved only partially because of the quantity of existing occupations, their dynamic upgrade and the lack of researches of the issue in the scientific literature. However some indicative standards have already been included into the corresponding official programs of the PPPT.

We have developed a structural and functional PPPT model on the basis of the research of national and foreign scientists and on the analysis of scientific pedagogical literature. The structural-functional model contains the following components: targeting, theoretical-methodological, content, organizational (procedural); diagnostic. The last one has a great importance for our study, because it determines the development of qualities that provide the PPPT of future specialists (value-motivational, cognitive-informational, operational-active, professional-reflexive), evaluation criteria and levels of formation of these components.

The diagnostic component of the developed model contains the necessary diagnostic tools for checking the quality of PPPT of students in the process of mastering their specialty. They are as following : criteria, indicators, levels.

It should be noted that pedagogical and psychological science has different views on the criteria for evaluating the physical readiness of future specialists for professional activity. In the process of formation of a future specialist, PPPT has a great impact on the formation of his character, set of values, the development of the student's motivational and emotional spheres. At the same time, its main task is to form the specialists' physical potential of a particular kind of professional activity [8].

The system approach to the study of the physiological and psychological patterns of the employee's working activity involves the application of such methods of research as physiological, psychological, statistical, mathematical, etc. In our research the main method is a physiological one that is used to study the functional state of the worker and evaluate body systems' reaction on a specific job load [9].

According to this method, we were able to determine the level of formation of so-called operative dynamic stereotype.

The operative dynamic stereotypes of individual professions have different structures. The ratio of reflexes and the interaction of body functions cause these differences. This is because of the vegetative functions and their changes that provide the activity of the whole organism and the implementation of the dynamic stereotype. Theformation of the operative dynamic stereotype leads to a particular automatization of the worker's action due to the establishment of temporal connections between neuronal centers. The automatic action facilitates the work and frees neurons for creative activity, promotes their workability and productivity.

Physiological principles of rationalization of working movements are the basis of the development of rational working processes, operations and techniques. To do this, worker selects the workplace, which corresponds to the nature of the working, worker's physiological and anthropometrical peculiarities, determines stability of the standing and sitting position, inclination and turns of the body and the head, the static tension, the convenience and safety of the work; the trajectories and the distance of work units movement, the speed of movements and the possibility to replace one motion by another one, the possibility of combining movements, the tempo and the rhythm of work [10].

The most common physiological method includes the methods for investigating the functional state of the central neuronal system, the motor apparatus, muscular strength and endurance, respiration, the state of the car-

Physical abilities	Before the experiment			After the experiment		
	EG(n=40) X±S	CG(n=40) X±S	р	EG(n=40) X±S	CG(n=40) X±S	р
Coordination (c)	10,2±0,16	10,4±0,18	>0,05	8,4±0,14	9,2±0,15	<0,05
Speed(c)	15,1±0,17	15,3±0,13	>0,05	13,7±0,13	14,2±0,15	<0,05
Balance(c)	39,6± 2,16	38,1±1,48	>0,05	54,8±1,78	41,1±2,23	<0,001
Hand coordination(c)	10,7±0,54	10,8± 0,88	>0,05	8,1±0,59	9,7±0,63	<0,05
Power endurance(c)	33,9±,84	34,7±1,39	>0,05	47,6±1,72	40,1±1,7	<0,001
Static power endurance(c)	32,6±1,40	32,3±1,64	>0,05	45,1±1,34	39,7±1,67	<0,001
Speed and power(м)	6,0±0,36	6,1±0,35	>0,05	7,2±0,29	6,7±0,32	<0,05

Table I. Students' functional state index (EG and CG before and after the experiment)

diovascular system, analyzers. We have used the method for measuring the latent time of reflex reactions to evaluate the functional state of the neuronal system. One of these techniques is sensorimotor analysatory reflexometry. In this case, the time of the simple reaction or the time of the recognition and selection of the reaction can be studied. When increasing the reaction time decreasing in efficiency is indicated.

We studied the motor apparatus of the worker using the methods of tremometry, coordinator metry, dynamometry, ergography, etc. Muscle tremor has been considered as an index of tiredness.

We have used dynamometry to determine the strength and endurance of the individual muscle groups. To register the fulfillment of a particular piece of physical work by the individual motor units before the sense of tiredness the following ergographs (wrists, shoulders, etc.) have been used. The ergographs make it possible to record the graph of worker's muscular tiredness.

We have studied the state of the students' cardiovascular system using pulsometry and measuring blood pressure. The functional state of an employee's respiratory organs has been studied by methods of pneumography and spirometry. With the help of pneumograph respiratory movements of the chest have been recorded and by the spirometer the respiratory volume and the vital capacity of the lungs have been measured. With such data, the minute volume of breath has been calculated. The changes in frequency and depth of breathing were the signals of physical work intensity [11].

Effective research of the employee's functional state, his workability, tiredness and professional suitability can be provided with a combination of different methods of research. That is confirmed by the data in the table I.

The statistical analysis of the testing results of the functional state of EG students who followed the Program, shows that there are positive changes in the quantitative parameters of their indexes, the probability of differences between them is reliable (p < 0.05-p < 0.001). The reliability of the differences between the final functional state indexes of the EG and the CG for the benefit of the first ones has also been proved and statistically verified.

The difference (p<0,05-0,001) between the initial and final indexes of students' professional qualities development is confirmed. It is worth mentioning that the following parameters as the speed and power abilities, the static power endurance, power endurance, hand coordination, body balance were under consideration. The growth of the EG students' indexes mentioned above was at the level from 9 to 28% with the reliability of the differences (p <0,05 - 0,001).

The perfection of working skills (operative dynamic stereotype) has been evaluated by the means of quantitative and qualitative indexes of work, as well as by such physiological indicators:

- the stability of the skills which are characterized by the variability of the time spent on work performance, the amplitude and length of the trajectory of movements;
- the concentration on the neuronal processes when the developed reflexes are formed only in response to the stimuli of a certain quality and do not occur to stimuli that have different signal meaning.

The research does not cover all the aspects of the problem given. The issue of the development of the following method which could improve women's organisms with the assistance of modern technologies (based on the research conducted on Medical Faculty students) and the further comparison of these results with the results based on the research conducted on the female students of pedagogical universities could be considered as the perspective for further investigation.

CONCLUSIONS

It is proved that Program implementation propels an improvement of each component of students' (EG) practical professional physical abilities and functional preparation as well. The effectiveness of given PPPT model was confirmed with the help of statistic changes of general functional preparation. Average index increase is by 25% in students from EG and only by 7,5% in those from CG.

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MEDICO-SOCIAL VALUE OF OSTEOARTHRITIS. SECONDARY PREVENTION AND TREATMENT OF OSTEOARTHRITIS IN COMORBIDITY WITH CHRONIC GASTRITIS

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ABSTRACT

Introduction: Medico-social significance of osteoarthritis is due to a number of factors, one of which is associated with the need for long-term anti-inflammatory therapy, which is associated with undesirable side effects.

The aim: Identify the features of the course of chronic gastritis in patients taking selective NSAIDs for osteoarthritis.

Materials and methods: Were examined 122 patients with osteoarthrosis, who had verified chronic gastritis in the anamnesis (50 males and 72 females), aged from 42 to 64. Control group included 40 patients with osteoarthrosis without gastroduodenal zone pathology in the anamnesis. For arthralgia relief, patients were prescribed to intake meloxicam (average dose $- 12.5 \pm 1.39$ mg/day) or nimesulide (average dose $- 150 \pm 14.91$ mg/day).

Results: It was determined that prescription of selective NSAIDs (meloxicam and nimesulide) raised the risk of NSAIDs gastropathy/dyspepsia in 2.9 times (P<0.03) in patients with chronic gastritis in the anamnesis than in patients without associated gastroduodenal zone pathology. Atrophy of gastric mucous membrane was associated with higher risks (P>0.05) of erosive gastropathy.

Conclusions: With the purpose of gastropathy prevention upon taking NSAIDs, patients with chronic gastritis in the anamnesis are recommended to undergo gastroprotective therapy.

KEY WORDS: chronic gastritis, NSAIDs gastropathy, NSAIDs dyspepsia

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INTRODUCTION

Osteoarthritis (OA) – is a chronic progressive degenerative joint disease resulting from the degradation of the articular fungus with subsequent changes in the subchondral bone and the development of marginal osteophytes, leading to loss of cartilage and concomitant damage to other components of the joint (synovium, ligaments) [1, 2].

Arthrosis is the most common form of articular pathology. Radiographic signs of osteoarthritis occur in most people over 65, and about 80% of them are over 75 years old. 11% of the population over 60 years have symptomatic (with clinical manifestations) osteoarthritis of the knee joint. In the US, among persons over 30 years of age, symptomatic osteoarthritis of the knee occurs in about 6%, and in the hip joint - in about 3% . Osteoarthritis causes many problems associated with walking and climbing stairs. This is the most common cause of hip and knee arthroplasty. The frequency of osteoarthritis increases with age, with obvious sexual differences. Up to the age of 50, the prevalence of osteoarthritis in most cases is higher in men than in women. After 50 years, osteoarthritis of the knee, hand and foot joints is more common in women. In population studies, the incidence and prevalence of the disease increase 2-10 times over a period of 30 to 65 years and continue to increase with age [3, 4].

In the treatment of osteoarthritis, there are two main groups of drugs: non-steroidal anti-inflammatory drugs (NSAIDs) and cartilage-modifying agents of delayed action. At the same time, the use of NSAIDs has a high risk of unwanted side effects, primarily from the digestive system. This circumstance causes a number of restrictions on the use of this group of drugs in patients with diseases of the stomach [2, 5].

The problem of gastrointestinal safety upon the use of NSAIDs in patients with chronic gastroduodenal pathology is largely unsolved issue of today. It has been conclusively proved that the presence of an ulcer disease (peptic ulcer) in the anamnesis seems to be one of the leading risk factors of NSAIDs gastropathy and related gastric bleedings [6]. However, the question of the gastropathy/dyspepsia risk during NSAIDs therapy in patients with chronic gastritis (CG) in anamnesis remains debatable. Upon CG, as well as upon ulcer disease, the leading mechanism of forming pathological process is represented by the imbalance in activation of aggression factors and reduction of the protective components of the gastric mucous membrane [7].

Osteoarthritis (OA) is the most common rheumatic disease. OA in women leads to the reduction of life expectancy at the average of 10 - 15 years, which is primarily stipulated by the intensity and duration of pain. Adequate

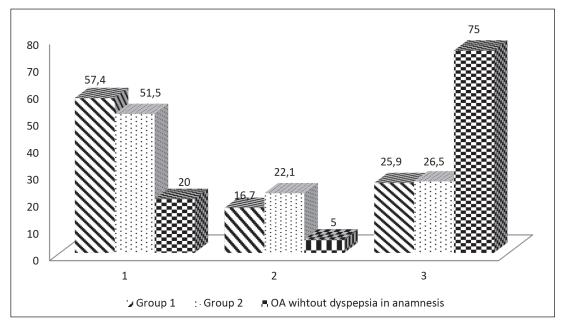


Fig. 1. Rate of NSAIDs gastropathy/dyspepsia in the patients examined. 1- Despepsia; 2- Gastropathy; 3- Absence of gastroduodenal symptoms.

analgesia using NSAIDs is a strategically important component of OA treatment. With the aim of arthralgia relief in OA, patients take these drugs for a few days up to several months. NSAIDs intake is often carried out "on demand" in cases of increased physical activity, etc. Daily dose of preparation is chosen by titration in order to achieve the analgesic effect [8, 9].

THE AIM

Identify the features of the course of chronic gastritis in patients taking selective NSAIDs for osteoarthritis.

MATERIALS AND METHODS

We examined 122 patients with OA having verified CG in anamnesis (50 men and 72 women) aged from 42 to 64 years (mean age — 49,65 \pm 3,51). Depending on the morphological form of gastritis, patients were divided into two groups: group 1 consisted of 54 patients with non-atrophic gastritis (NAG) in combination with OA; group 2 included 68 patients with atrophic gastritis (AG) in combination with OA. Group 3 was made of 40 patients with OA without concomitant gastroduodenal pathology in anamnesis. CG was diagnosed on the basis of Sydney-Houston classification and OLGA-staging [10, 11]. OA diagnostics was conducted in accordance with approved international guidelines [5]. The study included only *H. pylori* negative patients (eradication was carried out in the initial examination).

For arthralgia relief, patients were recommended to intake such selective NSAIDs as meloxicam (average dose (12.5 ± 1.39) mg/day) or nimesulide (average dose (150 ± 14.91) mg/day). The daily dose was calculated tak-

ing into account the fact that patients received different NSAIDs doses on different days, depending on the severity of the articular syndrome. The present study was conducted in connection with a treatment of acute gastroduodenal pathology.

Diagnostics of NSAIDs gastropathy was based on gastroduodenoscopy, which was performed for all the patients examined, who appealed about abdominal pain or dyspepsia.

RESULTS AND DISCUSSION

Most patients (102) had been initially diagnosed to have CG which was later accompinied by OA. Less commonly, in 20 cases, OA verification preceded CG. This is due to the fact that CG usually occurs at the young age, while OA is typical for the middle and older age groups. At the same time, CG may be asymptomatic for a long time, but when patients apply for medical care, they have already had atrophic changes in the gastric mucous membrane. It is in such cases OA had been diagnosed earlier than CG.

As a result of the NSAIDs use, dyspepsia was being developed in 31 (57.4%) patients, gastropathy — in 9 (16.7%) patients of group 1. Gastropathy and dyspepsia were detected in 15 (22.1%) and in 35 (51.5%) patients of group 2, respectively. Noteworthy was the fact that erosive lesions of the gastric mucous membrane in the form of NSAIDs gastropathy were observed 1.3 times more frequently in patients with AG than upon NAG (Fig. 1).

At the same time, the frequency of adverse effects upon NSAIDs intake in patients with OA without gastroduodenal pathology was considerably lesser. Thus, dyspeptic syndrome developed 2.9 times (χ^2 =26.0; P=0.02) and 2.6 times lesser (χ^2 =94.35; P=0.03) in group 3 as compared with groups 1 and 2, respectively, while gastropathy — 3.3 times

Symptom	OA with NAG (n=31)	OA with AG (n=35)	OA without dyspepsia in anamnesis (n=8)
«Hungry» epigastric pain	10 (32.26%)	_	_
Epigastric pain after eating	3 (9.68%)	5(14.29%)	_
Periodical feeling of discomfort in the epigastrium	12 (38.71%)	25 (71.43%)	8 (100%)
Periodical feeling of heaviness in the epigastrium	10 (32.26%)	25 (71.43%)	4 (50%)
Periodical nausea	8 (25.81%)	10 (28.57%)	1 (12.5%)
Periodical heartburn	12 (38.7%)	5 (14.29%)	1 (12.5%)

Table I. Characteristic of NSAIDs dyspepsia syndrome in the patients examined

(χ^2 =84.33; P=0.009) and 4.4 times (χ^2 =36.78; P=0.002) lesser than in groups 1 and 2, respectively (Fig. 1)

Duration of patients' follow-up before symptoms of gastroduodenal pathology ranged from 1 week to 3 months. However, in the majority -28 (70.0%) of 40 and 39 (78.0%) of 50 patients of groups 1 and 2, respectively complaints of "gastritic" character were being developed during the first month of the start of NSAIDs intake. At the same time, upon OA without comorbidity, the syndrome of abdominal pain/dyspepsia, was being developed mainly in the third month after the start of NSAIDs intake.

Patients of group 1 had abdominal pain not related to food intake as the leading clinical syndrome upon the development of NSAIDs gastropathy. Subjectively, patients were more likely to notice moderate — in 6 (66.7%) of 9 cases — and expressed — in 2 (22.2%) of 9 cases — intensity of pain. Unlike group 1, clinical picture of NSAIDs gastropathy was obliterated and low-symptomatic in group 2. Periodical feeling of heaviness and discomfort in the epigastrium, often after a meal, were the main clinical manifestations, which occurred in 12 (79.9%) of 15 patients. At the same time, abdominal pain was observed in 3 (20.1%) of 15 patients. Upon NSAIDs dyspepsia, discomfort and feeling of heaviness in the epigastrium prevailed in all the groups (Table I). Noteworthy was the fact that symptoms of gastroesophageal reflux disease in group 1 were 2.7 times more common than in group 2. This circumstance pointed out the activation of acid processes upon NAG in patients receiving NSAIDs.

Results of study indicate that the factor of CG in anamnesis significantly increases the risk of gastropathy/dyspepsia upon receiving NSAIDs as compared to the patients without gastroduodenal pathology in medical history. NSAIDs intake and the presence of atrophic changes in in the gastric mucous membrane in patients can be characterized by the increased rate of adverse side effects from the gastroduodenal zone as compared with NAG.

Clinical picture of NSAIDs gastropathy upon AG and NAG has its own peculiarities. So, upon NAG, development of gastropathy is characterized by abdominal pain of varying intensity not related to food intake, while upon AG —by prevalence of symptoms of heaviness and discomfort over the weak pain syndrome. These circumstances concern such selective NSAIDs as meloxicam (average dose (12.5 ± 1.39) mg/day) or nime-sulide (average dose (150 ± 14.91) mg/day).

CONCLUSIONS

- Intake of meloxicam or nimesulide concerning OA in 2.9 times (P<0.03) increases risk of development of NSAIDs gastropathy/dyspepsia in patients with CG in anamnesis as compared to patients without concomitant gastroduodenal pathology.
- 2. AG is associated with a trend (P>0.05) of the higher risk of erosive gastropathy.
- 3. It is reasonable to conduct gastroprotective therapy upon NSAIDs intake to prevent gastropathy in patients with CG in anamnesis.

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PRACA ORYGINALNA ORIGINAL ARTICLE

DEVELOPMENT OF ARTERIAL HYPOTENSION IN PREMATURE INFANTS WITH EARLY ONSET BACTERIAL INFECTIONS: TOOLS OF CLINICAL PREDICATION

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ABSTRACT

Introduction: The safe thresholds of blood pressure in preterm neonates are still unclear.

The aim of our study was to substantiate the diagnostic criteria for the syndrome of arterial hypotension (AH) and indications for the appointment of hemodynamic support in premature infants with early onset bacterial infections.

Materials and methods: A prospective cohort study was conducted. 2 experimental groups were formed – premature babies with early onset bacterial infections and AH (n = 58), and control group (n = 62), premature babies without AH. The subjects of the study were a number of risk factors. Simple and multiple logistic regression analyses were used. **Results:** In premature infants with AH, compared with those without AH, there are significantly lower values of stroke index of left ventricle (SILV), index of resistance (IR) of the middle cerebral artery, pH, significantly higher level of urea in serum and a higher proportion of children with hypoglycemia. Multiple logistic regression analysis was used to develop a clinical prognostic model for the AH-syndrome. Only prognostic model, which included SILV, blood pH and blood glucose, had high prognostic characteristics and the largest area under the ROC curve. **Conclusions:** The following diagnostic criteria can be used for the appointment of medical support for hemodynamics: the digital value of the level of mean blood pressure, expressed in mmHg, is less than the gestational age in weeks, and at least one of the following indicators –pH is less than 7.2, blood glucose level is less than 2.8 mmol/l, SILV is less than the normal ranges.

KEY WORDS: premature infants, arterial hypotension, early onset infections, hemodynamic support, prognostic model

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INTRODUCTION

One of the most common manifestations of early bacterial infections in prematurely born infants is arterial hypotension (AH). Diagnosis and treatment of AH in premature infants is complicated problem, with which the doctors are faced in their daily practice. Under the clinical meaning of the term "arterial hypotension," according to experts, three different functional levels should be understood: loss of autoregulation of blood flow in organs, loss of function and loss of integrity of tissues (ischemic threshold). There are many discussion questions - how to determine the specific parameters of blood pressure (BP) in premature infants, which cause severe pathological changes in this particular group of patients. The following is commonly accepted as the definition of AH in premature infants: the level of average BP is lower than the value of the child's postconceptual age or 30 mm Hg, as it is believed that these numbers are critical for the damage to the brain [1-4]. But these definitions are based on the principles of the physiology of the immature cardiovascular system and do not interpret what actually is hypotonia and its clinically significant consequences in premature baby. There are studies suggesting that there is no link between the level of cerebral blood flow and systemic arterial pressure in premature infant [5] and suggest the presence of intact cerebral blood flow

in such patients with critical numbers of systemic arterial pressure [6]. In addition, there are indirect indications that brain vessels of premature infants, due to the immaturity of autoregulation of cerebrovascular blood flow, respond to childbirth stress in the form of spasm, so cerebral blood flow can be low with "normal" ranges of blood pressure, and on the 2nd day after birth, there is a sharp increase of cerebral perfusion, regardless of the level of BP and gestational age of the child [7-8]. Despite the multitude of questions about the normal level of BP in premature babies and the growing knowledge of other methods for determining the level of systemic blood flow, measuring BP in the intensive care units is a primary and principle method of indirect assessment of the adequacy of cardiac output, blood flow and tissue perfusion in intensive care units because of the accessibility and simplicity of this method [9-10]. The question arises that in order to determinate the need for aggressive medical intervention, it is necessary to evaluate AH in combination with other indicators of the clinical status of the newborn [11-14].

THE AIM

The aim of our study was to investigate the clinical and infectious-metabolic manifestations of AH in prema-

Prognostic variables	25 Children with AH Children v n=58 n:		OR 95% CI	р
Blood glucose (mmol/l), M±m	3,6±0,17	3,7±0,15	0,94 (0,69-1,28)	0,685
Glucose < 2,8 mmol/l, n (%)	10 (17,2)	3 (4,8)	4,63 (1,38-15,6)	0,013
Urea (mmol/l), M±m	5,4±0,42	3,7±0,23	1,51 (1,16-1,96)	0,002
Creatinine (mkmol/l), M±m	87,0±7,77	93,7±7,90	1,0 (0,98-1,01)	0,544
NO2+NO3 (mmol/l), M±m	74,5±9,62	64,5±7,84	1,01 (0,99-1,02)	0,413

Table I. Indicators characterizing the metabolic status of prematurely born children of surveyed groups

Table II. Echocardiographic and dopplerographic parameters characterizing the state of the cardiovascular system in premature children, $M \pm m$

Prognostic variables	Children with AH n=58	Children without AH n=62	OR 95% CI	р
Cardiac output (ml/min.)	580,6±43,43	599,9±50,85	1,0 (1,0-1,0)	0,768
Stroke index (ml/min* ^x)	4,0±0,32	4,0±0,35	0,98 (0,77-1,26)	0,896
Stroke index of the left ventricle (мл/хв*м2)	1,1±0,11	1,9±0,19	0,30 (0,13-0,70)	0,005
Heart index	3,8±0,24	4,0±0,29	0,89 (0,65-1,22)	0,472
End systolic dimension (cm)	0,9±0,03	0,9±0,04	0,19 (0,01-3,05)	0,239
End-diastolic dimension (cm)	1,4±0,04	1,5±0,04	0,33 (0,04-2,85)	0,312
End diastolic volume (ml)	5,4±0,38	5,9±0,46	0,92 (0,75-1,12)	0,398
Stroke volume (ml)	3,8±0,29	4,0±0,32	0,92 (0,7-1,21)	0,557
Ejection fraction (%)	70,6±1,35	69,3±1,65	1,02 (0,97-1,07)	0,530
Contractile ability of myocardium (%)	37,6±1,10	36,6±1,30	1,02 (0,95-1,09)	0,579
End-systolic volume (ml)	1,4±0,14	1,8±0,22	0,74 (0,47-1,17)	0,198
Total peripheral vascular resistance (dyn/s*cm ⁻⁵)	4597,4±421,58	5760,7±496,68	1,0 (1,0-1,0)	0,088

ture infants with early onset bacterial infections and to substantiate the diagnostic criteria for determining the syndrome of AH and indications for the appointment of hemodynamic support in premature infants with early onset bacterial infections.

MATERIALS AND METHODS

The methodology and methods of the study was based on the principles of the Consensus on Biological and Medical Ethics and the principles of evidence-based medicine.

The subjects of the study were a number of risk factors: 25 antenatal factors, 7 intranatal factors, 8 factors of the group "measures of primary reanimation", 9 from the "infection status" group, 9 laboratory parameters.

A prospective cohort study was conducted. 2 experimental groups were formed - the main group (n = 58), premature babies with early onset bacterial infections and AH, and control group (n = 62); premature babies with early onset bacterial infections without AH. Arterial hypotension (AH) was defined as the level of mean arterial pressure (MAP) in mmHg, which is less than the gestational age of the child in weeks, or less than 30 mm Hg. Early onset infections were diagnosed with the appearance of a clinical symptom of a child (tachycardia, tachypnea, desaturation, apnea, perfusion abnormalities, convulsions) and laboratory signs of infection (the number of leukocytes greater than 20x10⁹, or less than 5x10⁹ and elevated C-reactive protein) up to 72 hours of life. Confirmation of early infections also was served by determination of positive blood culture: gram-negative or gram-positive microflora.

For the processing of quantitative values, traditional methods of parametric and nonparametric statistics were used. Nonparametric methods were used to analyze qualitative characteristics, which were expressed mainly in percentage terms. The methods of parametric statistics were carried out for: verification of the normality of the distribution of quantitative characteristics using the Kolm-

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Indicators	dicators Children with AH Children without AH n=58 n=62		OR 95% CI	р
pН	7,28±0,02	7,33±0,012	0,002 (0,0002-1,66)	0,05
pCO2 (mmHg)	34,4±2,27	28,6±1,44	1,07 (1,00-1,16)	0,047
pO2 (mmHg)	47,1±4,1	57,2±4,38	0,98 (0,95-1,007)	0,145
BE (mmol/l)	8,6±1,12	8,7±0,88	1,00 (0,89=1,12)	0,919

Table III. Status of acid-base blood exchange in children examined groups, $M \pm m$

Table IV. Prognostic clinical models of development of arterial hypotension in premature babies with early onset bacterial infections

Variables	β	М	р	Area under ROC-curve				
		Ir	nodel					
рН	-7,33	3,49	0,036					
Glucose	2,36	1,29	0,067					
cons	53,33	25,53	0,037	0,7046				
ll model								
SILV	-7,034	3,17	0,027					
рН	-0,365	8,61	0,966					
Glucose	3,79	3,79	0,317					
_cons	11,141	62,14	0,858	0,9676				
		III	model					
Urea	0,69	0,24	0,006					
рН	-9,91	4,06	0,014					
_cons	69,56	29,27	0,017	0,8150				
		IV	model					
SILV	-6,35	2,78	0,022					
urea	0,427	0,435	0,327					
pН	-3,23	7,63	0,672					
_cons	29,81	55,4	0,590	0,9444				

Table V. Operational characteristics of the prognostic clinical model of the development of arterial hypotension in premature children with early onset bacterial infections, which includes pH, stroke index of the left ventricle and glucose level less than 2.8 mmol/l

Characteristics	
Sensitivity	83,33 %
Specificity	100,00 %
Positive predictive value	100,00 %
Negative predictive value	80,00 %

ogorov-Smirnov criterion; checking the equality of general dispersions using Fischer's criterion.

In the normal distribution of data the main statistical characteristics were used, namely: average (M) to determine the central trend; the standard error of the average (m) for the accuracy of the average assessment, the confidence interval (CI) – to determine 95% of the average interval.

The hypothesis of equality of general averages was tested using Student's t-criterion. Determination of the t-criterion has allowed to find the probability that the average values of quantitative characteristics, calculated for different groups, belong to the same set. If the probability is p < 0.05, then these samples belong to two different sets, since their average values are significantly different. With an abnormal distribution, the central trend was determined using median (M) and quartile (Q).

Comparisons of relative or expressed in percentages values were performed using the criterion χ^2 (chi-square),

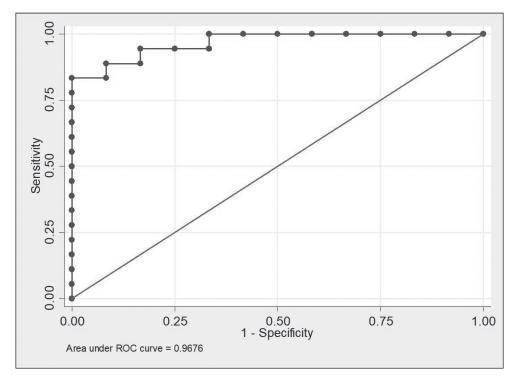


Figure 1. ROC-curve of the clinical prognostic model for the development of arterial hypotension in premature children with early bacterial infections

when we were comparing quantitative values with abnormal distribution in unrelated samples we used the Mann-Whitney criterion (criterion U).

Simple and multiple logistic regression analysis (STA-TA 11.0 application package) was used to determine the relationships between individual indicators and construct predictive clinical models.

An analysis of operational characteristics of diagnostic tests, included: calculation of sensitivity, specificity, positive predictive value, negative predictive value, and construction of a ROC-curve and calculation of the area under it.

RESULTS

At the beginning of the study, the rate of hemodynamic disorders in premature babies with early onset bacterial infections in the early neonatal period was studied. Thus, it was found that the clinical course of early onset bacterial infections in premature babies is diverse and is characterized by the involvement of many organs and systems of the body, in particular episodes of AH were noted in 41.2 % of children. Subsequently, reliable risk factors associated with these conditions and the main clinical manifestations, were identified and studied, The study did not reveal any reliable link between the development of hypotension and the risk factors of the group of mother's somatic status, "peculiarities of antenatal and intra-natal periods", except for anemia during pregnancy (OR = 0.17, p = 0.008) and premature rupture of membranes (OR = 0.35, p = 0.007), which is most likely due to intrauterine infection, which manifests itself in child in a form of infectious process with AH.

The analysis of medical and demographic indicators, clinical signs, frequency of use of reanimation measures in patients of the examined groups did not reveal any association with AH.

The study of the metabolic profile of premature babies with early onset bacterial infections has shown that the average value of glucose content in children of the examined groups did not differ significantly (Table I). However, in the group of children with early onset bacterial infections and AH, the proportion of children who had a glucose level less than 2.8 mmol/l was significantly higher than in children without AH. Probably the energy shortage at birth of a child due to intrauterine problems may be one of the factors contributing to the development of AH in premature babies. The level of urea in children with AH was higher than in children without hypotension (5.4 \pm 0.42 versus 3.7 ± 0.23 mmol/l), but the level of creatinine was almost the same, indicating a metabolic component the formation of AH in premature children with early onset bacterial infections.

As a result of the study of echocardioscopy and doppler analysis, it was found that only the stroke index of left ventricle (SILV), which characterized the pumping function of the heart, was significantly associated with the development of AH and was significantly lower in premature infants with hypotension than in children without AH ($1.1 \pm 0.11 \text{ mL/}$ min*m² and $1.9 \pm 0.19 \text{ mL/min}$ *m², respectively, OR = 0.3, p = 0.005) (Table II). At the limit of statistical significance, there were the differences between groups of children in the mean values of the overall peripheral vascular resistance index, which characterizes the overall peripheral vascular resistance (4597.4 ± 421.58 din/s * cm⁻⁵ and 5760.7 ± 496.68 din/s * cm⁻⁵, respectively, p = 0.088). Thus, one of the reasons for the development of hypertension in prematurely infants may be reduced contractility of the left ventricular myocardium.

The study of the neurological status of premature infants with early onset bacterial infections showed that 3.5 % of children with AH and 3.2% of children without hypotension had a coma, 75.9 % and 77.4 % of children had oppression syndrome and 6.9 % - 8.1 % of children - convulsive syndrome. However, the IR (index of resistance) of the middle cerebral artery in children with AH was significantly lower than that of children without AH (0.66 \pm 0.02 vs. 0.81 \pm 0.04, p = 0.012). The results of the research confirm the opinion of other authors about the imperfection of cerebral autoregulation in prematurely born children and the absence of specific clinical symptoms of its violations (Table III).

Multiple logistic regression analysis was used to invent a clinical prognostic model for the development of AH-syndrome and to study its operational characteristics. Four clinical prognostic models with a sequential inclusion of risk factors, which were determined by simple logistic analysis (Table IV), were formed.

Only the second model, which included the left ventricular stroke index, blood pH and blood glucose, had high prognostic characteristics and the largest area under the ROC curve (Table V, Figure 1).

DISCUSSION

AH in premature babies is a serious undeclared problem due to the lack of a clear definition of the concept. Early cardiovascular and circulatory signs of infection and especially sepsis in premature babies are very difficult to interpret. With sepsis, microcirculatory dysfunction is secondary, appears after unevenness of perfusion of organs, arteriovenous bypass and damage to autoregulation [14-15]. However, regardless of the method for determining low blood pressure, this problem has a significant spread - from 20%, according to various researchers [15]. Treatment of AH in premature babies involves administration of fluid volume, inotropes and corticosteroids in refractory cases [16-17]. Unwarranted use of aggressive methods of treatment of hypotension in prematurely born children, and especially sympathomimetics, can lead to adverse effects of treatment, including intraventricular hemorrhages [18], food intolerance, pulmonary hypertension, tachyarrhythmia, etc. [19-22]. It should be noted some features of the pharamycodynamics of sympathomimetics in premature babies - a very low rate of administration of the solution (0.1 - 1 ml/h), along with relatively large volume of «dead space» lead to a longer time to the start of action and to a stable effect of the administered dose, and therefore after a change in dosage unnecessarily high doses may be unintentionally assigned. Larger duration of sympathomimetics support in prematurely infants may potentially lead to undiagnosed adverse events [23-26]. The results of our research have become the basis for the definition

of "syndrome of arterial hypotension", which includes the level of mean blood pressure in a child in mmHg less than the gestational age in weeks and the presence of one of the following criteria - SILV less than the age standard, pH less than 7.2, blood glucose less than 2.8 mmol/l. The presence of this syndrome in a child can serve as an indication for the appointment of medical support for hemodynamics, in contrast to the current situation, when it is prescribed only at a reduced blood pressure, which in premature infants of 1 day of life may be a variant of the norm and often is not accompanied by negative changes in body organs and systems.

CONCLUSIONS

Thus, in premature infants with AH, compared with children without AH, with the absence of significant differences in the clinical manifestations of this condition, there are significantly lower values of SILV, IR of the middle cerebral artery, pH, and a significantly higher level of urea in serum and a higher proportion of children with hypoglycemia. However, after the multiple logistic regression analysis, there was only a reliable association between SILV and AH (p = 0.027) and the absence of such a connection between AH and other risk factors that are related to metabolism, which indicates the crucial role of SILV in predicting the development of AH, and the development of acidosis, hypoglycemia and increased level of urea may be both a cause and a consequence of AH. The operational characteristics of the prognostic model, which includes SILV, pH, glucose level <2.8 mmol/l are quite high - sensitivity - 83.33%, specificity - 100%, positive predicting value -100%, negative predicting value - 80.0%, area under the ROC curve - 0,9676.

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PRACA ORYGINALNA ORIGINAL ARTICLE



PHYSICAL DEVELOPMENT BY MEANS OF FITNESS TECHNOLOGIES AS ONE OF GENERAL ASPECTS OF STUDENT'S HEALTH

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ABSTRACT

Introduction: The problem of the formation, preservation and strengthening of students' health during higher educational period is becoming increasingly relevant. Following factors have a purposeful impact on health and physical development of students: correct organization of physical education process, motivation to study, student's personality and adaptation process to new educational conditions.

The aim: A comparative analysis of assessment of the initial state of student's health by means of physical development indicators.

Materials and methods: For investigation and evaluation of physical development, the generalizing method of observation was used for a group of 600 students aging 18, 19 and 20 years (100 persons in each age group). All students were divided into control and experimental groups by the method of equal distribution of groups. The students from control groups took classes according to traditional educational system, which provided development of only those physical qualities that are necessary for successful assimilation of motor activity techniques. Students from experimental group took classes according to fitness technologies program.

Results: The data obtained has shown that men and women from experimental groups during the formative have reliable differences only in body weight and in the index of Erisman. The dynamics of anthropometric indices of students from experimental and control groups depended from the content of educational and extra-curricular physical education classes. Implementation of fitness technologies in physical education process of students from experimental groups contributed to the improvement of functional indicators of both men and women. Following indicators changed: heart rate for 1 min, systolic blood pressure, diastolic blood pressure, Robinson index, lung life volume, muscle strength of dominant hand. The evaluation of anthropometric and functional indicators also helped to determine indices dynamics of students' physical development during: force index, vital index, mass-growth index, Stange test, Genci test, Harvard step-test index.

Conclusions: The analysis of physical development of students testifies about imperfection of physical education system, low level of physical preparedness of students and unsatisfactory state of physical culture and health work in higher education institutions.

KEY WORDS: dynamics, methodical system, students, physical development, fitness technologies

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INTRODUCTION

Population's health level is an integral indicator of the country's development, mirroring its social, economic and moral state, being a powerful factor of demographic, economical, labor and cultural potential formation. Health is a state characterized by complete social, biological and mental well-being of a person. According to the World Health Organization, physical state of a person depends on 50% from way of life, on 20% from environment, on 20% from hereditary factors and on 10% from availability and quality of medical care. Nowadays health of students, as well as health of whole population of Ukraine, is very low. Reasons for this can be found in absence among the most of students healthy lifestyle habits and negative environmental influence. Among the various ways of reducing the physical stress on human body the main way, according to the recommendations of the World Health Organization, is health promotion by increasing the body's resistance, by increasing nonspecific resistance, by expanding the capacity of the immune system and by activation of recovery processes. In this regard, it is extremely important to study

the dynamics of physical development of the population as one of the most important generalizing factors of health and an indicator of social well-being of the society. Studying the physical development of students, as a special social group of people with their specific features of work, life, leisure, lifestyle in the process of learning, has particular significance for a prognostic health assessment.

An analysis of recent research data has shown the feasibility of fitness technology usage in physical education process. Fitness technology is a complex and interdisciplinary concept that determines the diversity of its research directions. Analysis of literary sources showed that scientists studied various aspects of the identified above research problem. V.V. Bilets'ka, T.V. Vasylistova, V.B. Zinchenko, O.Ya. Kibal'nyk, T.Yu. Krutsevych studied following aspects: application of fitness technologies in institutions of higher education, the use of innovative means and forms of classes organization, formation of recreational culture of students, training and professional development of specialists in physical recreation and fitness, monitoring physical fitness and physical health of students [1, 2, 3, 4, 5]. M.M. Bulatova, V.I. Hryhor"yev, V.I. Donchenko, A.V. Yemets', V.O. Zhamardiy, L.Ya. Ivashchenko, Ye.O. Skrinnik, O.H. Saykina and Usatova I.A. consider fitness technology as an important factor in personal development, improvement of youth through the rational usage of motor activity in conjunction with other health-improving factors [6, 7, 8, 9, 10, 11, 12].

THE AIM

The purpose of the article is to carry out an evaluation of the initial state of health by the students' physical development indicators. Objectives of the article: 1) to study data of anthropometric examination of students by means of fitness technologies; 2) to investigate integral indicators of students' physical development by means of fitness technologies.

MATERIALS AND METHODS

For investigation and evaluation of physical development, the generalizing method of observation was used for a group of 600 students aging 18, 19 and 20 years (100 persons in each age group). All students were divided into control and experimental groups by the method of equal distribution of groups. The students from control groups took classes according to traditional educational system, which provided development of only those physical qualities that are necessary for successful assimilation of motor activity techniques. Students from experimental group took classes according to fitness technologies program. Individual anthropometric data was summarized and, after processing, average values of physical development of students for a certain moment of study were obtained. The anthropometric examination consisted from measuring the length and weight of the body, as well as the volume of the chest at resting conditions, and was carried out with standard instruments (growth meter, medical scales, measuring tape) according to a generally accepted unified method. The life volume of lungs was studied by a spirometer, as a parameter characterizing the state of the respiratory system. Measurement of blood pressure and heart rate were studied as parameters of cardiovascular system. The muscular strength of the students was evaluated by means of the hand dynamometer. Following indices and functional tests were used to assess the dynamics of physical development: Erisman index, Robinson's index, life index, mass-growth Index, Harvard step-test Index, Stängge test, Genci's test. Processing of observation materials on physical development was carried out by methods of variation statistics by formation of variation rows, with subsequent obtainment of average values (M), average errors of the arithmetic mean (m) by age-sex groups.

The effectiveness of the developed fitness technologies in physical education process of students was assessed by the following indicators: 1) by volume of physical activity; 2) the general level of theoretical training in the curriculum for physical education and the availability of special knowledge and skills in fitness technologies usage during independent exercises; 3) according to the dynamics of motivation for exercises and sports, in particular, for fitness technologies; 4) by the level of general physical preparedness and individual physical qualities development; 5) the level of interest and attitude of students to fitness technologies in physical education process; 6) according to the dynamics of physical preparedness; 7) by the dynamics of physical qualities development (speed, strength, endurance, flexibility, agility); 8) by comparative analysis of physical preparedness «profiles»; 9) by the assessment of general physical fitness; 10) by the dynamics of student's physical fitness; 11) according to the dynamics of physical development; 12) according to the dynamics of the functional state of the organism; 13) by the dynamics of indices and samples of physical development of students; 14) by the dynamics of psycho-emotional state indicators; 15) by the dynamics of physical health; 16) by the dynamics of the formation of interests and motivational-value attitude to independent exercises and participation in sporting events; 17) by the attitude of students to physical education process; 18) by the overall assessment of the success of physical education; 19) on the basis of formed competencies of fitness technologies. These criteria formed the basis for evaluating the performance indicators of fitness technologies in physical education activities of students.

RESULTS AND DISCUSSION

The term «physical development», by definition of T.Yu. Krusevich, has two meanings: a process occurring in the human body during natural aging and under physical education influence and a condition. Under the physical development in the sense of «condition», a complex of features that characterize the morpho-functional state of the organism, the level of development of physical qualities and abilities necessary for life is considered [5].

According to researchers, study period in institutions of higher education is characterized by the end of growth in length, the formation of body proportions typical for an adult, the completion of sexual development, the end of process of ossification of the spine and extremities and the completion of somatic formations [13, 14].

At the same time, scientific research of T.B. Kutek [15] found out, that body mass index, chest circumference, lung capacity and heart rate depend on the environmental conditions. Thus, students who lived in conditions of radiation pollution, there is an increase in body weight, chest circumference, heart rate and decrease in functionality of the respiratory system.

V.K. Balsevich's and V.O. Zaporozhanov's [16] data confirms the hereditary conditionality of constitutional features and body structure of a person, morphological characteristics of muscle fibers and blood supply systems of the motor apparatus, genetic conditionality of functional manifestations, which are directly related to physical activity and genetic determinism of biochemical aspects of preparedness along with physiological and anthropological factors. Dissociation and difference of physical development indicators results corresponds to ambiguous and different manifestations of morpho-functional features of students, which complicates their usage in physical education practice. The data showed that men and women from experimental groups have reliable markings only in body weight and in index of Erisman. In particular, the weight of men at the end of the research decreased by 3.2 kg and women lost 3.5 kg, which corresponds to (t = 2.39; P<0.05) and (t = 2.74; P < 0,05), respectively.

Indicators of the Erisman index show that male students from experimental group had an improvement of the index by 2.10 cm, while control group's parameters changed only by 0.20 cm, indicating a significant difference between groups (P<0.05). In women, opposite changes were detected, experimental group students lost body weight by 3.5 kg, compared with a control group loss of 0.9 kg, which in general influenced the proportionality of development. The obtained data confirms the tendency of modern students for the desire to reduce body weight. Nowadays, on young people are affected by television screens greatly, they receive diverse information about a beautiful body, the temptation of having a beautiful body to have a prestigious job, to achieve great career success, to marry successfully, and more. On the other hand, the range of nutrition, which is accessible to a large part of the students, has substantially changed [17].

For each individual, a certain range of exercise is possible, which is essential for normal body development and health. The connection of motor activity with the state of health, functional reserves of the body, physical capacity should act as the main argument in determining the necessary values of physical activity. The achievement of the necessary health effect during exercise is associated with the solution of such issues as physical load adequacy per individual capabilities of the organism, the necessity for rational regulation of their direction and strength of influence, etc. [18].

During the research there was no statistically significant increase in the growth of students in experimental and control groups (P>0.05). The highest gain for men was 0.8 cm, which occurred in experimental group. A similar increase in height occurred in women from experimental group by 1.2 cm. In the control group, there was not so significant increase in the height: 0.7 cm for men and 0.6 cm for women, which indicates that the students of this age have already stopped body length growth.

Men and women from experimental and control groups did not significantly increase the chest circumference, body length remained almost unchanged, but body mass in experimental groups significantly decreased. The dynamics of the anthropometric indices of students from experimental and control groups depended to a certain extent on the content of educational and extra-curricular physical education. The low initial level of physical fitness and physical development of students does not allow usage of high in volume and intensity of training which in general negatively affects the physical development of students in experimental and control groups.

Important indicators of cardiovascular performance are heart rate and arterial pressure. Implementation of fitness technologies in physical education process of students from experimental groups contributed to the improvement of all investigated functional indicators both in men and women, namely: heart rate per 1 min, systolic blood pressure (SBP), diastolic blood pressure (DBP), index of Robinson, vital capacity of the lungs (VCL), dominant hand strength.

Men from experimental group showed following changes: heart rate decreased by 5.05 per 1 minute (P<0.05). Control group's men showed decrease in heart rate by 0.57 per 1 minute (P>0.05). SBP decreased by 8.07 mm Hg. (P<0.05) in experimental group. In control group SBP lowered by 2.15 mm Hg. (P>0.05). DBP dropped by 5.16 mm Hg. (P<0.05) in experimental group and by 1.31 mm Hg. (P>0.05) in control group. The Robinson index has improved in experimental group by 4,08 consensual units (P<0.05) and by 1.21 consensual units (P>0.05) in control group. Male students from experimental group improved their LLV by 271.87 ml (P>0.05). Male students from control groups improved their VCL by 79.04 ml (P>0.05). Dominant hand strength increased by 7.47 kg (P< 0.05) in experimental group and by 1.24 kg (P>0.05) in control group.

A similar improvement in functional performance was observed in women from experimental group, where all of the studied parameters had a significant changes (P<0.05), but in comparison with male indicators, women had somewhat lower rates. At the same time, students from control group, that were engaged in the traditional system of physical education, none of the studied parameters showed any significant improvement (P>0.05). This suggests that the introduction of fitness technologies in physical education process contributes to increasing the functional readiness of students.

The analysis of heart rate showed that with an increase in the level of functional preparedness of students there is a significant decrease in heart rate. Robinson's index studies also show positive dynamics of improved functionality. The VCL characterizes the maximum amount of exhaled air after the deepest breath and indicates the state of external respiration apparatus, which depends on the physical development and functional capabilities of student's body.

The evaluation of anthropometric and functional indicators of students also contributed to determination of students' physical development dynamics during. Output figures for men from experimental group were: strength index - 69.53%, in the control groups - 70.16%. After completion of the research, students from experimental group improved their strength values by 3.64%, which corresponds to the level of reliability at (P<0.05), in the control group no statistically significant changes were detected (P>0.05). Meanwhile, life index in experimental group also improved by 5,03 ml / kg (P<0,05); in control group there was no significant improvement in life index. The mass-growth index was 479.53 g / cm in experimental group and 382.38 g / cm in the control group at the begin-

ning and 475.84 g / cm in the experimental group at the end (P<0.05) and 479.06 g / cm in the control group (P>0.05). The evaluation of the respiratory system's performance by Stanhe's test, which consists from delayed breathing, showed that students from experimental group improved their performance by 8.70 s, which corresponds to the significance level (P<0.01). At the same time, this indicator improved only by 2.84 seconds in control groups (P>0.05).

Similar data was obtained during and for Genichi's test (delayed breathing on exhalation). In this test, students from experimental group improved their performance by 5.86 seconds (P<0.05), and students from control group by 2.14 seconds (P>0.05). Classes held by fitness technologies also positively influence the improvement of students' ability to work. At the end of the experiment students from experimental group improved the Harvard Step-Test score by 6.67 points (P<0.05), and from control group by 1.12 points, which does not confirm the significance of reliability (P>0,05). Based on the foregoing, it can be stated that the introduction of fitness technologies significantly improves the growth of physical development indicators of students.

The analysis of physical development indexes of female students showed the same tendency as in men. Students from experimental groups significantly improved the indicators in all studied indices that have a reliable level of significance (P<0.05-0.01). In control groups there were no significant differences in any index (P>0.05).

We can fully agree with the statement of G.P. Griban, with the introduction of a new methodical system of physical education, the pedagogical process (system of learning) is changing, that is, the technology of physical education (training), which is the primary in relation to the pedagogical system. Accordingly, the design of a new pedagogical system is connected, firstly, with the design and implementation of new learning technology and, secondly, with subsequent changes in other subsystems of the pedagogical process [19, p. 174]. Therefore, fitness technologies contributed to significant changes of physical education process.

CONCLUSIONS

Physical development dynamics of students to introduction of fitness technologies shows that students have low and unsatisfactory level of physical development. A significant proportion of students can not reach even the average level of physical development. The analysis of student's physical development testifies to the imperfection of physical education system, low level of physical preparedness of students and unsatisfactory state of physical culture and health work in institutions of higher education. Implementation of fitness technologie in physical education process has confirmed that physical education in institutions of higher education significantly activates the educational process, supports the high efficiency of students during the study day, promotes the activation of mental processes, etc. Acquiring a certain system of knowledge, skills and abilities of fitness technologies usage can attract more students to a healthy lifestyle, take sports for all, better prepare students for future professional activities, expand the scientific and cognitive potential, provide long-term health and ability to work. Experimental testing of the effectiveness of fitness technologies application has significantly improved all studied parameters, which gives grounds to recommend it for implementation in physical education process in higher educational institutions of Ukraine. Prospects for further scientific research are aimed at the development of software and methodological support, which will contribute to improving the state of health, level of physical fitness of students, formation of physical culture and health competencies.

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PRACA ORYGINALNA ORIGINAL ARTICLE



POSSIBILITIES AND PERSPECTIVES OF HUMAN TYPOLOGIES TAKING INTO ACCOUNT IN DENTISTRY

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ABSTRACT

Introduction: Such sciences as differential physiology, differential psychology, differential anatomy and chemistry are developed greatly nowadays. They deal to human typologies. The scientific works big amount concerning dentistry in this aspect allows speaking about differentiated dentistry.

The aim: To assess control locus in the UMSA Ukrainian students dependently on their dominant extremity as well as to assess and to compare face asymmetry expression in the guys and girls from Egypt and Ukraine studying at different courses.

Materials and methods: 50 Ukrainian students from dental faculty different courses in the 1st series of the experiments, 18 girls and 18 guys from Egypt and Ukraine in the 2nd series. Methods: - determining the dominant extremity and control locus by survey; - computer modeling for facial expression assessment.

Results: 43 students (85%, p<0,01) independently on dominant extremity demonstrate control internal locus and only 7 people (comprising 15%, p<0,01), 6 people (90%, p<0,01) from which were left-handers and all ambidexters) – the external one. These were the 1st experimental series results. We received following results in the experiment second part. Faces of the students from Egypt, guys in bigger extent, were more asymmetrical. We were taking photos of the students and then were measuring longitudinal and transversal sizes of face right and left halves. 10 guys from Egypt (55,6%, p<0,01) and 5 girls from Ukraine (27,78%, p<0,01) were distinguished by bigger longitudinal and transversal sizes as well as looked less harmonic while coinciding the face left halves than the right ones that can be explained in part by primary usage of left side while masticating as well as left hand usage at writing (in part in the Egyptian guys).

Conclusions: We consider that our work can have significance in Maxillary-Facial and Plastic Surgery, Transplantology, Orthopedy, Prosthetic Dentistry, Neurology as well as Cosmetology and Psychology.

KEY WORDS: human typologies, differentiated dentistry, asymmetry

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INTRODUCTION

Such sciences as differential physiology, differential psychology, differential anatomy and chemistry [1] are developed greatly nowadays. They deal to human typologies and describe human physiological and pathological peculiarities separately on them as well as their influence on organism functioning at alive matter all organizational levels while speaking about personality individualization. Study individualization is described as one of prior approaches in Pedagogy. One can say about teachers types, one emphasizes necessity of pupils individual-typological distinguishing features maximal taking into account in a study process. Main typological aspects comprise: age, gender, gender-age, ethnic, ethnic-gender, ethnic-age, ethnic-gender-age, temperament, characterologic typologies and character accentuations, control locus (external and internal), behavioral strategies (defense and coping), interhemispherical asymmetry individual profile (left-handers real, hidden and unreal, right-handers and ambidexters), different constitutional and somatotype typologies, place of living (town/city or village) et cetera.

Maxillary-facial area as a whole and oral cavity in part are not an exception as for typologies influence on peculiarities of anatomy, histology, organs and tissues biochemistry, physiological and pathological processes course in them as well as individual morphological-functional peculiarities presence.

THE AIM

The aim: to assess control locus in the UMSA Ukrainian students dependently on their dominant extremity as well as to assess and to compare face asymmetry expression in the guys and girls from Egypt and Ukraine studying at different courses.

MATERIALS AND METHODS

OBJECTS

50 Ukrainian students from dental faculty different courses in the 1st series of the experiments, 18 girls and 18 guys from Egypt and Ukraine in the 2nd series.

METHODS

1) Determining the dominant extremity and control locus by survey. If a human being was thinking that God, case, other people et al. influence mostly on his Destiny his control locus was considered as the external one, if he himself – the internal one.

2) Computer modeling for facial expression assessment. Ukrainian Medical Stomatological Academy commission on bioethics allows the article given publishing and states about all bioethical norms fulfillment.

RESULTS AND DISCUSSION

43 students (85%, p<0,01) independently on dominant extremity demonstrate control internal locus and only 7 people (comprising 15%, p<0,01), 6 people (90%, p<0,01) from which were left-handers and all ambidexters) – the external one. These were the 1st experimental series results. We received following results in the 2nd experimental series. 10 guys from Egypt (55,6%, p<0,01) and 5 girls from Ukraine (27,78%, p<0,01) were distinguished by bigger longitudinal and transversal sizes as well as looked less harmonic while coinciding the face left halves than the right ones.

Ukrainian students started counting on their own forces in bigger extent nowadays according to the results received. Left-handers are less sure in their forces and possibilities are needed in other people support, in Belief to God. Ambidexters as well because it is often "difficult to choose which hemisphere and arm to work with" in one or another situation that is why they are closer to left-handers than to right-handers on the parameters assessed.

The results on facial asymmetry can be explained in part by primary usage of left side while masticating as well as left hand usage at writing (in part in the Egyptian guys).

There was rather big factic material collecting by dentists therapeutists, surgeons, orthodontists, prosthesists both children and the adult ones which is impossible to be given in the short article volume, that is why we will give only few examples.

Works with ethnic aspect are delt to dental implantology in Iran [2], cements applying in surgical dentistry [3; 4], multidisciplinary approach as for treating the patients with iatrogenies in dentistry [5], mutagenic effects of the agents commonly-used for pulp dissection [6], chemicals usage for the tooth root resorbtion treatment (the Iranian, Turkish and Italian dentists work) [7], global problem of fluorum level increase in water, fluorosis, caries, teeth loosing and their filling questions [8; 9], knowledge about preventive dental care in Iran [10], the questions of dental ethics maintaining in the dental investigations in Iran [11]; demonstrative dentistry in Iran [12]. Enamel surface irradiation with a laser with carbonic dioxide enforced fluorum capture that can be used for caries therapy [13]; if fluorum was placed without laser than carbonic laser action did not improve enamel resistance to caries [14].

Ethno-age aspect is paid much attention together with ethnic typological aspect: there exist data about insufficient control of infectional process by Iranian dentists and dental students in part [15]; much attention is paid to proving as much complete diagnostics and differential diagnostics of teeth fluorosis in the Iranian children as possible [16]; fluorification usage in the different-aged children and in adolescents as well as different specialists attitude to it in Iran [17]; teeth decay early restorative therapy preference in the 20-yeared Iranians [18]; knowledge about demonstrative dentistry in Tehran among the Shahid Beheshti university dental faculty students [19]; studying the fluorum content in milk for infants in Iran [20]; laser fluorescence and radiography which are considered as caries treatment informative diagnostic methods in the 7-13-yeared Iranian children [21]. Maxillary central incisives are injured with trauma in the Iranian schoolchildren in 84% of cases [22] agreed more to apply risk-associated preventive treatment (such a tendency is present in Iran) [23]; there was a difference in pain perception by the patients after tooth normal extraction dependently on the doctor gender [24]; Iranian women have more expressed fear at dental reception comparatively to men [25].

Next important typological aspect is ethno-gender-age there was teeth loosing congenital factors investigation in Iran taking into account the patients age and gender [26], while proposing in part to examine children elder than 12 years or elder than 13 years in another investigation [27]; also in Iran there was an assessment of teeth roots inclinations which were treated endodontically by students dentists from Mashhad [28]; congenitally-missing teeth distribution in Iran is 10,9% in permanent occlusion, the second mandibular pre-molars take the 1st position, then the maxillary ones without valuable difference in the 7-25-year both-gendered inhabitants [29]. Tooth caries is studied in typological aspects nowadays in the 10-12-year Tehranian children and it was demonstrated that girls have increased risk comparatively to boys [30]. Iranian boys have got teeth traumas higher risk comparatively to girls [31].

There is a description of constitution and somatotype typologies separately and in a complex with ethno-gender-age aspect in Iraq [32].

Locus of control belongs to important typological aspect which takes bigger and bigger attention of scientists in different countries both theoreticians and the clinicians. Dentistry does not represent an exception. Australian and Swedish dentists works are dedicated to anxiety and fear assessment at dental reception [33], separately the Australian ones [34]. Thus, ethnic aspect is assessed in a complex with control locus.

Control locus is also described in a complex with ethno-age aspect. For example it was assessed at caries and gingival problems before and after talks about dental health in the Indian students [35], in a complex with anxiety assessment in them [36], separately without anxiety assessment – in the Swedish adolescents [37].

Control locus is described together with ethno-gender-age typological aspect in the Spanish students with creating the dental fear index Spanish version [38], in the dentists students from India [39].

Behavioral strategies (coping and avoiding) belong to another important typological aspect study and taking into account of which is actual in dentistry. We found works about coping in the American patients at surgical preparation [40; 41].

American dentists assessed patterns of children coping with aversive dental treatment [42], Irish – at anesthesia

at caries [43], thus while behavioral strategies description with ethno-age aspect.

It was established that 23% of left-handers suffer from dental diseases. Some literary data [44] demonstrate higher (approximately twice at statistically valuable difference) level of permanent incisives traumatizing among left-handers comparatively to right-handers among the 13-17-year old adolescents. Left-handers have significantly higher risk on dental trauma.

The planned scientific aims have been reached completely, we met only several similar works performed in UMSA Iranian and Ukrainian students but not the Egyptian ones, unfortunately we did not have approaches to modern computer technologies as they use in the USA, UK and other countries, we would like to continue such works performance in the students from other countries.

CONCLUSIONS

Nowadays one can speak about new science – differentiated dentistry – and use human typologies in different areas of theoretical and practical dentistry.

Probably the given investigations on face asymmetry can have significance in Maxillary-Facial and Plastic Surgery, Transplantology, Orthopedy, Prosthetic Dentistry, Orthodonty, Neurology as well as Cosmetology and Psychology.

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PRACA ORYGINALNA ORIGINAL ARTICLE

THE PROBLEM OF ACUTE PESTICIDE POISONINGS OF AGRICULTURAL WORKERS IN UKRAINE UNDER THE CONDITIONS OF THE NEW BUSINESS PATTERNS

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ABSTRACT

Introduction: Due to introduction of new forms of agriculture and transformation of the treatment and preventive service in recent years, there has been a false impression of a sharp decrease in the level of occupational morbidity among agricultural workers 30 % to 25 % in the structure of general occupational morbidity in the 80–90s down to 0.2-0.4 %. The aim: Summarize data on the prevalence, causes, structure of acute pesticide poisoning in agricultural workers at the current stages of its reform in order to improve preventive measures.

Materials and methods: Data on the prevalence, causes and structure of 647 cases of acute pesticide poisoning in agricultural workers over the past 25 years have been summarized; staff of the Scientific Toxicology Center took part in the sanitary-hygienic investigation and establishment of the diagnosis.

Results: The causes for the development, aetiology and structure of 647 cases of acute pesticide poisoning, among which 522 cases of acute poisoning of field beet growers with 2,4-D-based herbicides (80.7 %), 60 cases (9.3 %) of OPC poisoning, 36 cases of beet growers poisoning with sulphonylurea-based herbicides, 14 patients with acute synthetic pyrethroid poisoning, and isolated cases (15 patients) of intoxication with aluminium phosphide, dithiocarbamates, Vitavax, and Fipronil were analysed.

Conclusions: Analysis of the causes of the development and structure of poisoning has allowed to optimize the complex of preventive measures to strengthen sanitary control over the implementation of individual and public safety hygienic regulations during storage and use of pesticides.

KEY WORDS: acute pesticide poisonings, agricultural workers in Ukraine

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INTRODUCTION

Over the past 25 years, the agriculture of Ukraine is characterized by a radical reform of the agroindustrial complex (AIC). Elimination of collective and state farms, and change of the forms of ownership is at the base of these reforms. As land shares, the majority of the lands passed into the ownership of former collective farmers and state farm workers. In recent years, land shares are actively leased or bought up by the private farms and large farming enterprises. Unfortunately, small-scale land users and private farms of the AIC still function without proper sanitary control over the transportation, storage and use of pesticides (P), and they are characterized by unfavourable working conditions for workers. Unfavourable working conditions of agricultural workers (mostly hired workers to perform certain seasonal jobs) are characterized by imperfect technological process, extensive use of outdated equipment and machines, a large amount of poorly mechanized labour operations and manual labour, especially when growing sugar beet, tobacco, gardens, and vinelands [1-3]. At the same time, there is a deterioration in the provision of workers with individual protective equipment against the exposure of adverse production factors, as well as health care services due to closing-down of medical and obstetric centres and district hospitals, deterioration in the quality of preliminary and regular medical examinations, and almost complete disruption of medical examination system [1-4].

Due to introduction of new forms of agriculture and transformation of the treatment and preventive service in recent years, there has been a false impression of a sharp decrease in the level of occupational morbidity among agricultural workers 30 % to 25 % in the structure of general occupational morbidity in the 80-90s down to 0.2-0.4 % [1, 3, 4]. The decrease in occupational morbidity among agricultural workers has occurred dozens of times, despite the increase in the volume of work and production of grains, vegetable crops, sunflower, etc. [5]. Misinterpretation of the low level of occupational morbidity among agricultural workers is associated not only with the deterioration of the quality of regular medical examinations, but also with the fact that farmers often use seasonal hired workers without legal registration to work, and therefore they have no registered work experience, that does not allow to trace a connection between the developed diseases and profession. Unfortunately, the problems of social security of smallscale land users, farmers, private machine operators, who are employed, have not been solved so far. In addition, the system of deduction of contribution amounts to the social insurance fund requires improvement.

In recent decades, the structure of occupational diseases in agricultural workers has been formally represented mainly by group cases of acute pesticide poisoning [1–4]. Acute pesticide poisoning is still quite widespread, and in most cases occur due to gross violations of hygienic regulations, mainly among people of working age, cause a long-term loss of professional working ability and often persistent disability, and is accompanied by significant social and economic damage [1-6].

THE AIM

Objective: summarize data on the prevalence, causes, structure of acute pesticide poisoning in agricultural workers at the current stages of its reform in order to improve preventive measures.

MATERIALS AND METHODS

Data on the causes of development, prevalence and structure of acute pesticide poisoning in agricultural workers were summarized depending on profession and work experience. Only those cases of intoxication with pesticides among agricultural workers over the past 25 years have been analysed, in which the staff of the Scientific Center took part in the sanitary-hygienic and clinical-laboratory study of the aetiology of poisoning and clarification of the diagnosis. Unfortunately, it is not possible to summarize all cases of acute pesticide poisoning in the country, since all poisonings are still recorded in the "Other" column of the statistical reporting forms.

This paper analyses the results of sanitary-hygienic and clinical-laboratory examination of 647 cases of acute occupational pesticide poisoning among agricultural workers, with predominance of acute poisoning with 2,4-dichlorophenoxyacetic acid-based herbicides (2,4-D) — 522 patients (80.7 %) and organophosphorus compounds — 60 patients (9.3 %). Victims also included 36 patients with acute poisoning with sulphonylurea-based herbicides (Rimsulfuron), 14 patients poisoned with synthetic pyrethroids (SPs), and isolated cases of intoxication with aluminium phosphide, dithiocarbamates (TMTD), oxatiine compounds (Vitavax), and phenylpyrazole derivatives (Fipronil).

After first aid, all the victims were transferred to the clinic of the Scientific Toxicological Center, where all patients underwent standard detoxification and antidote therapy [6-7], as well as general clinical and biochemical examination according to standardized methods [8]. Classification and general principles of diagnostics set out in the guidelines for physicians by Ye. A. Luzhnikov et al. were adopted as the basis for the diagnostics of clinical syndromes of intoxications and determination of their degrees of severity [9].

RESULTS AND DISCUSSION

The composition of the examined patients and the structure of acute pesticide poisoning are presented in Table I, which shows predominance of patients with 2,4-D- (80.7 %), OPCs (9.3 %) and sulphonylurea-based herbicide poisoning (5.6 %).

In the professional composition of the examined patients, the field beet growers prevailed: out of them, 522 patients (80.7 %) with acute 2,4-D-based herbicide poisoning and 36 patients (5.6 %) with sulphonylurea-based herbicide poisoning. The professional composition of the main group of patients with acute pesticide poisoning is presented in Table II.

All 6 patients with TMTD poisoning and 4 with aluminium phosphide poisoning were workers of grain storages, who violated hygienic regulations during grain treatment. Three cases of Vitavax poisoning occurred in the workers of mixing units, two cases of Fipronil poisoning developed in workers during treatment of potatoes with a gross violation of hygiene requirements. The age of all examined patients ranged between 28 and 62 years (mean age -36.4 ± 0.7 years). Out of the 647 cases of acute poisoning, 605 patients were females (93.5 %) — all field crop and fruit growers, winegrowers, disinfectors, and several general workers. Among 14 patients with acute SP poisoning, there were 8 females and 6 males.

Acute poisoning with 2,4-D-based herbicide in 522 field beet growers (8 cases of group poisoning, 24 to 153 victims) and sulphonylurea-based herbicides in 36 field beet growers, who performed the manual thinning of sugar beet sprouts, resulted from the driftage of herbicides from adjacent fields, sowed with cereals, which, without coordination with other land users, were treated at the same time with these pesticides. Also as a result of the driftage of pesticides from adjacent fields treated by OPC machinery operators, acute OPC (Dimethoate) poisoning also occurred in 36 female winegrowers who, at the same time, carried out manual work on a nearby vineyard in hot weather. The main cause of these poisonings was lack of consistency in plans for the use of pesticides among land users, whose lands border each other.

Out of 60 cases of OPC poisoning, in 13 cases (21.7 %) poisoning occurred under the action of karbofos, in 8 cases (13.3 %) – dichlofos, in 3 cases (5.0 %) – phosalone, and in 36 cases (60 %) – dimethoate.

Signs of OPC poisoning in the majority of victims appeared 2-3 hours after inhalation and percutaneous occupational exposure. The main complaints of the victims were increased tearing and salivation, headache, dizziness, heavy cough with profuse mucous sputum, paraesthesia in the hands and feet, cramps in the muscles of the extremities, nausea, and often vomiting and pain in the right hypochondrium or in the region of the heart. Depending on the severity of complaints and clinical-laboratory parameters, 51 out of 60 patients (85 %) had a mild degree (I) of intoxication, 6 (10 %) — moderate (II), and 3 (5 %) — severe degree (III). The test for blood serum cholinesterase (CE) and acetylcholinesterase in red blood cells showed that

Pesticides	Number of victims (n=647)	Proportion, %	
1	2	3	
2,4-dichlorophenoxyacetic acid-based herbicides (2,4-D)	522	80.7	
Organophosphorous compounds (OPCs)	60	9.3	
Sulphonylurea-based herbicides	36	5.6	
Synthetic pyrethroids (SPs)	14	2.2	
Aluminium phosphide	4	0.6	
Dithiocarbamates (TMTD)	6	0.9	
Oxatiine compounds (Vitavax)	3	0.5	
Phenylpyrazole derivatives (Fipronil)	2	0.3	

Table I. The structure of acute pesticide poisoning in the examined patients

Table II. The professional composition of the main group of patients with acute pesticide poisoning

	Pesticides							
Professional groups	2,4-D (n=522)	OPCs (n=60)	Sulphonylurea (n=36)	SPs (n=14)				
1	2	3	4	5				
Field beet growers	522	-	36	-				
Winegrowers	-	36	-	-				
Breeders	-	9	-	-				
Fruit growers	-	8	-	-				
Workers of toxic chemical warehouses	_	2	-	5				
Disinfectors	_	2	-	3				
General workers	-	-	-	6				
Machinery operators	_	3	-	-				

Note: n — number of patients.

while their levels decreased by an average of 20-40 % in case of degree I of intoxication, then their levels decreased on average by 73.8 % and 78.8%, respectively, and returned to normal only in 30-40 days in case of degree II-III.

Patients with acute 2,4-D-based and sulphonylurea-based herbicide poisoning complained of general weakness, headache, dizziness, paraesthesia in the face, tongue, lips, hands and feet.

Among 14 patients with acute SP poisoning, in nine cases poisoning developed upon exposure to 2.5 % Decis (deltamethrin), in one -2.5 % Arrivo (cypermethrin), in three -20 % Sumicidin (fenvalerate), and in one case -5 % Karate (lambda cyhalothrin). All victims after exposure to SPs noted intense headache, dizziness, general weakness, burning sensation and hyperaemia of the face, visible mucous membranes and sclera, as well as severe paraesthesia in the face, especially in the nasolabial triangle, nausea and vomiting of varying degrees of intensity. Similar complaints were noted in patients with acute TMTD, Vitavax and Fipronil poisoning.

Thus, the reform of agriculture in Ukraine, unfortunately, is not accompanied by proper and effective sanitary control over the labour conditions of the workers. Due to this, hygienic requirements for the storage and use of pesticides are often grossly violated, which is accompanied by the development of acute poisonings with agrochemicals, including group ones.

The main reason for sanitary and hygienic violations is the lack of coordination of plans for the use of pesticides among both land users and the sanitary service. Within the structure of group acute pesticide poisoning, agricultural workers, beet growers are predominantly poisoned with 2,4-D-based and sulphonylurea-based herbicides, winegrowers are poisoned with OPCs as a result of the driftage of these pesticides from adjacent fields due to lack of coordination of plans for the use of agrochemicals between the land users whose lands border each other.

CONCLUSIONS

The strengthening of sanitary control over the implementation of hygienic regulations for individual and public safety in the purchase, storage, and use of pesticides is at the basis of the developed complex of preventive measures. The necessity for land users to annually draw up work plans for the use of agrochemicals in the fields and their mandatory coordination not only with the sanitary service, but also with adjacent land users whose lands border each other has been justified. At the same time, the complex of organizational and sanitary-hygienic measures for the prevention of acute pesticide poisoning, both on an individual and collective level, has been optimized.

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PRACA POGLĄDOWA REVIEW ARTICLE

ANALYSIS OF THE MORTALITY RATE AMONG THE POPULATION OF THE POLTAVA REGION AND THE WAYS OF ITS REDUCTION

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ABSTRACT

Introduction: Saving and improvement of population' health is one of the main priorities of the policy in any country. Studying of the level and causes of mortality is a powerful tool for assessing the effectiveness of health care systems. WHO recommends using of the European classification of preventable causes of death that based on three levels of prevention.

The aim of this study is to compare the level and structure of mortality of the population of Ukraine and the Poltava region, to substantiate scientific approaches to the study and identification of those causes of death that can be prevented in order to formulate prevention programs at different level.

Materials and methods: In research are used the information from the State Statistics Service of Ukraine and from the Center for Medical Statistics of the MoH of Ukraine. **Review:** Despite the positive dynamics of mortality in recent years, both in the Poltava region and in Ukraine, the indicators remain extremely negative. About 73.3% of all fatalities in Ukraine are three main types of causes cardiovascular diseases, external causes of death and neoplasms. In the Poltava region, 70.56% of all causes of death are due to cardiovascular disease; neoplasms occupy 13.88%; external causes - 4.87%; diseases of the digestive system - 3,06%; respiratory diseases - 1.31% of the causes of death. **Conclusions:** The mortality rate both in the Poltava region and in Ukraine has tendency for declines, but remains rather high. General trends in the structure of causes of death: in the first place are diseases of the cardiovascular system, the second - neoplasms, the third -external causes. Structuring of the causes of death that based on the principle of prevention in Ukraine do not conduct.

KEY WORDS: Public health; avoidable mortality; statistical information

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INTRODUCTION

Saving and improving the health of the population is one of the main priorities of the policy of many countries. In itself, the European policy Health 2020 is aimed at improving health and increasing the well-being of the population, reducing inequities in health and developing human-oriented health systems [Target benchmarks].

Indicators of population health, including demographic indicators, and especially mortality rates due to causes of death in different age groups, and indicators of various types of morbidity are the main objects of public health management [1,2].

In addition to studying the prevalence of illness and injury, studying the level and causes of death among people is the most effective means of assessing the effectiveness of health care systems in any country.

According to the World Health Organization (WHO), about 70% of all causes of deaths in whole world there are infectious diseases (NCDs). Traumatism on road refers to the top ten causes of death in countries with different income levels. There 27% of deaths from external causes are precisely on road accidents.

One of the ways to reduce mortality rates is to determine the priorities for identifying the causes of mortality that can be prevented by further defining a strategy to reduce it. The modern approach to the analysis of mortality is the use of the European classification of preventable causes of death, which is based on different levels of prevention, combined into 3 groups, and 14 groups of diseases are classified as preventable causes. [3].

The World Health Organization has developed an indicators for the six target benchmarks of Health - 2020 policy. The first and main guideline was the reduction of anticipatory mortality in Europe by 2020. The main indicators for this purpose were the following: the age-standardized rate of total premature mortality (aged 30 to 70 years) for 4 groups of major non-infectious diseases: cardiovascular diseases, malignant neoplasms, diabetes mellitus and chronic respiratory diseases, with distribution by gender. There is also a proposal to separately consider diseases of the digestive system. Indicative will be the reduction of these indicators by 1.5% annually.[4].

It should be noted that the quality of the received information and as a result of the management decision directly depends on the organization and ordering of the mortality accounting system.[5,6].

THE AIM

The purpose of this study is to compare the level and structure of mortality of the population of Ukraine and the Poltava region, to substantiate scientific approaches to the study and identification of those causes of death that can Valentyn M. Dvornyk et al.

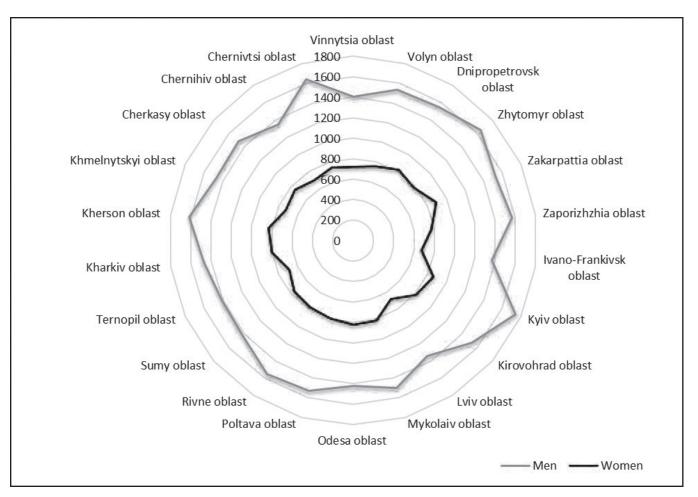


Figure 1. Mortality rate among the population of different regions of Ukraine (per 100 thousand).

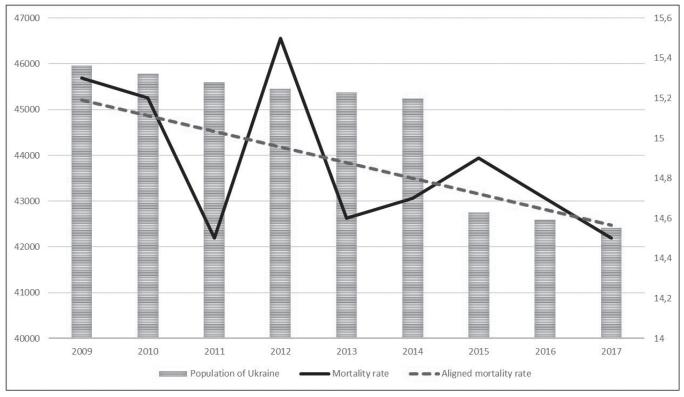
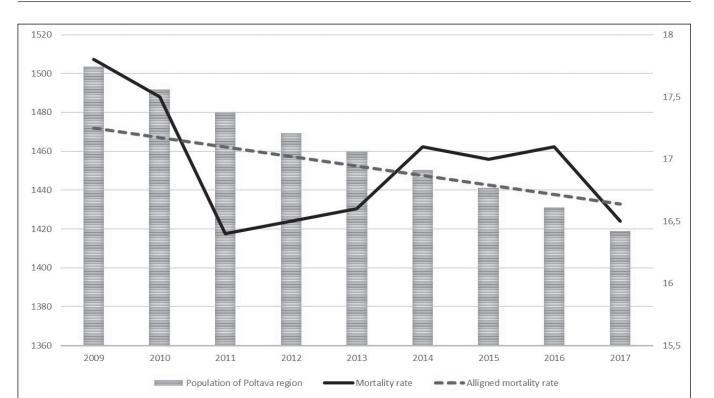
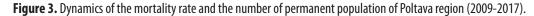


Figure 2. Dynamics of the mortality rate and the number of permanent population of Ukraine (2009-2017).





Iddle 1. Iolal mortality fales in the Pollava region in 2015-201.	al mortality rates in the Poltava region in 2013-2	017.
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Year	Urban and rural population	Urban population	Rural population	Urban population in % to rural population
2013	16,79	14,30	20,72	69,02
2014	17,20	14,84	20,92	70,94
2015	17,12	14,79	20,82	71,04
2016	17,22	14,87	20,98	70,88
2017	16,65	14,42	20,24	71,25
у % 2017 до 2013	99,17	100,84	97,68	-

Note: Calculated according to the State Statistics Service of Ukraine

be prevented in order to formulate prevention programs at the regional and the state level.

MATERIAL AND METHODS

The statistical materials which are used in this work is obtained from the State Statistics Service of Ukraine and from the Center for Medical Statistics of the Ministry of Health of Ukraine; applied methods of the system approach, bibliosemantic, graphic.

REVIEW AND DISCUSSION

The demographic situation in Ukraine is well grounded cause for concern both for the authorities and for the general population. Reducing the total amount of population, decrease in life expectancy and the cumulative crashing of fertility, negative balance of migration, which became characteristic signs of demographic processes during the years of independence, all it give grounds to qualify them as signs of prolonged demographic crisis. [7].

A similar situation exists in most territories of Ukraine, including in the Poltava region.

The chart clearly shows the level and gender structure of the mortality of Ukraine's population by regions of Ukraine. The highest mortality rates are observed among the population of Chernihiv (18.4 ‰), Poltava (16.6 ‰), Kirovograd and Cherkasy (16.3 ‰), Zhytomyr (16.2 ‰) regions (Fig. 1).

Poltava region is an area in the center of Ukraine, which belongs to the agrarian and industrial region. The region covers an area of 28.7 thousand km², which is 4.8% of the total territory of Ukraine. According to the State Statistics Committee of Ukraine, the number of the existing population is 1413.8 thousand people, including urban - 878.9 and rural - 534.9 thousand people.

During the last time, the population of the Poltava region is gradually decreasing, which is mostly due to the natural movement (Fig.3).

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Causes of death	ICD-10	Urban population			Ru	European		
Causes of death		two sexes	men	women	two sexes	men	women	region
Neoplasms	C00-D48	184,88	215,48	158,94	186,98	240,93	138,47	153,8
Diseases of the circulatory system	100–199	779,08	755,85	798,77	1206,35	1066,42	1332,15	327,1
Diseases of the respiratory system	J00–J99	22,58	35,60	11,55	42,70	65,53	22,18	34,6
Diseases of the digestive system	K00–K93	51,15	68,12	36,78	54,24	73,36	37,05	44
External causes of morbidity and mortality	V01-Y89	63,87	108,85	25,76	96,12	165,96	33,34	52,1

Table II. Comparative characteristics of mortality in Ukraine population WHO region for some reasons (per 100 thousand)

Table III. Mortality of population of the Poltava region for various reasons during 2013-2017

	0	tion	2013		2014		2015		2016		2017	
	ICD-10	Population	per 100 thousand	%	per 100 thousand	%	per 100 thousand	%	per 100 thousand	%	per 100 thousand	%
Infectious and	A00-	urban	18,93	1,3	16,06	1,08	16,47	1,1	16,47	1,1	13,72	0,9
parasitic diseases	B99	rural	24,5	1,15	22,25	1,06	22,13	1,1	18,34	0,8	14,1	0,7
Tumor	C00-	urban	226,64	15,8	238,35	16,1	237,74	16,1	230,7	15,5	226,6	15,7
	D48	rural	242,77	11,7	225,78	10,8	252,91	12,1	236,99	11,3	238,66	11,8
Endocrine diseases,	E00-	urban	4,05	0,2	3,84	0,2	4,43	0,2	2,97	0,2	3,11	0,2
nutritional disorders	E90	rural	7,8	0,37	3,94	0,18	5,26	0,25	4,21	0,2	2,59	0,1
Diseases of the	100-	urban	974,87	68,1	1017,11	68,5	1016,88	68,7	1035,22	69,6	1008,12	69,9
circulatory system	199	rural	1434,62	69,2	1477,48	70,6	1462,17	70,2	1521,37	72,5	1444,04	71,3
Diseases of the	J00-	urban	27,72	1,9	20,36	1,37	19,88	1,3	22,54	1,65	17,06	1,2
respiratory organs	J99	rural	65,88	3,18	55,99	2,68	48,98	2,35	33,2	1,58	29,87	1,47
Diseases of the	K00-	urban	48,46	3,38	54,07	3,6	50,79	3,43	49,32	3,31	46,35	3,21
digestive system	K93	rural	66,24	3,19	63,17	3	57,87	2,78	58,33	2,77	58,45	2,88
External	V01-	urban	80,58	5,63	83,14	5,6	78,86	5,33	67,86	4,56	67,27	4,66
causes	Y89	rural	119,87	53,78	113,97	5,45	116,84	5,61	109,32	5,2	103,55	5,11

Despite the positive dynamics of mortality rate in recent years, both in the Poltava region and in Ukraine as a whole, the indicators remain extremely negative. In 2017, the mortality rate of the population of the Poltava region was 16.6 ‰ (in 2016 - 17.2 ‰) (Fig.3). At the same time, in 2017, mortality in Ukraine was 14.53 ‰ (in 2016 - 13.7 ‰) (Fig.2).

It should be noted that there are significant differences in the mortality rate of urban and rural population (Table I).

The structure of the cause of death that has been sustained over the resent years has been formed. About 73.3% of all fatalities in Ukraine are three main types of causes of death: circulatory system diseases, external causes of death and various neoplasms. The dynamics of the number of deaths is mostly determined by fluctuations in age-related mortality and age-structure changes.

In Table II presentations comparative characteristics of mortality in Ukraine population WHO region for some reasons. A similar situation occurred in the Poltava region. In the Poltava region, 70.56% of all causes of deatharedueto cardiovascular disease (including 69% among the urban population and 71.34% - among the rural population); neoplasms occupy 13.88% of all causes of death (15.71% among the urban population, 17.79% among the rural population); for external causes it accounts for 4.87% of all deaths (4,66% among the urban population, 5,11% among the rural population); the diseases of the digestive system accounted for 3,06% (3,21% among the urban population, 2,88% among the rural population); respiratory diseases makeup about 1.31% of the causes of death (1,18% among the urban population, 1,47% among the rural population).

Among the external causes of death in the first place are the results of deliberate self-harm (21.8% among urban population and 28.0% among rural population), second place occupied by road accidents. The road accidents occupy 17.85% among all the external causes of the death of the urban population in 2017 (10.8% - rural population), and this indicator tends to increase compared to 2013 (Table III).

The concept of preventability ("avoidable" mortality) was primarily develop for the prevention of lethal outcomes of diseases or injuries. Moreover, the list of conditions from which people should not die in the modern development of the health care system, was the result of agreed opinion of the expert community, which included representatives of the scientific community, medical practitioners, specialists in management and economics, epidemiology and statistics.

The World Health Organization (WHO) recommends for all countries conduct systematic investigations of avoidable mortality in accordance with the proposed methodology, which consists of an interdisciplinary anonymous investigation of a representative sample of deaths aimed at identifying the possibility of avoiding death or correcting the factors associated with it. [8].

However, in Ukraine such studies at the state level are not organized and are not conducted.

CONCLUSIONS

The mortality rate of the population both in the Poltava region and in Ukraine as a whole has tendency for declines, but remains rather high.

General trends in the structure of causes of death: in the first place are diseases of the cardiovascular system, the second - neoplasms, the third - external causes. The structure of the causes of death is a discrepancy between urban and rural populations.

Structuring of the causes of death that based on the principle of prevention in Ukraine do not conduct.

The formation of a system of informational background for the analysis of mortality indicators in the aspect of the concept of "avoidable mortality" can provide a public health system with managerial information.

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The work is a fragment of SRR "Medical and social rationale for optimizing approaches to managing and organizing various types of medical care for adults and children in the period of reforming the health care industry" (is registered with UkrISTEI)

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PRACA POGLĄDOWA REVIEW ARTICLE



DYNAMICS OF THE INCIDENCE, PREVALENCE AND DISABILITY OF DIABETES MELLITUS IN CHILDREN AGED 0 TO 17 YEARS IN THE POLTAVA REGION OVER THE PERIOD OF 2008-2017

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ABSTRACT

Introduction: Worldwide, there is a tendency to an increase in the number of patients with diabetes mellitus. After cardiovascular disease and oncology, this disease takes the third place, being ahead of HIV and tuberculosis.

The aim of the research was to study and analyze the dynamics of the prevalence, incidence and disability of diabetes mellitus among children aged 0-17 years in the Poltava region over the period of 2008-2017.

Materials and methods: The data of statistical reports of medical institutions and the Center of Medical Statistics of the Ministry of Health of Ukraine over the period of 2008-2017 was analyzed. The obtained data was processed using using the MS Office 2010 software package.

Review: We have found that the prevalence of diabetes mellitus among children under the age of 17 in the Poltava region is constantly growing. In 2008, the prevalence of diabetes among children aged 0-17 years was 1.11. In 2017, the index was 1.32. Regarding the incidence, the indicator also gradually increased, in 2017 it was 0.21 versus 0.12 in 2008. Having analyzed the disability of diabetes among children, it is evident that the total disability is gradually increasing. If in 2008 there were 185children with diabetes mellitus, then in 2017 there were 256 people (disability index 0.72 and 1.09, respectively). The primary disability among children in 2017 was 0.19, in 2008 it was 0.09, respectively. **Conclusions:** The presented research allowed to study and analyze the incidence, prevalence and disability of diabetes mellitus among children from 0 to 17 years old in the Poltava region over the period of 2008-2017.

KEY WORDS: diabetes mellitus, children, prevalence, incidence, Poltava region

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INTRODUCTION

Worldwide, there is a tendency to an increase in the number of patients with diabetes mellitus. After cardiovascular disease and oncology, this disease takes the third place, being ahead of HIV and tuberculosis. According to the latest data from WHO and the International Diabetes Federation (IDF), about 382 million people on our planet suffer from diabetes mellitus today. It is projected that by 2035 this figure will have risen to 592 million, and the number of deaths due to the disease will increase by more than 50% [1]. Diabetes mellitus can occur at any age and continue throughout life. There are a lot of factors that cause this disease; among them one may name stress, hypodynamia and obesity. Hereditary predisposition is also observed.

According to the Ministry of Health, 1,3 million patients with diabetes have been officially registered in Ukraine, including 9,5 thousand children. It has been stated that the number of young patients increases every year [2]. 98% of children have the first type of diabetes when the pancreas does not secrete insulin. In children, diabetes has a very severe course and can lead to high and early disability.

Since the beginning of 2017, about 47,000 patients with diabetes have been registered in the Poltava region, of which 8347 adults and 309 are children receiving insulin.

Usually, the diagnosis of diabetes mellitus was based on the pronounced symptoms of hyperglycemia, but over the past decades the emphasis has been placed on the need to establish the earliest (asymptomatic) stages of carbohydrate metabolism disorders.

THE AIM

The aim of this research was to study and analyze the dynamics of prevalence, incidence and disability of diabetes mellitus among children from 0 to 17 years old in the Poltava region over the period of 2008-2017.

MATERIALS AND METHODS

The data of statistical reports on children's endocrinology of medical institutions and the Center of Medical Statistics of the Ministry of Health of Ukraine over the period of 2008-2017 [3,4,5,6,7,8,9,10,11,12] have been analyzed. To study the incidence, prevalence and disability of diabetes mellitus among children from 0 to 17 years old, the following data was studied and processed:

- indicators of the incidence of diabetes mellitus in the region for 2008-2017 years,

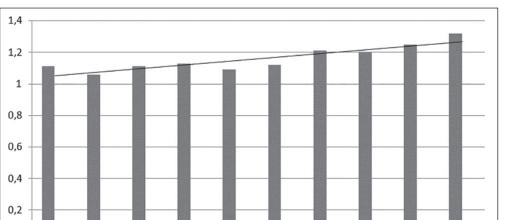
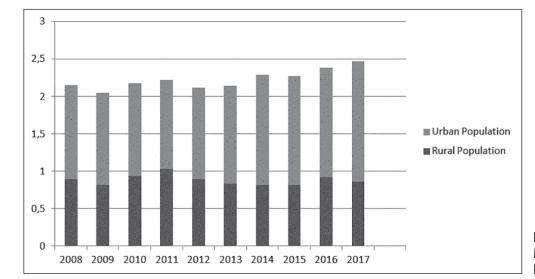


Fig. 1. The Prevalence of Diabetes Mellitus in Children Aged 0-17 Years per 1,000 Children Population since 2008



2012

2013

2014

2015

2016

2017

0

2008

2009

2010

2011

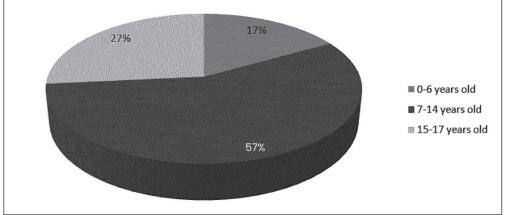


Fig. 2. The Prevalence of Diabetes Mellitus among Urban and Rural Population

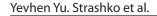
Fig. 3. The age structure of the prevalence of diabetes among children in 2017

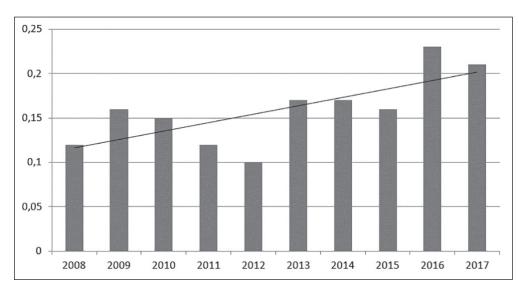
- indicators of the prevalence of diabetes mellitus in the region for 2008-2017 years,
- disability indicators for diabetes in the region for 2008-2017 years.

The obtained data was processed using epidemiological and medical statistical methods using the MS Office 2010 software package.

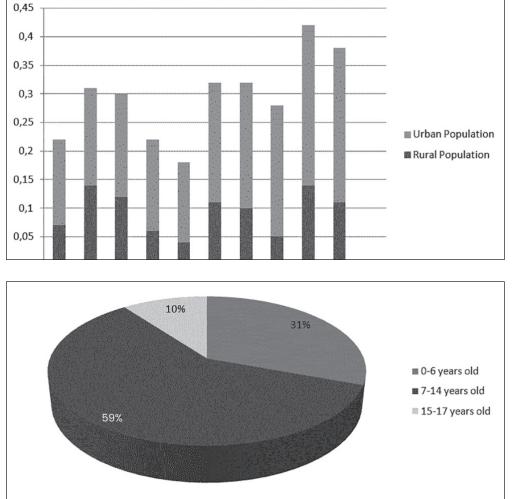
REVIEW AND DISCUSSION

The incidence and prevalence of the disease are among the main indicators characterizing the health of the adult and child population [13]. We have found that the prevalence of diabetes mellitus among children under the age of 17 in the Poltava region is constantly growing. In 2008, the prevalence of diabetes per 1,000 population among children aged









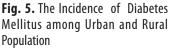


Fig. 6. The age structure of the incidince of diabetes among children in 2017

0-17 was 1.11. In 2017, the index increased significantly and amounted to 1.32 (increased by 19%). If by 2012 the prevalence of the disease was decreasing, then since 2013 there has been a tendency to an increase in the prevalence of diabetes mellitus among children under 17 years old (Fig. 1). Comparing the prevalence of diabetes among urban and rural population, it can be said that over the past 10 years the growth rate among rural children is negative and amounts to 0.03 (decreased by 3%), while the growth rate among urban population is constantly increasing, and for the last 10 years it amounts to 0.28 (that is 28%), which can be explained by irrational nutrition, frequent stress and untimely addressing to medical institutions (Fig. 2).

When studying the structure of the prevalence of dia-

DYNAMICS OF THE INCIDENCE, PREVALENCE AND DISABILITY OF DIABETES MELLITUS IN CHILDREN AGED 0 TO 17...

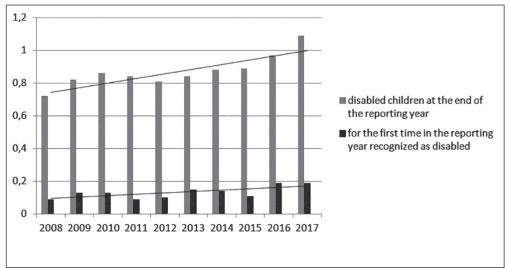


Fig. 7. Disability in Diabetes Mellitus among Children under 18

Table I. Analysis of the dynamic range of the prevalence of diabetes among children under 17 years old in the Poltava region over the period of 2008-2017.

Per 1, 000 population	Prevalence	Growth Rate
2008	1,11	
2009	1,06	-5%
2010	1,11	5%
2011	1,13	2%
2012	1,09	-4%
2013	1,12	3%
2014	1,21	8%
2015	1,20	-1%
2016	1,25	4%
2017	1,32	6%

Table II. Analysis of the dynamic range of diabetes incidence among children under 17 years old in the Poltava region over the period of 2008-2017.

Prevalence	Growth Rate
0,12	
0,16	33%
0,15	-6%
0,12	-20%
0,10	-17%
0,17	70%
0,17	0%
0,16	-6%
0,23	44%
0,21	-9%
	0,16 0,15 0,12 0,10 0,17 0,17 0,16 0,23

betes among the child population of different age groups in 2017, it was established that the disease is most rapidly spreading among children of 7-14 years old and amounts to 57% (Fig. 3).

Regarding the incidence, the index also gradually increased, in 2017 it was 0.21 versus 0.12 in 2008, that is, increased by 75% (Fig. 4). This can be explained by the late address of parents to medical institutions, because in

recent years diabetes mellitus has been hidden under the masks of infections and acute respiratory viral infections, passive way of life, obesity, harmful habits and unbalanced nutrition.

In the period from 2008 to 2017, the tendency to the increase in the incidence rate among children from 0 to 17 years of the rural areas of the Poltava region, has a wave-like character with a peak in 2009 and 2016 with an index

of 0.14. Over the last year there has been a decrease in the incidence rate to 0.11, that is, decreased by 21%. Among urban population, a wave-like character is also observed, but the highest peakof the incidence was observed in 2016 with an index of 0.28. Over the past year, the incidence rate has decreased to 0.27 (by 4%, respectively) (Fig. 5).

When studying the structure of the incidence of diabetes among the child population of different age groups in 2017, it was found that the primary disease incidence is most common among children aged 7-14 years and is 59% (Fig. 6).

The analysis of the structure of the prevalence and incidence of diabetes showed that during the time of study, the growth rate was constantly increasing. It can also be said that the incidence of diabetes mellitus is somewhat lower among rural children.

Regarding infant mortality from diabetes mellitus, in the last 10 years not a single case has been registered in the Poltava region.

Having analyzed the disability of diabetes among children aged 0 to 17 years, it is evident that the total disability is gradually increasing. If in 2008 there were 185 disabled children with diabetes mellitus, then in 2017 there were 256 people (disability index 0.72 and 1.09, respectively). Total disability over the last 10 years has increased by 51%. Primary disability among children under 17 years old in 2017 was 0.19, and in 2008 it was 0.09, respectively (Fig. 7). Primary disability has increased by 111% over the past 10 years. The growth rate over the past 10 years is 1.11 (111%, respectively).

Having analyzed the dynamic range of diabetes prevalence among children from 0 to 17 years old in the Poltava region, it has been found that the growth rate of the total prevalence is gradually increasing. But for several years there was a decrease in the growth rate (by 5% in 2009, by 4% in 2012, and by 1% in 2015) (Table I).

Having analyzed the dynamic range of diabetes incidence among children from 0 to 17 years old in the Poltava region, it has been found that the growth rate of the total incidence varies from 0.20 in 2011 to 0.70 in 2013. But if to compare 2008-2017, it can be said with certainty that over the past 10 years the growth rate in the total incidence is 0.75 (increased by 75%) (Table II).

CONCLUSIONS

According to statistics for the last decade, the number of young patients with diabetes mellitus in the Poltava region has increased. The fastest growth rates in the prevalence of the disease have been found in children 7-14 years old. Childhood disability is one of the acute medical and social problems of the 21st century. In terms of the frequency of disability, this pathology is on 3rd place, being second only to cardiovascular and oncological diseases [14].

This testifies to the need for the introduction of comprehensive measures to prevent diabetes mellitus and its complications in children. It is important to detect the disease at an early stage, thus it will help reduce its negative effects and take it under control. The urgent task for modern researchers is to stop the epidemic of diabetes, which is a serious problem for our country [15,16].

In general, the research presented allowed to study and analyze the incidence, prevalence and disability of diabetes mellitus among children from 0 to 17 years old in the Poltava region over the period of 2008-2017.

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PRACA POGLĄDOWA REVIEW ARTICLE

MEDICAL ASPECTS OF SPECIALIST TRAINING IN PHYSICAL THERAPY AND ERGOTHERAPY IN THE SYSTEM OF HIGHER EDUCATION OF UKRAINE

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ABSTRACT

Introduction: In today's conditions, the aggravation of health and demographic problems in Ukraine arose the urgent need for physical rehabilitation and restoration of the health of our citizens by means of a non-medical nature. Under such conditions, specialists in physical therapy and ergotherapy become subjects of medical, social and psychological assistance, associates of the improvement of physical qualities, psycho-emotional stability and adaptation reserves.

The aim of the study is to develop and substantiate the medical aspects of training a specialist in physical therapy and ergotherapy in the system of higher education in Ukraine. Materials and methods: To achieve the goal, a set of research methods, in particular theoretical ones, is used: historical-comparative and logical, terminological, quantitativequalitative (bibliometry), generalization, abstraction, analysis and synthesis, modeling, studying documents; empirical: observation, survey, analysis of products of activity, complex pre-nasol diagnostics.

Conclusions: The theoretical synthesis of domestic and foreign experience is carried out and the author's approach to solving an important and actual scientific problem of forming the medical competence of future specialists in physiotherapy and ergotherapy is proposed. An analysis of the international experience of training physical rehabilitation specialists has made it possible to identify the most promising American and European models that have a number of significant differences in the principles of organization and financing of pedagogical processes, professional etiquette and self-discipline of specialists.

KEY WORDS: professional training, specialist in physical therapy and ergotherapy, readiness for professional activity, medical education, key and special competencies

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INTRODUCTION

In modern conditions, the aggravation of health and demographic problems in Ukraine arose the urgent need for physical rehabilitation and restoration of the health of our citizens by means of a non-medical nature, which issues an agenda on the preparation of a sufficient number of highly skilled specialists, on which depends not only the realization of the health potential of physical education as a component of the comprehensive and harmonious development of personality, but also complex forecasting of restorative needs of man, correction of patterns of his life activities. Under such conditions, specialists in physical therapy and ergotherapy become more and more subjects of medical, social and psychological assistance, associates of the restoration or compensation of physical abilities and intellectual abilities of a person, improvement of the functional state of his organism, improvement of physical qualities, psycho-emotional stability and adaptation reserves. This increases the urgency of the training of specialists in rehabilitation and restoration, which is carried out under the educational program "Physical therapy, ergotherapy" with qualification - a bachelor of physical therapy, ergotherapy.

The problem of training specialists in physiotherapy and ergotherapy was considered in the context of the study of physical rehabilitation of patients of different nosological groups (O. Dubohai [1], V. Muhin [2]), study of organizational and pedagogical aspects of professional training of specialists in this field (M. Hertsyk [3], V. Kuksa [4], Yu. Liannoi [5], O. Mihiienko [6]), the substantiation of the methodology and training system for specialists in physical rehabilitation (L. Sushchenko [7], B. Shiyan [8]).

The purpose of the educational program is to train highly qualified, competitive rehabilitation specialists who possess the relevant competencies - knowledge of innovative character, skills of their practical application in relation to the effective and early return of patients with a disability to domestic and labor processes, into society; restoration of person's personal properties.

Bachelor in the specialty "Physical therapy, ergotherapy" can take the following primary positions: physical therapist, ergotherapist of treatment and prophylactic institutions; the instructor of medical-physical culture, the masseur of sports teams, the fitness center, the health and medical and prophylactic institutions, the methodologist of the recreational physical culture.

THE AIM

The aim of the study is to develop and substantiate the medical aspects of training a specialist in physical therapy and ergotherapy in the system of higher education in Ukraine.

MATERIALS AND METHODS

To achieve the goal, a set of research methods, in particular theoretical ones, is used: historical-comparative and logical, terminological, quantitative-qualitative (bibliometry), generalization, abstraction, analysis and synthesis, modeling, studying documents; empirical: observation, survey, analysis of products of activity, complex pre-nasol diagnostics.

REVIEW

The systematic analysis of materials from the experience of training physical rehabilitation specialists revealed that in the countries of Europe (Poland, Czech Republic, Great Britain, Austria, Bulgaria, Denmark, France, Germany, Belarus) and the world (USA, Canada, Jordan, Australia) health rehabilitation develops in the form of adaptive physical culture and physiotherapy. The world experience of the professional organizations of specialists in physical rehabilitation (World Confederation of Physical Therapy, Canadian Association of Physical Therapy, German Association of Physiotherapy) demonstrates a significant variety of approaches to the system of training, and analysis of documents - to construct the content of training courses, filled with their diagnostic material, which in a certain is in contradiction with the European tendency of universalization and internationalization of training of specialists according to the Concept of European Physiotherapy. That is why there is the urgent need to eliminate the differences between the structure and content of curricula and programs, which will allow the exchange of students and teachers, will promote the mobility of labor resources. Scientists distinguish three areas of activity of specialists in physical rehabilitation: rehabilitation - in health care institutions of the Ministry of Health; physical culture and health - in educational institutions; medical and rehabilitation - assistance to patients in ambulatory-polyclinic institutions, offices of non-state form of ownership, home conditions [9; 10] and propose to consider physical rehabilitation in two aspects that are inextricably linked - rehabilitation, health and education-professional [11].

Implementation of the competence approach as a means of modernizing the content of higher education leads to the definition of a specific list and content of key competences of graduates of higher education institutions, which are envisaged in the educational qualification of a specialist in physical therapy and ergotherapy; establishing conformity of basic competences with professionally-oriented disciplines; selection of content disciplines, which will ensure the formation and development of competencies; development of a control system for their formation [12, p.47].

The educational program of training specialists in physiotherapy and ergotherapy provides for the formation of such general competencies: the ability to apply knowledge in practical situations; the ability to conduct research at the appropriate level; the ability to adapt and act in a new situation; ability to work both autonomously and in a team; the ability to motivate people and move towards a common goal; the ability to assess and ensure the quality of work performed; the ability to analyze and synthesize; the ability to use information and communication technologies in physical rehabilitation; ability to work with professional information; the ability to comply with ethical and legal regulations relating to health [11].

The special (professional) competences of the bachelor of physical therapy take into account the multidisciplinary nature of the training of a specialist. But an important component of such training is medical training. That is why, based on the analysis of the system of training specialists in physiotherapy and ergotherapy (including analysis of educational and professional program), we have determined the medical professional competencies and normative and legal support for their formation.

The educational program of training a specialist in physical therapy and ergotherapy involves the formation of the following competencies of medical direction:

- ability to analyze structure, normal and individual development of the human body and its motor functions;
- ability to understand and explain the pathological processes that are subject to correction by physical rehabilitation measures;
- ability to collect anamnesis, perform rehabilitation examinations, test, review and document their results;
- ability to carry out operative, current and step-by-step control of the patient / client's state by appropriate means and methods and document the results obtained;
- ability to analyze structure, normal and individual development of the human body and its motor functions;
- ability to understand and explain the pathological processes that are subject of correction by physical rehabilitation measures;
- ability to apply and evaluate physical therapy;
- ability to work with persons with disabilities of different nosologies of support and recovery of physical forces spent by people with limited physical abilities;
- ability to apply psycho-diagnostic techniques for studying physical, mental and social health of a person;
- ability to use modern methods of diagnostics of functional states of the human organism and research of various pathological conditions, to have the techniques of conducting these researches; to track the dynamics of the impact of rehabilitation measures and their effectiveness, to correctly determine the adequacy of the volume and content of methods for the diagnosis of the effectiveness of regenerative therapy [4].

An analysis of current active training curricula for specialists in physical therapy and ergotherapy confirms the conditional distribution of disciplines according to the following cycles:

1) disciplines of the general training cycle:

- the normative part - Ukrainian Language (professional language); History of Ukraine, History of Ukrainian

Culture, Foreign Language (professional language), Philosophy, Fundamentals of Hygiene and Ecology, Computer Technique and Information Technologies in the Physical Rehabilitation, Safety of Life and Principles of Labor Protection in the Field, - 33 ECTS credits, 990 hours, including 330 auditorium 660 - independent work;

- selective disciplines Psychology, Psychology of Health and Health Lifestyle, Pedagogy, Rehabilitation Pedagogy, Fundamentals of Research - 17 credits ECTS, 510 hours, including 170 classrooms, 340 - independent work;
- *2) disciplines of general-biological direction:*
- the normative part is Biochemistry, Human Anatomy, Age Anatomy, Pathological Anatomy, Human Physiology, Age Physiology, Pathological Physiology, Physiology of Motor Activity, General Health Theory, Diagnostics and Monitoring of Health - 40 ECTS credits, 1200 hours, 400 of them 800 lectures - independent work.
- selective disciplines Theory of Health Nutrition, Diet Therapy, Biomechanics, Psychophysiology, Fundamentals of Functional Research, Psychomotorics, Metrological Control - 21 credit ECTS, 630 hours, including 210 classrooms, 420 - independent work;
- *3) disciplines of the cycle of physical education:*
- normative part Physical Education (extra-curricular discipline).
- selective disciplines Theory and Methods of Physical Education, Adaptive Physical Culture, Recreational Motor Activity and Health Fitness -10 ECTS credits, 330 hours, 110 of them are classrooms, 220 are independent work;

4) disciplines of medical direction:

- normative part General Care for Patients with Elements of Physical Therapy, Fundamentals of Clinical Pathology, Deontology of Physical Therapist, Pre-medical Care in Urgent Situations, Introduction to Specialty, Theory and Practice of Physical Rehabilitation, Massage (general, rehabilitation), Non-traditional Methods of Massage, Physical Therapy in Acute and Chronic Diseases of Internal Organs, Physical Therapy in Surgical Diseases, Physical Therapy in Diseases and Disorders of the Musculoskeletal System, Physical Therapy in Diseases of the Nervous System, Modern Rehabilitation Technologies for People with Disabilities, Modern Health Spa Technologies, Physiotherapy and Health Resort, Physical Rehabilitation in Gerontology, Kinesi and Gidrokinesoteraphy, Technical and Orthopedic Means in Physical Rehabilitation - 66 ECTS credits, 2580 hours, including 860 classroom 1720 - independent work.
- selective disciplines Sport Medicine, Management and Marketing of Rehabilitation Institutions, Fundamentals of Social Rehabilitation, Physical Rehabilitation under Extreme Conditions, Alternative Remedies, Fundamentals of Kinesiology, Physical Rehabilitation of Alcohol and Addicts - 27 ECTS credits, 810 hours, including 270 classrooms, 540 - independent work;
- practice Practical training (2 semester), Clinical practice (4 semester), Clinical practice (6 semester), Industrial practice in the profile of the future profession (8 semester) - 18 credit ECTS, 540 hours.

Having mastered a series of medical disciplines, the specialist in physical therapy and ergotherapy is competent in solving scientific problems in physical rehabilitation by using a set of modern methods and research methods, he has a critical understanding of the corresponding problems in the field of health care, physical rehabilitation. The integral nature of the learning of knowledge forms the ability to use the modern data accumulated as a result of scientific research both directly in the subject area of physical rehabilitation and adaptive physical culture, as well as in physiology, medicine, biochemistry, biomechanics, psychology, pedagogy, theory and method of physical education, management theory.

An important component of medical training of specialists in physiotherapy and ergotherapy is the ability to conduct a rehabilitation examination and testing the basic functional capabilities of patients of different nosological groups, processing information. At the same time, knowledge and skills to use devices and equipment for rehabilitation measures are important; devices and equipment for control of the basic vital indicators of the patient; technical auxiliary vehicles and self-service.

A future specialist should direct his efforts to effectively adapt people with functional limitations to physical and social environments. At the same time, it is important to mobilize spiritual forces, to form a conscious attitude towards reality and their own possibilities for self-realization.

Important professional traits of physiotherapy specialist are the ability to determine the optimization of the functional state of a person, increase the level of health; skills and abilities to develop preventive measures for diseases and complications due to increased non-specific and specific protection factors. The effectiveness of the physical therapist is also determined by the ability to determine the effective development of locomotor-static functions of the organism and to diagnose the peculiarities of the development and functioning of the organism associated with a defect of one or another functional system.

DISCUSSION

The formation of physical therapy is conditioned by the fact that in society there was an urgent need to comprehensively study the processes of human health development (formation, treatment, restoration, improvement), stages of controllability of the state of health (maintenance, preservation, reproduction) in general and its separate components (physical, mental, reproductive, etc.) and to distinguish types of professional rehabilitation (social, medical, physical, psychological, pedagogical) [13].

Scientists allocate six types of health education: natural, medico-centric, socio-centric, physical-centered, sport-centric and valio-centric [13]. The purpose of the medico-centric model is the treatment of diseases; it is based on the principles of pharmacology, prevention, prophylactic, monopolization of health activities. The criteria for the effectiveness of the activity are a complete recovery after the illness, working-and-performance, prophylaxis and dispensary. The physical-centered model aims at the development, preservation, reproduction of physical health and its principles are: systematic physical exercises, heterochromatic deterministic development of physical qualities, moderate increase in volume and intensity of work; criterion of efficiency - level of physical development, preparedness and normal homeostasis of an organism. The goal of the sport centric model is to set high scores and highs; it is based on the principles of maximum loading, the pursuit of high sporting achievements. Effectiveness is determined by the level of athletic achievements and functional test indicators. The valio-centric model is aimed at developing the abilities and skills of organization of a healthy lifestyle, it is based on the principles of rational nutrition, moderate physical activity, abandoning bad habits, preventing stress, teaching health at all stages of life. The criteria for the effectiveness of this model are the attitude towards health, the level of health and morbidity, creative active and moral life. The socio-centric model is aimed at helping people who are in a difficult social situation, its principles are cultural worth, humanity, influence on personal self-consciousness, the result - the improvement of personal qualities of the ward, his attitude to society and the world around him. Naturo-centric model is aimed at the organization of a healthy lifestyle regardless of the state of health, among its leading principles - the nature of life, personal responsibility for their health, and the expansion of communication opportunities. The criteria for the effectiveness of this model are self-actualization, the ability to self-reliance with disabilities and conditions [13].

The key aspects of the professional activities of physical therapists and the main points on which education and training of health professionals are based are outlined in the European Physiotherapy Benchmark Statement. This document highlights the peculiarities of physiotherapy syllabuses, general provisions that are the standard for awarding certain levels of qualifications; the requirements for the level of knowledge and skills required by specialists with a certain level of qualification [14]. Scientists define the most typical specialization of physiotherapy in the European educational space: cardio respiratory rehabilitation; family medicine; gerontology and geriatrics; intensive care; neurology / neurophysiotherapy; gynecology and urology; oncology; orthopedic manual therapy, orthopedics; pediatrics; pain management; preventive ergonomics; psychiatry and psychosomatics; rehabilitation; rheumatology; sports medicine [15, p. 112].

CONCLUSIONS

Thus, the theoretical synthesis of domestic and foreign experience is carried out and the author's approach to solving an important and actual scientific problem of forming the medical competence of future specialists in physiotherapy and ergotherapy is proposed. It was established that the training of a specialist is at the junction of the spheres of physical education and health, having the functions of the most accurate assessment of the human body, its mental and physical qualities, patterns of life, which is a necessary stage in the creation of an individual program for the restoration of human functional capabilities through the use of physical exercises and natural factors. An analysis of the international experience of training physical rehabilitation specialists has made it possible to identify the most promising American and European models that have a number of significant differences in the principles of organization and financing of pedagogical processes, professional etiquette and self-discipline of specialists.

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COMPLEMENTARY MEDICINE: INTERNATIONAL EXPERIENCE OF FUNCTIONING AND SPECIFIC FEATURES OF THE APPLICATION IN UKRAINE

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ABSTRACT

Introduction: Finding an optimal model for the development and functioning of the health care system is an important aspect for most economically developed countries. The aim of this article is to comprehensively study the problems of functioning of complementary (alternative) medicine, to identify the main tendencies of its development in some foreign countries and specific features of its application in Ukraine.

Materials and methods: During the research the authors have used theoretical methods (analysis, synthesis, generalization, systematization, etc.) and empirical methods (observation, classification, etc.) of scientific research.

Review: The conducted study provides grounds for arguing that complementary (alternative) medicine in various forms exists in most countries of the world and is promoted by the World Health Organization (hereafter – WHO). However, the legal regulation of complementary medicine and its interaction with the traditional medicine are significantly different. It has been established that a significant part of patients use alternative methods of treatment, neglecting the information interaction with the attending physician. The authors have revealed the shortcomings of permitting procedures concerning the activity of healers, the result of which there are many fraud cases in this sphere.

Conclusions: The authors have proved the necessity of improving the legislative base for the regulation of complementary medicine, integration of alternative methods into official medicine, improvement of the system of professional training of physicians, determination of the volume of usefulness and benefits of medical aid by alternative methods, expansion of international cooperation and exchange of experience with foreign specialists practicing the use of complementary medicine.

KEY WORDS: complementary medicine, alternative medicine, nonconventional methods, healing

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INTRODUCTION

The main documents regulating the development of the public health system in Ukraine as part of global health for the period up to 2020 are: "Health-2020. Fundamentals of Politics and Strategy" (adopted by the 62nd session of the WHO Regional Office for Europe, Malta, 2012, Resolution EUR / RC62 / 8) [1]; "European Action Plan for Strengthening Public Health Capacity and Services" (adopted by the 62nd session of the WHO Regional Office for Europe, Malta, 2012, Resolution EUR / RC62 / 12 Rev.1) [2]; Decision 851/2004 / EU of the European Parliament and of the European Council dated from April 21, 2004 on the establishment of the European Center for Disease Prevention and Control [3].

It is believed that in order to achieve positive results of public health, medicine, law, psychology should be the basis for building an effective system of medical care.

Complementary and Alternative Medicine (CAM) is worldwide either an integral part of providing health care or supplementing traditional health care. Since the curiosity of such methods of prevention and treatment is increasing, there is a need to outline their legal certainty and the possibility of deeper integration into health care systems.

THE AIM

The aim of this article is to comprehensively study the problems of functioning of complementary (alternative) medicine, to identify the main tendencies of its development in some foreign countries and specific features of its application in Ukraine. The main task of the article is to find out the effectiveness of the application of complementary medicine in foreign countries, to determine the extent of its impact on the health care system in Ukraine and to identify the disadvantages of functioning, as well as to formulate propositions for their elimination, taking into account the positive foreign experience.

MATERIALS AND METHODS

The authors of the article used the results of the survey of patients with cancer, diabetes mellitus and psychiatric disorders regarding the application of alternative treatment methods along with traditional evidence-based medicine. The authors have also accomplished a comprehensive analysis of current national and foreign legislation, analytical materials (in particular, findings from the National Health Survey of 2012 performed by the Department of Health Policy and Management, Minnesota University) in order to determine the peculiarities and shortcomings of legal regulation in this sphere. Theoretical methods (analysis, synthesis, generalization, systematization, etc.) and empirical methods (observation, classification, etc.) were used during the research.

REVIEW AND DISCUSSION

In 2002 the World Health Organization (WHO) has determined the strategy on the place and importance of complementary medicine in the health care system, and has recognized that this area is one of the resources of the primary health care service that facilitates its accessibility and improvement of public health [4].

Under the complementary medicine (the translation from English "supplementary medicine"), we should understand all types of alternative areas of medicine that are used in conjunction with officially recognized methods.

There are many synonymous terms for complementary medicine. Some of them are based on its opposition to official medicine (for example, alternative and official, traditional and non-traditional, etc.). This division is not typical for all countries. For example, complementary and alternative medicine in the United States is one of the areas of healthcare that does not compete with official medicine and even complements it. However, complementary medicine in most countries is allowed, although it does not get state support.

The fundamental difference of complementary medicine is orientation on the internal forces of the patient's body, which must actively fight the disease. This means the concentration, mobilization and redistribution of internal reserves and capabilities of the patient's body, which can not be involved and used by traditional therapeutic means. The benefits of complementary medicine have long been estimated in some foreign countries, but more effective is considered scientific medicine within surgical intervention. So, in case of symptoms of appendicitis, a person appeals to a surgeon. However, in the future, while the recovery process after the surgery, the use of complementary medicine methods may be more effective. The use of this type of medicine is also quite common in the treatment of various chronic diseases.

Models of using complementary medicine vary according to the country, customs, culture, life, and standard of living of the population. As a rule, the use of alternative therapies is considered in the context of three main models:

1. Application in the countries where non-traditional medicine is one of the main sources of health care provision. This is typical for those countries, where there are restrictions on the provision of medical services (for example, in Africa, there is 1 healer per 500 people, and 1 physician per 40 thousand people) [5].

- Application due to cultural or historical influences. So, in the Republic of Korea and Singapore, where the normal health care system is well developed, 86% and 76% of the population are still using non-traditional medicine services [6].
- 3. The application of alternative methods as an additional treatment along with the traditional one. The combination of techniques is quite often used in the countries with well-developed health care systems, for example, in

North America and in a number of European countries. Folk medicine in Ukraine exists in parallel with the official one. This is confirmed by the provisions of Part 1 of the Art. 741 of the Law of Ukraine "The Basis of the Legislation of Ukraine on Health Care" dated from November 19, 1992 [7], where folk medicine (healing) is defined as methods of recovery, prevention, diagnosis and treatment, based on the experience of many generations of people, established in folk traditions and do not need state registration. This law provides the possibility for persons who do not have special medical education, but who are registered in the manner prescribed by the law as individuals-entrepreneurs and received special permission, to be involved in folk medicine (healing).

Unfortunately, the Ministry of Health of Ukraine critically assesses the legislative definition of this activity and the existing permitting procedures for its implementation. According to the Ministry of Health of Ukraine, the experience of many generations and establishment in the national traditions can only be proved by ethnologists or culturologists, but the Ministry does not have such specialists. Besides, specialists of the Ministry of Health of Ukraine believe that any methods of rehabilitation, diagnosis and treatment should be safe and effective for patients. However, the safety and effectiveness of alternative medicine methods have not been tested by clinical trials or scientific experiments [8].

Unacceptable position of the Ministry of Health of Ukraine regarding alternative treatment methods is confirmed by the fact that the Government of Ukraine submitted to Verkhovna Rada of Ukraine the draft Law No. 9062 dated from September 9, 2018 [9], which contains propositions to exclude the Art. 74¹ from the Fundamentals of the Ukrainian legislation on health care, which regulates the right to be involved in folk medicine (healing) and obliges the Ministry of Health of Ukraine to issue appropriate permits (currently, the draft is being processed by the Health Care Committee of Verkhovna Rada of Ukraine).

Another position has the WHO, which declared about the need for cooperation of the international community, governments, professional organizations of health care employees to ensure the proper use of folk medicine in strengthening people's health. Recognizing the progress made by governments in many countries to integrate traditional medicine into national health care systems, the WHO has called for strengthening the relationship between classical and traditional medicine providers and the development of appropriate integrated health education programs for health care professionals [10]. The resolution of the 62nd session of the World Health Assembly called for the development of traditional medicine on the basis of scientific research and innovation, as well as for the improvement of legal regulation of the activities of practitioners of traditional medicine and promoting their knowledge and skills in cooperation with representatives of health care [11].

The legal regulation of complementary (alternative) medicine in the countries of the European Union considerably differs in terms of approaches and the scope. A number of European countries have legislation to regulate complementary (alternative) medicine, for example, Belgium, Bulgaria, Denmark, Germany, Hungary, Iceland, Norway, Portugal, Romania, Slovenia. The provisions on non-traditional medicine in Switzerland are approved even in the national Constitution. Legislation in some countries fragmentarily regulates alternative treatments, focusing on specific types (Finland, Italy, Lithuania, Latvia, Romania, United Kingdom). However, there are countries, where there is no legislative regulation of this sphere of activity.

Complementary (alternative) medicine in countries of Central and Southern Europe is used only by physicians, and medical practice beyond the legal regulation is illegal and is considered as a crime. Anyone in Northern Europe can provide such services, and restrictions are applied only to specific medical activities (for example, surgery, anesthesia). Legislation in Hungary and Slovenia allows certain types of non-traditional medicine to be practiced by qualified specialists without medical education, and some types only by physicians. There are countries, where some types of non-traditional medicine are recognized as specific medical specialties. In several countries diplomas of physicians who have completed a full course on a particular type of complementary medicine are issued and recognized by national medical associations / chambers / councils. However, there are no mutual recognition of diplomas among the various EU Member States, which impedes the free movement of physicians. Approximately 180,000 physicians in the European Union have been trained and educated in one or more forms of complementary medicine [12, p. 84].

The private and law approach is predominantly applied in the US, and the patient is given more freedom of choice. Thus, the Texas Court (USA) ruled that the right to choose one form of treatment is a private human right. Along with other decisions, the court ruled that choices in health care are deeply personal matter [13].

The costs on complementary medicine in many countries are partially funded by state and private insurance companies. More and more physicians in such countries are interested themselves in non-traditional treatment methods, because this allows them to reduce hospitalization and increase the opportunity to compensate the costs. So, many French physicians are specialists in the field of homeopathy and acupuncture. These two types of services are compensated by social security if they are assigned or performed by the physician. The Tournai-Ath social insurance company in Belgium partially reimburses for some additional / alternative treatment options, for example, for homeopathic remedies. In Germany, state and private insurance also compensates some of the costs on complementary medicine [14].

There are certain features of the licensing procedure in Ukraine for the application of non-traditional treatment methods. In particular, in order to obtain a special permit from the Ministry of Health of Ukraine to have the right to be involved in such activities, it is necessary to obtain the conclusion of the state sanitary-and-epidemiological examination (on the presence of the premises that meets the established requirements) and a certification-expert conclusion confirming the presence of healing abilities (involves a three-level verification: interview, attestation - the procedure for determining the level of theoretical knowledge, which establishes the level of training on the basis of medical knowledge and the claimed by the challenger method of traditional medicine, through passing tests and situational tasks; expert evaluation – verification of practical skills and knowledge on selected patients). Since the procedure for obtaining the special permit from the Ministry of Health of Ukraine is complicated, there are abuses and violations while issuing the indicated conclusions. At the same time the issued permits do not give the healer the right to treat patients with cancer, with acquired immunodeficiency syndrome, infectious and some other diseases.

Many countries unlike Ukraine permit and even support at the state level joint treatment of cancer patients with non-traditional methods, together with a professional oncologist, and state funds finance further research in this direction [15]. The aim of combining these two areas of medicine is to prevent or minimize the negative effects of chemotherapy, to correct and stabilize the psycho-emotional state, to reduce pain, and to improve the quality of life in general.

The use of complementary (alternative) medicine (CAM) in cancer patients has been documented in major cities in the United States, Canada, Europe, Nigeria, and Saudi Arabia. These studies demonstrate that cancer patients who received chemotherapy, simultaneously used an alternative method.

An example of this is Ireland, where there were two studies in cancer centers, which recorded the use of CAM. The study was conducted with the participation of 81 patients, of which 51 women (63%). Most (93.8%) of the patients in the sample were between the age of 41 and 80 years. 47 (58%) patients reported about the use of CAM simultaneously with conventional chemotherapy. The average cost of CAM was less than 20 euros per month, but five patients (6.2%) spent more than 100 euros per month. The main reasons for receiving CAM were the improvement of life quality (23.5%), improvement of psychological / emotional well-being (17.3%), immunity increase (16%), elimination of side effects of cancer (9.9%), elimination of side effects of treatment (8.6%) and directly the effectiveness of treatment / cure for cancer (2.5%). Patients who used CAM noted as sources of information health care employees (30.9%), family / friends (19.8%), the media (13.6%), and practitioners in this area (2, 5%). Only 27 (33.3%) patients out of 81, discussed the use of CAM with a health care employee, where 18.2% asked about the interaction with traditional therapy, 18.2% asked about the effectiveness of CAM, 16.7% asked whether it should be used, and 15.2% asked about the safetyof CAM [16].

These issues relate to the results of another study on counseling / agreement with the treating physician on the use of complementary medicine. Thus, one third of the adult population in the United States uses CAM, although 42.3% of users do not discuss the application of alternative methods with their primary care physicians. Consequently, physicians should consider the issue on more active patient survey, especially with regard to methods that may have a medical significance [17].

The use of complementary (alternative) medicine is also common among patients with type 2 diabetes around the world. A bright example is the study conducted in Saudi Arabia, where there is a high incidence of diabetes mellitus. The average age of patients was $51,6 \pm 10,6$ years, 43,4%of them were males. The prevalence of CAM practice was 30.5%. Factors that motivate the use of CAM-therapy within patients with diabetes were: age older than 51, unemployment and knowledge of participants about the effectiveness of CAM products [18].

A significant proportion of people with mental disorders address for the help to specialists in complementary (alternative) medicine. In the framework of the World Mental Health Survey, a Compositional International Diagnostic Interview was conducted to determine the presence of mental disorders for the last 12 months among 138,801 participants aged 18-100 years. As a result of the conducted study, the data was obtained regarding the dependence of the degree of using complementary medicine to patients with mental disorders from the country, mental disorders and their severity, as well as functioning of the health care system. It has been found out that the application of non-traditional treatment methods is common among people with severe mental disorders, in high-income countries and among those receiving traditional care [19].

Medical institutions, including approaches and understanding of the complementary medicine's effects and efficacy, are of great importance for the acceptance and / or rejection of complementary medicine in any country.

Departments of alternative medicine exist in France, Germany, Hungary, Italy, Norway, Sweden, Switzerland and the UK. According to the study published in 2006, alternative methods training is available in 42% of the Medical Faculties of the 15 'old' EU countries and 20% of the Faculties in the 'new' EU countries. Some courses in non-traditional medicine are mandatory in 13% of the Medical Faculties of the EU-15 countries. And there are no compulsory courses at any of the Medical Faculty of the 'new' EU countries [20].

At the same time, for example, the Department of Rehabilitation and Non-Traditional Medicine of anylo. Halytsky Lviv National Medical University, carries out training of specialists on specialization "Folk and Alternative Medicine". We believe that the inclusion of courses on alternative methods of treatment in the curriculum of medical training is important for the complex training of specialists, and thus it is a guarantee of qualitative training on "clear" educational programs, as opposed to healers who may not even have medical education. That is, one of the ways to ensure the quality of non-traditional medicine services and to minimize cases of fraud in this area may be the requirement for mandatory medical training of individuals. At the same time, medical institutions, in addition to the basics of classical medical information, should be provided with complementary medicine training.

CONCLUSIONS

The conducted research allows to make such conclusions. Complementary medicine is used by a large part of the population, both in Ukraine and in the world, and therefore requires proper legal regulation and a definite form. In particular, it concerns the control over the activities of healers and their medical training, the definition of perspective directions for the development of this type of medicine and their implementation at the state level, the integration of alternative medicine into the official, the improvement of the system of professional training of physicians by introducing alternative methods, determining the volume of efficiency and benefits of providing such methods of medical care, the expansion of international cooperation and the exchange of experience with foreign specialists practicing in this area.

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COMPARATIVE ANALYSIS OF THE DYNAMICS OF MODIFIED RISK FACTORS OF NON-COMMUNICABLE DISEASES AMONG THE POPULATION OF CHINA AND UKRAINE

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ABSTRACT

Introduction: In the modern world, the problem of non-communicable diseases, which nowadays constitute the main cause of social and economic losses, is extremely topical: the main causes of disability and mortality of the working population are caused by non-communicable diseases.

The aim is a comparative analysis of the prevalence and dynamics of the risk factors of the NCDs, and the overall mortality rate between the economically developed country - China and the developing country - Ukraine.

Materials and methods: To achieve the set goal, the method of data analysis was used - the alignment of dynamic rows with the definition of increasing rates, the determination of reliability between two unrelated aggregates, triangulation. Material: annual reports of the State Statistics Service of Ukraine and the National Bureau of Statistics of China. **Review:** As a result of the study, it was found that with the tendency to reduce the mortality rate, the mortality rate in Ukraine exceeds the rate in China, especially among men (2.5-3 times); the percentage of smoking is 6 times higher among Ukrainian women; an increase in malnutrition is observed in Ukraine, while in China it is constantly decreasing; in both countries there is an increase in the frequency of obesity in both sexes, but in Ukraine the prevalence is 4-6 times higher.

Conclusions: Thus, using the obtained data, one can conclude that, despite the difference in the level of economic development between countries, behavioral risk factors remain an extremely important problem.

KEY WORDS: non-communicable diseases, risk factors, triangulation, dynamic rows, China, Ukraine

Wiad Lek 2019, 72, 5 cz. II, 1108-1116

INTRODUCTION

In the modern world, the problem of non-communicable diseases, which nowadays constitute the main cause of social and economic losses, is extremely topical: the main causes of disability and mortality of the working population are caused by non-communicable diseases (cardiovascular diseases, various neoplasms, chronic obstructive pulmonary diseases and diabetes mellitus).

The importance of this problem was noted during the Third High-level Meeting of the UN General Assembly on Non-communicable Diseases (NCDs) (New York, September 27, 2018) [1]. According to published data, about 71% (40.5 million cases) of all deaths in the world are due to NCDs. The rejuvenation of this problem was noted separately - 4% of deaths were noted at the age of up to 30 years and 38% at the age of 30 to 70 years. The data on increasing the probability of death before reaching of 70 years old age, as a result of NCDs among 165 countries (89% of countries) [2, 3].

Specialized missions in more than 25 countries are being organized by a specialized United Nations task force on the prevention and control of non-communicable diseases. The goals of these missions is to promote and support measures to strengthen the political support for the fight against NCDs at the level of governmental and non-governmental organizations, as well as the private sector and scientific communities [3].

When assessing the prevalence of NCDs, there is a situation where more economically developed countries (USA, Western Europe, China) have the capacity to organize adequate prevention and treatment of this group of pathologies, combat against the main risk factors contributing to its development, but still have a high prevalence of non-communicable diseases and their risk factors. For patients with non-communicable diseases from countries of low economic well-being and countries that are developing, another pattern is observed: on the one hand, the cost of treating a cardiovascular disease or tumor process is 5-7 or more times higher than the patient's income, which makes it difficult or rejects his treatment, on the other hand, in economically underdeveloped countries, there is an excessive spread of risk factors for these diseases [4, 5].

In China, chronic non-communicable diseases account for about 80% of deaths and 70% of lost years of life. The main non-communicable diseases that are characteristic of China are cardiovascular diseases and cancer, which are the main causes of death and exacerbate the burden of disease. One of the main NCDs behavioral risk factors - smoking

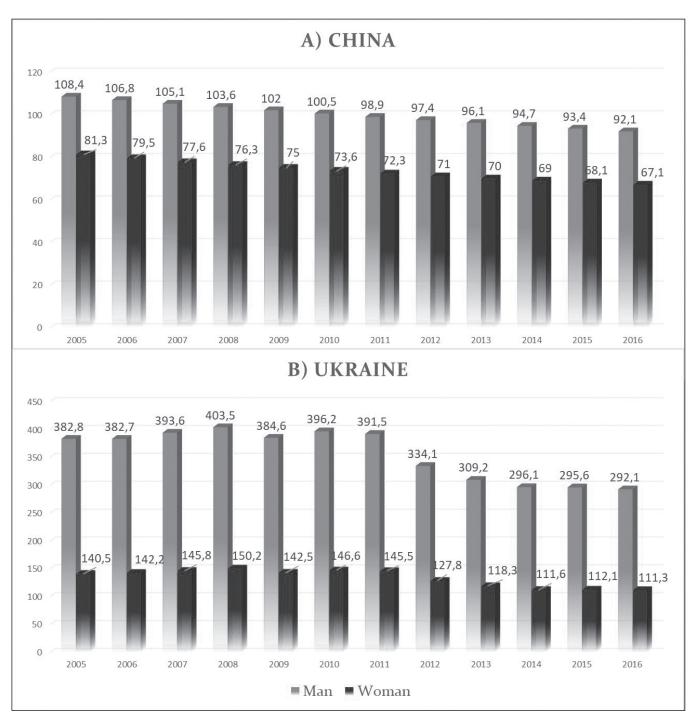


Figure 1. The total mortality rate of the adult population in China (A) and Ukraine (B) for the years 2005-2016.

is widely spread among China's population: more than 300 million men smoke cigarettes. The high level of concern induced by is the prevalence of obesity, since more than 20% of children and adolescents are overweight or have obesity. Great attention is paid in China to organizing of preventive measures in relation to the NCD group. [6].

Nowadays, the state of health of Ukraine's population is estimated at unsatisfactory level, what is associated with a high level of overall mortality, morbidity and disability, which are steadily increasing [7, 8]. Non-communicable diseases in Ukraine account for about 86% of the global burden of disease and have a negative tendency to increase. The first place in the structure of mortality (67.3%) and primary disability of the adult population (23%) are cardiovascular diseases (CVD): during the year 2015, mortality from CVD increased by 4.7%, from malignant neoplasms - by 4.4%, from diabetes - by 8.8%. In the WHO European countries ranking, Ukraine ranks fourth in terms of standardized mortality rates due to CVD, mortality of the working-age population as a result of oncological diseases, prevalence of smoking among men, and the fifth place - per capita consumption of alcohol [9].

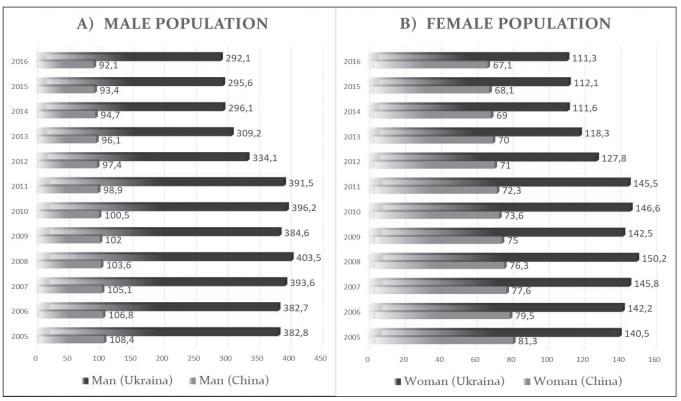


Figure 2. Comparison of mortality rates in China and Ukraine, depending on gender: a - men, b - women.

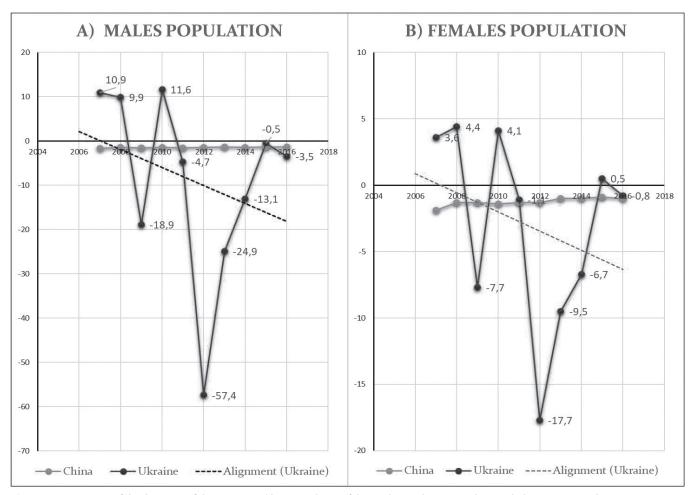
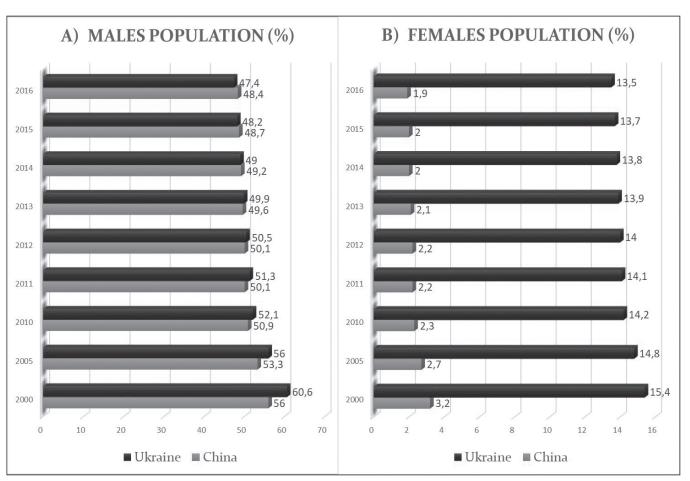


Figure 3. Comparison of the dynamics of the increasing (decreasing) rate of the total mortality rate in China and Ukraine: a - men, b - women.



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Figure 4. The prevalence of smoking among the population of China and Ukraine: a - men, b - women.

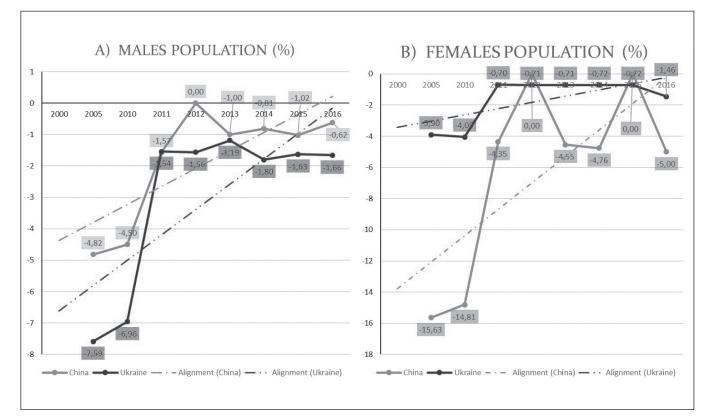


Figure 5. Comparison of the dynamics of the increasing (decreasing) rate of the smoking among population of China and Ukraine: a - men, b - women.

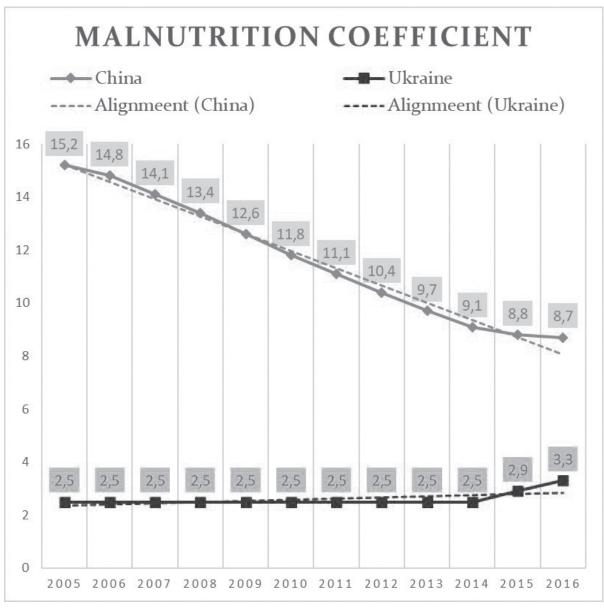


Figure 6. Dynamics of malnutrition rate among the population of China and Ukraine.

THE AIM

The aim of our research is to conduct a comparative analysis of the prevalence and dynamics of the risk factors of the NCDs (smoking, obesity and malnutrition), and the overall mortality rate between the economically developed country - China (2nd place per GDP per capita) and the developing country - Ukraine (61 place by level of GDP per capita) [10, 11].

MATERIALS AND METHODS

To achieve the set goal, the method of data analysis was used - the alignment of dynamic rows with the definition of increasing rates, the determination of reliability between two unrelated aggregates, triangulation. Material: annual reports of the State Statistics Service of Ukraine and the National Bureau of Statistics of China.

REVIEW AND DISCUSSION

The first step of the study was to trace the dynamics of the indicators of total mortality between China and Ukraine. It was found that in China throughout the entire study period, there has been a steady decline in the overall mortality rate for both men - from 108.4 per 1000 population in 2005 to 92.1 per 1000 population in 2016, and among women - from 81.3 up to 67.1 per 1000 population respectively (Fig. 1a). For the population of Ukraine, the picture is somewhat different: the trend towards a decline in the overall mortality rate has been observed since 2008, and before that there has been a gradual rise in the indicator (Fig. 1b). Thus, among the male population, the overall mortality rate changed from 382.8 per 1000 population in 2005, reaching a maximum of 403.5 per 1000 population in 2008 and gradually decreasing to 292.1 in 2016. A similar pattern is observed for the total mortality rate among the

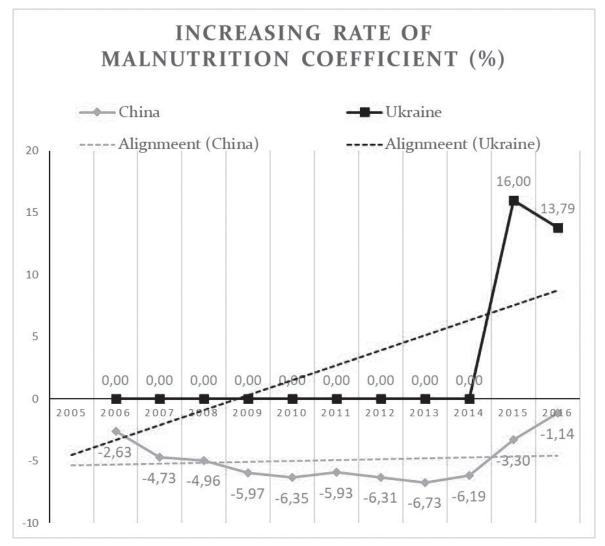


Figure 7. The increasing (decreasing) rate of the malnutrition coefficient among the population of Ukraine and China.

female population - from 140.5 per 1000 population in 2005 to 111.3 per 1000 population in 2016 with a peak of 150.2 per 1000 population in 2008.

As a result of the comparative analysis of the mortality rate, depending on gender, it has been established that there is a tendency towards a decrease in the mortality rate in both countries in the adult male population (p <0.05) (Fig.2a). The mortality rate of the male population in Ukraine is 2,5-3 times higher than in China. A similar picture is observed for indicators of mortality among adult female population (p<0,05) (Fig. 2b), the difference between mortality rates is 1.3-1.8 times.

Analyzing the growth rate (decline) of the total mortality rate it was established that for the population of China this indicator is stable and amounts to -1.3% - -1.6% among men and -1.3% - -1.8% among women. At the same time, Ukraine is characterized by a constant fluctuation of this indicator from -14.7% to + 3.0% among men and from -12.2% to + 3.0% among women (Fig. 3a,b).

Smoking is one of the major risk factors for non-communicable diseases. Studying the prevalence of smoking among the population of China and Ukraine depending on gender, it was found that the prevalence of smoking among the male population of both countries is consistently high - 48.4% for Ukraine and 47.4% for China (Fig. 4a). As for the prevalence of smoking among women, there is a significant predominance of smoking among the female population of Ukraine - 13.5% against 1.9% among Chinese residents. (Fig. 46). It should be noted that in both countries there is a tendency to reduce the prevalence of smoking for both man and woman.

Analyzing the increasing (decreasing) rate in the prevalence of smoking, it was established that throughout the entire study period there was a decrease in this indicator among both men and women in both countries. It should be noted that if the decreasing rate for the male population is stable over the whole period of time: -0.8% - -1% in China and -1.1% - -1.5% in Ukraine (Fig. 5a), then among women there is a variation of this indicator in the population of China from -4.35% to 0.0%, while in Ukraine this indicator is stable and amounts to -0.7% - -1.4% (Fig. 5b).

Separate interest for the development of non-communicable diseases are nutritional disorders, both in the direction of excessive consumption of certain foods and the development of alimentary obesity, as well as due to

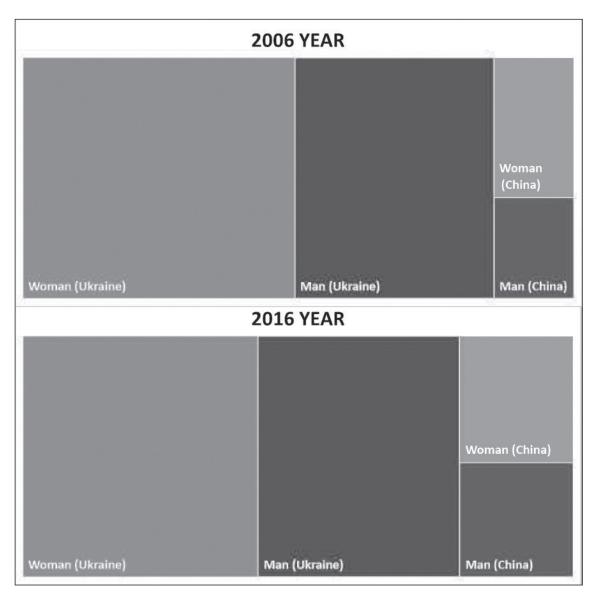


Figure 8. The ratio of the prevalence of obesity among the population of China and Ukraine.

insufficient unbalanced nutrition. We have analyzed the prevalence of malnutrition rates in Ukraine and China. As a result of the analysis, it was established that the malnutrition rate in China has a constant downward trend throughout the entire covered period: from 15.2% in 2005 to 8.7% in 2016, which points towards a gradual improvement in the quality of life. In the same period, the opposite situation is observed in Ukraine - the malnutrition rate for a long period was consistently 2.5%, and only from 2015 it began to change upwards – 2.9% in 2015 and 3.3% in 2016 year (Fig. 6).

Studying the increasing (decreasing) rate of the malnutrition coefficient, it was established that for the population of China there is a change in the rate of decline in the range of -3.3% - -6.7% with a tendency to slow down. In Ukraine, the increasing (decreasing) rate tends to increase and varies between + 13.7% - + 16.0% (Fig. 7).

Studying the prevalence of obesity among the population of China and Ukraine, it was established a gradual increase in the prevalence of obesity among the population of both China and Ukraine. At the same time, in Ukraine, both among men and women, the obesity rate among the population is 3.5–4 times higher than in China (Fig. 8).

During the study period, the obesity rate among men in Ukraine increased from 17.2% in 2006 to 22% in 2016 (in China from 2.9% to 5.9% respectively) (Fig. 9a); among women in Ukraine there is an increase in the prevalence of obesity from 23.5% in 2006 to 25.7% in 2016 (in China, respectively, from 4% to 6.5%) (Fig. 9b).

Investigating the dynamics of the increasing (decreasing) rate in the prevalence of obesity, there is a trend to increase the rate as among the male population of China with an annual fluctuation of the growth rate within the range of 6.5-7.5%, as well as among Ukrainian men with a fluctuation of growth rate within 2, 2% -2.8%. A similar situation is observed among women: in China, the indicator varies between 1.5%-2.5%, and in Ukraine, within the range of 0.8%-1.4% (Fig. 10).

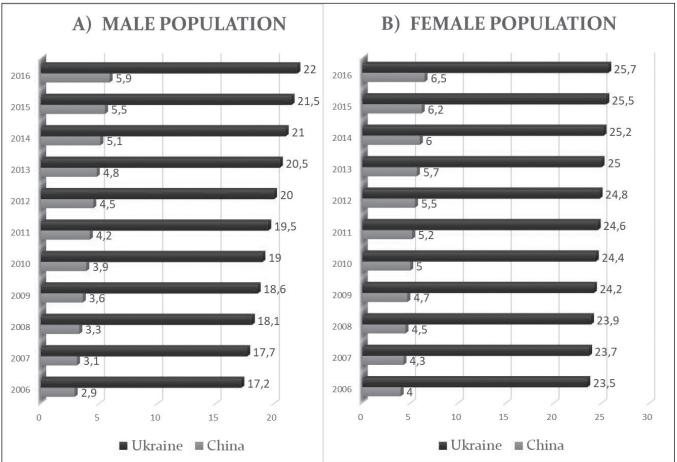


Figure 9. The prevalence of obesity among the population of China and Ukraine: a - men, b - women.

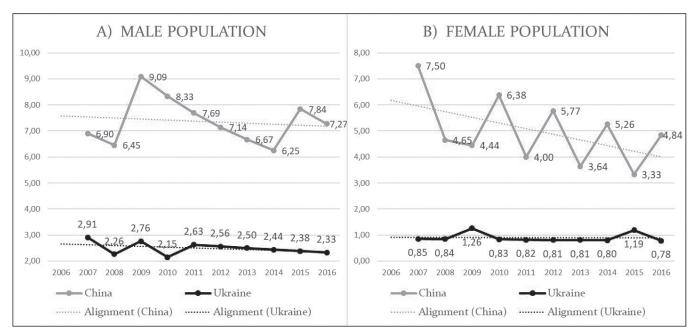


Figure 10. Comparison of the increasing (decreasing) rate in the prevalence of obesity among the population of China and Ukraine: a - men, b - women.

CONCLUSIONS

As a result of the study, it was found that with the tendency to reduce the mortality rate, the mortality rate in Ukraine exceeds the rate in China, especially among men (2.5-3 times); the percentage of smoking is 6 times higher among Ukrainian women; an increase in malnutrition is observed in Ukraine, while in China it is constantly decreasing; in both countries there is an increase in the frequency of obesity in both sexes, but in Ukraine the prevalence is 4-6 times higher.

Thus, using the obtained data, one can conclude that, despite the difference in the level of economic development between countries, behavioral risk factors remain an extremely important problem.

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EVALUATION OF THE HUMAN BIOELECTROMAGNETIC FIELD IN MEDICINE: THE DEVELOPMENT OF METHODOLOGY AND PROSPECTS ARE AT THE PRESENT SCIENTIFIC STAGE

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ABSTRACT

Introduction: The authors focus on the unresolved problem of NCDs and on the relevance of further scientific research in accordance with the current physics-biological level of knowledge about the structure and functioning of the human body. In the course, emphasis is placed on the need for further study of methods for assessing the bioelectromagnetic field of the human body as a potential "tool" for a possible solution of the NCD problem in the framework of system medicine.

The aim is to assess the level of development of the methodology and substantiate the scientific feasibility of further exploring the possibilities of the clinical application of these methods for assessing the bioelectromagnetic field of the human body in the algorithms for examining and managing patients with NCDs to study valeological status and objective monitoring of physical phenomena in the clinic of internal diseases.

Materials and methods: The analysis of the literature data was carried out in the course of a search study of methods for the rapid assessment of valeological status as a fragment of the initiative research project "Development of algorithms and technology for introducing a healthy lifestyle in patients with non-communicable diseases based on the study of psycho-emotional status" (State registration No. 0116U007798, UDC 613:616-052:159.942:616-03).

Review: The gnoseological aspect of the development of the methodology for assessing the bioelectric and biomagnetic fields of the human body is described in the article. The conditional time stages of the methodology are highlighted and characterized in it. It was proposed to distinguish between periods: 1) cumulative (XIII-XVIII centuries), 2) cumulative-dynamic (XII-XX centuries), 3) modern (XXI century) 4) modern (prospective). Questions of the feasibility of further research assessing the bioelectromagnetic field of the human body are discussed.

Conclusions: 1. The above gnoseological aspect of the 700-year-old methodology for studying the bioelectromagnetic field of a human body demonstrates a staged evolution of its development, the presence of a significant amount of cumulated scientific information, which requires rethinking as part of system medicine. This convinces us of the existence of a tendency of inevitable approaching the final stage of knowledge of the human bioelectromagnetic field with the widespread introduction of these techniques into the practical public health of the world.

2. The accumulated layer of scientific knowledge about the bioelectromagnetic component of the human body requires integration into fundamental medicine, transformation of the modern paradigm by creating a bioelectromagnetic-chemical concept of the exchange of matter and energy in the human body.

3. Further research on the assessment of the bioelectromagnetic field is relevant and can contribute to solving the NCD problem both at a fundamental level within the framework of system medicine and by optimizing the diagnostic assessment in patient management algorithms during diagnosis, treatment, primary and secondary prevention.

KEY WORDS: Non-communicable diseases, Ultra-Weak Photon Emission, Primo Vascular System, bioelectromagnetic human field

Wiad Lek 2019, 72, 5 cz. II, 1117-1121

INTRODUCTION

Noncommunicable diseases (NCDs) cause the death of 41 million people each year according to the World Health Organization (WHO). Each year, 15 million people die from a NCD between the ages of 30 and 69 years. This happens despite the success of instrumental diagnostics, pharmacotherapy, surgical treatment methods and the promotion of a healthy lifestyle. In connection with the global pandemic, WHO developed a *Global action plan for the prevention and control of NCDs 2013-2020*. The 2030 Agenda for Sustainable Development recognizes NCDs as a major challenge for sustainable development. As part of the Agenda, Heads of State and Government committed to develop ambitious national responses, by

2030, to reduce by one-third premature mortality from NCDs through prevention and treatment [1-4]. Therefore, further scientific and clinical search for potential ideas to solve the NCD problem remains extremely important for medicine. In recent years, systems biology and system medicine have received significant development due to the accumulation of a large number of new fundamental scientific knowledge. According to scientists, these areas may allow to generalize the principles of the functioning of cells, tissues and the organism, as well as they can provide interdisciplinary and transdisciplinary approaches to the problems of cardiology and other branches of medicine [5]. Combining systems medicine approaches with computer technologies can help create a more complete model of the emergence and development of NCDs, which will match the new level of scientific knowledge. A new paradigm of medicine is being formed gradually and it is based on the creation of a methodology of biological and medical systems, the integration of knowledge from other branches of science. This leads to a better understanding of complex non-linear relationships of factors in the human body, which determine the multiplicity of clinical variants of the pathological pattern in NCDs. This is especially true when there is a modern problem of the multiplicity of chronic diseases in patients. As clinical practice shows, the fact that patients simultaneously have multiple pathologies on the part of various organs and systems complicates the diagnostic search, the assignment of adequate individualized treatment, and objective control over the physiological state of the patient during therapy. Modern technological advances combined with the development of computer technology can help create a more complete model of understanding the pathology of NCDs. For example, deepening knowledge of physics and systems biology against the background of technological progress made available methods for assessing the bioelectromagnetic field of the human body for clinical use. This can give systemic medicine a new "tool" for a deep fundamental study of the essence of the pathology at the field level of metabolism, and they can also significantly improve the comprehensive diagnosis of patients and optimize their objective examination. Methods for assessing the bioelectromagnetic field of a person make it possible to investigate the total indicators of the physical health of a person and his valeological status, and they are also able to detect pathology at the preclinical stage. [4]. This is a very important aspect in the early diagnosis of NCDs and it can be key research in the prevention algorithms for this pathology in case of justification of scientific hopes.

THE AIM

The purpose of this publication is to assess the level of development of the methodology and substantiate the scientific feasibility of further studying the possibilities of the clinical application of these methods for assessing the bio-electromagnetic field of the human body in algorithms for examining and managing patients with NCDs to study valeological status and objective monitoring of physical phenomena in the clinic of internal diseases.

MATERIALS AND METHODS

The analysis of the literature data was carried out in the course of a search study of methods for the rapid assessment of valeological status as a fragment of the initiative research project "Development of algorithms and technology for introducing a healthy lifestyle in patients with non-communicable diseases based on the study of psycho-emotional status" (State registration No. 0116U007798, UDC 613:616-052:159.942:616-03).

REVIEW AND DISCUSSION

The development of the methodology for assessing the bioelectromagnetic field of the human body in the direction of additional synthesis of scientific knowledge has come a long way of forming within the framework of the existing doctrine of scientific medicine. Evidence shows such, during the analysis of literature data, we can conditionally identify the following time stages of the formation of the methodology for assessing the bioelectromagnetic component of the human body: 1) the cumulative stage (XII-XVIII centuries), 2) the cumulative-dynamic stage (XII-XX centuries), 3) the modern stage (XXII century), 4) modern (perspective) stage. Until the end of the twentieth century, the periods of scientific research were mostly purely accumulative in scientific knowledge, with very limited integration into the basic science. This was the reason for their designation by us as the "cumulative period" and "cumulative-dynamic period", respectively. At the same time, from the 13th to the 18th century, there was an accumulation of purely empirical knowledge due to the practical use of acupuncture and reflexotherapy by doctors, but without adopting the theoretical ideas of ancient oriental medicine. In the 19th century, the scientific study of the bioelectromagnetic human phenomena became possible after the scientific discovery of electricity, the invention of the electroacupuncture method and the possibility of estimating the electrical conductivity of human tissues using a galvanometer. Over the 200-year period, scientists of the world have made significant progress in understanding the electrical activity of biological tissues. Many scientists have been studying this area. In 1751, Adamson investigated the nature of the electric discharge of fish. L.Galvani (1791, Italy) discovered the existence of «animal electricity.» A.Volta (Italy) was a scientific opponent of L.Galvani, and discovered a way to generate electricity. C.Matteucci (1811-1868, Italy) proved the existence of an electrical phenomenon in biological tissues. E.Du Bois-Reymond (1848, Germany) became the founder of electrophysiology, introduced the concepts of «excitation» and «excitable tissues». J.Bernstein (1886, Germany) analyzed the form of action potential. E.-J. Marey (1875, France) used a capillary electrometer to record the oscillations of the potentials of a beating heart. N.Ye.Vvedensky (1883, Russia) used to listen to rhythmic pulses of impulses in the nerve and muscle phone, Russia). W.Einthoven (1903, Holland) created the electrocardiograph and became the founder of clinical electrocardiography, the Nobel Prize winner [6]. It is important that from the end of the 18th century until the first half of the 20th century, science was able to accumulate a significant scientific base regarding the electrical activity of the tissues of the human body, and it was able to give them the appropriate scientific interpretation, which determined the possibility of future application of electrographic methods in medicine.

The methodology for assessing the biomagnetic component of the human body had a more difficult development. The first method of recording a biomagnetic field was photographing it in an electric field (1899 by Ya.Narkevich-Yodko, Poland). The discovery of this method of visualization of the biomagnetic component of the organism did not receive the correct physical explanation because of the discrepancy between the physics-biological knowledge of that period was large. Many scientists regarded this method from mystical positions and ignored it. In 1949, this method was rediscovered in the USSR, and it was called "kirlianography" by the name of the author. His studies were classified in the USSR for 15 years [7,8]. It must be said that, at that time, fundamental science was not theoretically ready to explain the essence and genesis of the results of kirlianography. This again complicated the development of this method of human biomagnetic registration. Many scientists began to perceive kirlianography as a pseudoscientific method due to a misunderstanding of the essence.

In the XX century, the method of registration of the electric fields of the body has received worldwide distribution. Many scientists of the world made a significant contribution to the study of human bioelectric potentials in the XX century. V.V.Pravdich-Neminsky (1913-1921, Russia) registered the electroencephalogram for the first time. A.F.Samoilov (1929, Russia) investigated the nature of neuromuscular excitation transfer for the first time. D.S.Vorontsov (1932, Russia) discovered trace fluctuations of biopotentials that accompany the action potential in nerve fibers. G.Bishop, J.Erlanger and H.S.Gasser (1930-1940, USA) used electronic amplifiers and oscilloscopes for the first time and won the Nobel Prize. A.L.Hodgkin with A.F.Huxley and B.Katz (1947-1952, England) used accurate methods for recording electrical potentials for the first time, studied the ion permeability of the giant nerve fiber membrane for the first time, formulated modern membrane-ion theory of bioelectrogenesis and received the Nobel Prize [6]. At the same time, electrocardiography, encephalography has-become routine methods for practical public health of the world as a logical consequence of the research.

The scientific progress of the second half of the XX century led to a significant dynamic of research into the bioenergy field, which was associated with the deepening of fundamental knowledge and with the growth of technical capabilities. In the 70s of the XX century, the creation of magnetometer devices made it possible to register the magnetic field in humans. Scientific studies of the biomagnetic component of the human body were begun from this time. The use of ultrasensitive sensor-gradiometers SQUID (Superconducting Quantum Interference Device) in magnetometers opened the way to the introduction of magnetography in practical medicine. Evidence shows such, the 56-year and 51-year experience of using magnetocardiography (MCG), magnetic encephalography (MEG) gave a lot of research material about the characteristics of the biomagnetic component of the human body. Methods for assessing the biomagnetic field of striated muscles, eyes, stomach were also developed [7,9]. In the end, all this led to the scientific understanding that magnetography and kirlianography are two different ways of objectively fixing the biomagnetic field of the human body: hardware registration and photo visualization, respectively. Finally, by the end of the XX century, the physical nature of kirlianography was revealed. In addition, a more advanced method of recording the electromagnetic component has been developed. It was called gas discharge visualization. [7].

In the XX century, the morphological study of the tissues of the human body as a substrate of bio-electromagnetic activity was continued simultaneously with the development of technologies for recording and evaluating the bio-electromagnetic field of the human body. Scientists were engaged in substantiating the physiological mechanisms of its occurrence as well. L.Danielle, G.Dowson (1935, England) The principles of the structure of cell membranes and transmembrane transport were disclosed and a "sandwich" model of the structure of membranes was created. S.J.Singer and G.L.Nicolson (1972, USA) developed a liquid-membrane model of the membrane structure. During this period, many studies were carried out on the study of the electrical conductivity of human tissues: the electrical capacity and electrical resistance of cell membranes were determined, the electrical heterogeneity of the skin surface was determined, and biologically active points (BAT) were discovered [6, 7]. The BAT was mapped, their biophysical parameters were determined, their localization corresponded to the course of the energy meridians of ancient oriental medicine, the morphological properties, blood supply, innervation, biochemistry of the BAT area were studied. This followed from the works of scientists: GD Novinsky et al. (1959), A.P. Podshibyakina (1952, 1960), Kim Bong Ham (1960), V.G. Vogralik (1961-1988), G.M.Pokalev (1962), T.Ischikawa (1962), JEH Niboyet and A.Mery (1963), G.Kellner (1964), JF Dumitrescu (1967), G.Grall (1968), J. Strongorsarello (1969), G. Cantoni (1970), J.Bossy (1973), W. Melhardt (1975), P.Rabischong et al. (1975), F.G.Portnov (1980), Goydenko V.S. et al. (1982), Woolf C.J. (1983), Velkhover ES, Kushnir G.V. (1983), A.T.Kachan (1990), G.Luvsan (1990), Willis W.D. (1991), Samosyuk I.Z. (1993), Samosyuk I.Z., Lysenyuk V.P. (1994), Woolf C.J., Doubell T.P. (1994), Woolf C.J., Salter M.W. (2000). The link between the localization of BAT and meridians with the course of the nerve trunks and/or vessels was noted and their connection with the location of dermatomes and with real "muscle contraction lines", the function of muscle chains was established, as described in R.Fujita (1955-1958), S.de Morant (1955), A.R. Kirichinsky (1959), F.Hubotter, T.Ischikawa (1962), W.Lang (1965). J. Hu, B. Shirota (1966), I.M. Zhulev et al. (1992). N.V. Mikhailov created the concept of the energy-conducting system of connective tissue in 1965. Ideas for explaining the function and genesis of the BAT's field component were described in the works of F. Kracmer (1962), A. Lebarbier (1975), V. A. Ionichevsky (1984), Yu.P. Limansky (1988), Ragulskaya MV, (2000).

The interest of medical research in this direction was due to the fundamental discoveries made by physicists in the twentieth century. «All living cells generate an electrostatic charge, individual for each type of tissue, under the influence of metabolic processes». This fact was proved by H. Frolich (1975-1977, England). «All living cells form their own endogenous variable electromagnetic fields of the Froelich-Davydov type, which have a high degree of coherence, like laser radiation». The scientific work of G.M. Baule and R.McFee (1963), H.Frolich (1977), A.S. Davydov (1984, USSR) determined the discovery of this fact. «Living cells have the ability to automatically modulate their bioelectromagnetic fields with the structure of a biosystem. Bioelectromagnetic fields carry obvious code-frequency information and are solitons». A.S.Davydov (1984, USSR) was the founder of this area of biophysical research [6-8]. As a result, in the twentieth century, the techniques of acupuncture and electroacupuncture were studied, widely distributed within the boundaries of traditional medicine and reflexology, but they remained only partially understood. The lack of reliable data on the morphological substrate of tissues, which would be responsible for the production and transport of energy along the ancient Eastern meridians, was an additional obstacle to the understanding and recognition of electroacupuncture by academic medicine. The lack of a common bioelectromagnetic paradigm of metabolism in basic science was an obstacle to the understanding of electroacupuncture as well. Therefore, in the XX century, biomagnetic radiation of tissues was either associated with the function of the nervous system or was ignored as a fact. Accordingly, this slowed down the methodological development of the methodology.

In the XXI century, the study of the biomagnetic field component was continued and a-several fundamental discoveries were made. The fact of photon emission by all living cells without external stimulation was established. This is also characteristic of the cells of the human body. The phenomenon has been assigned the term «Ultra-Weak Photon Emission» (UPE). Since the photon is a fundamental elementary particle of electromagnetic radiation, the ability of its emission is explained by the appearance of the bioelectromagnetic field of tissues during metabolic processes. Today, the spectrum and intensity of the UPE of the human body are considered recognized, and the main source, statistical distribution, and fractality are partially understood [10-14]. So, it is established that the greatest intensity of UPE is recorded on the face, with a maximum in the region of the mouth and cheeks. The photon emission mechanism is thought to originate from the generation of free radicals in energy metabolic processes. Free radicals subsequently react with lipid or protein, generating electronically excited species as byproducts. These excited molecules can further react with fluorophores through energy transfer and lead to photon emission. Higher level photon emission on facial skin might be caused by differences in the content of melanin fluorophores between facial and thoracic skin. The established absence of a significant correlation between the emission of photons and the thermal image suggests that the daily rhythm of emission of photons is not the result of a change in temperature or microcirculation. Moreover, a clear negative correlation of temporal changes in photon emission and cortisol levels may indicate that the daily rhythm of photon emission reflects changes in cellular metabolic processes under the control of the circadian clock [15]. Another fundamental discovery is the discovery of a new anatomical formation, which was called the Primo Vascular System (PVS). This discovery radically changes the scientific view on the formation and transport of energy in the human body. [7, 16]. According to scientists, the primary vascular system / PVS is a morphological substrate that provides for the formation and transport of biophotons. The structure of the PVS is a transparent network of optical channels with DNA granules inside, which is web-like in the body on six tissue levels [17-21]. In 2002-2010, scientists Kwang-Sup Soh (Korea), Kyung A. Kang (USA), David K. Harrison (England) confirmed the discovery, which was made in 1960 by Korean biologist Kim Bong Ham [22, 23]. Thus, in the 21st century, the fact of the presence of the biomagnetic component in the human body became the undisputed scientific knowledge. Meanwhile, this scientific information was not fully integrated into fundamental medicine. Today, studies of the bioelectromagnetic field are fragmented. The development of the research methodology of the bioelectromagnetic component cannot be called complete. At the same time, it cannot be denied that the further development and implementation of biomagnetic component assessment methods carry significant scientific potential and can be a source of valuable objective clinical information for diagnosis and for studying the fundamental issues of the pathogenesis of internal diseases, including NCDs. Further research in this direction is extremely relevant and will continue. This promising research work was conditionally designated by us as the most modern stage in the development of this area.

CONCLUSIONS

- 1. The above gnoseological aspect of the 700-year-old methodology for studying the bioelectromagnetic field of a human body demonstrates a staged evolution of its development, the presence of a significant amount of cumulated scientific information, which requires rethinking as part of system medicine. This convinces us of the existence of a tendency of inevitable approaching the final stage of knowledge of the human bioelectromagnetic field with the widespread introduction of these techniques into the practical public health of the world.
- 2. The accumulated layer of scientific knowledge about the bioelectromagnetic component of the human body requires integration into fundamental medicine, transformation of the modern paradigm by creating a bioelectromagnetic-chemical concept of the exchange of matter and energy in the human body.
- 3. Further research on the assessment of the bioelectromagnetic field is relevant and can contribute to solving the NCD problem both at a fundamental level within the framework of system medicine and by optimizing the diagnostic assessment in patient management algorithms during diagnosis, treatment, primary and secondary prevention.

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DYNAMICS OF THE PREVALENCE OF AFFECTIVE AND NEUROTIC DISORDERS ON THE EXAMPLE OF THE POLTAVA REGION FOR 2014-2018

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ABSTRACT

Introduction: Recently, the situation regarding the mental health of the world population has a tendency to deteriorate and is one of the most serious problems, which faced all countries of the world and in particular the European region (ER), since at one or another period of life problems of mental health arise at least in every fourth person of the ER, and Ukraine is no exception.

ATO in Ukraine was started in 2014. We investigated the level of hospitalized mental morbidity in the residents of the city of Poltava since 2014.

The aim: To study hospitalized mental morbidity of the population of the Poltava region since 2014.

Materials and methods: Studied the incidence and prevalence of depressive disorders in Poltava and Poltava regions according to the new WHO classification. ICD-11. According to the report form 10 "Report on the Disease of Persons with Mental Disorders and Behavior", the following classes of depression were studied: F30-39 Mood Disorders (Affective Disorders, F40-48 - Neurotic and Somatic Disorders, F43.0 - Severe Stress and Compliance).

Review: Affective disorders are a set of psychiatric disorders, also called mood disorders. The main types of affective disorders are depression, bipolar disorder, and anxiety disorder. Symptoms vary by individual and can range from mild to severe.

Conclusions: The rate of growth of morbidity of affective disorder has decreased, compared with 2014, by -14% and neurotic disorders has increased 3,2%.

KEY WORDS: affective and neurotic disorders, prevalence

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INTRODUCTION

Recently, the situation regarding the mental health of the world population has a tendency to deteriorate and is one of the most serious problems, which faced all countries of the world and in particular the European region (ER), since at one or another period of life problems of mental health arise at least in every fourth person of the ER, and Ukraine is no exception.

In addition, the health care system alone cannot provide the mental health of citizens: too many factors that form it are beyond the scope of its activities. Consequently, for the full protection of mental health, it is important to organize support of all public sectors and the state as a whole. [1, 2, 3, 4].

In recent years, there has been a slight increase in the incidence of non-psychotic mental disorders, in particular depression, which does not correspond to global trends and also indicates an inadequate and, accordingly, incomplete organization for the detection, registration and assistance of people with depressive disorders. According to the association of psychiatrists of Ukraine, this is due to the fact that in the protocol of diagnosis and treatment of depression there is no such link as a family doctor. Depression is curable, but about 50% of serious depressions remain untreated [5, 6, 7, 8].

It is important to note that over the past two years, due to military actions, Ukraine has for the first time seriously faced with a large flow of refugees (about 2 million people) and the number of military personnel, most of whom have been exposed to extremely stressful factors that are reflected in mental health and require compulsory correction and treatment [9].

The Poltava region occupies the central part of the Left Bank Ukraine. The area of the region is 28.8 thousand square kilometers. Refugees in the Poltava region.

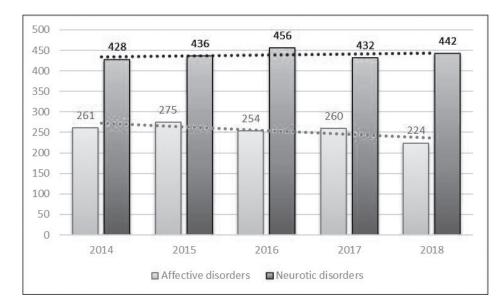
ATO in Ukraine was started in 2014. We investigated the level of hospitalized mental morbidity in the residents of the city of Poltava since 2014.

THE AIM

To study hospitalized mental morbidity of the population of the Poltava region since 2014.

MATERIALS AND METHODS

Studied the incidence and prevalence of depressive disorders in Poltava and Poltava regions according to the new WHO classification. ICD-11 [10]. According to the report form 10 "Report on the Disease of Persons with Mental



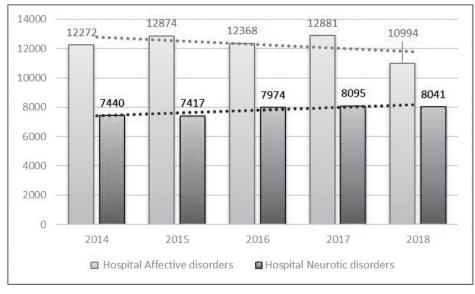


Figure 1. Hospitalized mental illness with affective and neurotic disorders.

Figure 2. Number days of hospital affective and neurotic disorders.

Disorders and Behavior", the following classes of depression were studied: F30-39 Mood Disorders (Affective Disorders, F40-48 - Neurotic and Somatic Disorders, F43.0 - Severe Stress and Compliance). They were taken at the Poltava region Clinical Psychiatric Hospital named after Maltsev. The statistical analysis was performed using dynamic series, calculated the baseline rate of growth. The design of the study was epidemiological, descriptive, and retrospective. Data for the study were taken from 2013 to 2017.

REVIEW AND DISCUSSION

Affective disorders are a set of psychiatric disorders, also called mood disorders. The main types of affective disorders are depression, bipolar disorder, and anxiety disorder. Symptoms vary by individual and can range from mild to severe [11].

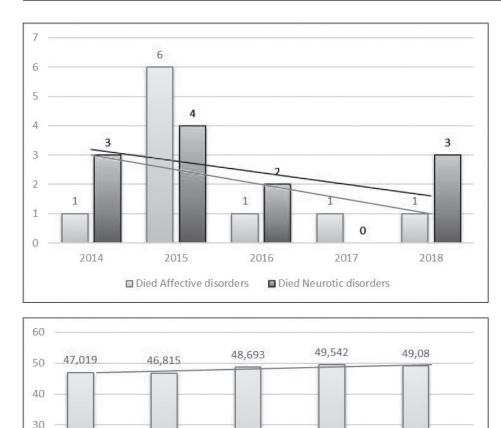
A psychiatrist or other trained mental health professional can diagnose an affective disorder. This is done with a psychiatric evaluation. Affective disorders can be disruptive to your life. However, there are effective treatments available, including both medication and psychotherapy. Neurotic disorders. Neurosis refers to a class of functional mental disorder involving distress but not delusions or hallucinations, where behavior is not outside socially acceptable norms. It is also known as psychoneurosis or neurotic disorder.

At the first stage, we studied mood disorders (affective disorders) in Poltava.

The rate of growth of morbidity of affective disorder has decreased, compared with 2014, by -14% and neurotic disorders has increased 3,2%. The largest indicator of affective disorder was in 2015 – 275 (1.89 per 10 000 population). The largest indicator of neurotic disorder was 2016 – 456 (3.16 per 10 000 population) (Figure 1).

Number of a days of hospitalization with affective disorder has decreased by 10% compared with 2014. Number of a days of hospitalization with neurotic disorder increased by 8% compared with 2014. The largest indicator of affective and neurotic disorder was in 2017 (12 881 and 8 095 in accordance) (Figure 2).

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17,487

2016

Average duration of treatment Affective disorders

Average duration of treatment Neurotic disorders

18,738

2017

18,192

2018

Figure 3. Number of deaths as a result of affective and neurotic disorders.

Number of deaths as a result of affective and neurotic disorders were no change, but the largest amount of these nosology were in 2015 – the 6 dead by affective disorder and 4 – by neurotic disorder (Figure 3).

17,011

2015

17,383

2014

20

10

0

Average duration of treatment affective and neurotic disorders have a tendency to growth . As can be seen from the picture the rate of growth of average duration affective and neurotic disorders has increased, compared with 2014, by 4%.

The World Health Organisation has defined mental health as a state 'of well-being in which the individual realizes his or her abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to their community', and proposed to be more than just absence of illness.

The World Bank evaluated the mental health of the three pilot oblasts (Lviv, Poltava and Zaporozhye) for the most common psychiatric disorders, including depression, anxiety, post-traumatic stress disorder.

Ukraine has a particularly high level of depression. There

_____ affective and neurotic disorders.

Figure 4. Average duration of treatment of

is also a close correlation between the deterioration of mental health in Ukraine and poverty, unemployment and the lack of a sense of security, which is intensifying by the impact of the conflict in the East of Ukraine.

Epidemiological statistics and reliable studies on the prevalence of mental disorders in Ukraine are relatively new sphere of activity [12].

The first national psychiatric epidemiological study was conducted in 2002 [13].

By estimates, about a third part of the population of Ukraine has experienced at least of one mental disorder throughout life. Gender differences in mental disorders have been identified: post-traumatic stress disorder and alcohol-related disorders are more prevalent among men, while depression and anxiety are more common among women. Our study was limited to the study of F30-39 Mood Disorders (Affective Disorders), F40-48 - Neurotic and Somatic Disorders, F43.0 - Severe Stress and Compliance.

Affective disorders are a set of psychiatric disorders, also called mood disorders. The main types of affective disorders

are depression, bipolar disorder, and anxiety disorder. Life events can trigger affective disorders. A traumatic event or personal loss can cause depression or another affective disorder. Use of alcohol and drugs is also a risk factor [14].

Symptoms, course of Illness, and comorbidity as predictors of expressed emotion in bipolar disorder [15].

There seems to be a genetic factor. If someone in your family has one of these disorders, you're at a greater risk of developing one as well. This means that they're hereditary. However, this doesn't guarantee you will develop an affective disorder just because a family member has one.

Neurosis refers to a class of functional mental disorder involving distress but not delusions or hallucinations, where behavior is not outside socially acceptable norms. It is also known as psychoneurosis or neurotic disorder.

There are more than one reasons why patients develop Anxiety disorders. Researchers and scientists are trying to find out more about the biological, psychological, and social factors which influence the development of anxiety disorders as there is still a lot more to learn about the role of these

Quality of life, self-stigma, and coping strategies in patients with neurotic spectrum disorders: a cross-sectional study [16].

CONCLUSIONS

The rate of growth of morbidity of affective disorder has decreased, compared with 2014, by -14% and neurotic disorders has increased 3,2%.

Number days of hospital affective disorder has decreased by 10% compared with 2014. Number days of hospital neurotic disorder increased by 8% compared with 2014.

Number of deaths as a result of affective and neurotic disorders were no change.

Average duration of treatment affective and neurotic disorders have a tendency to growth. As can be seen from the picture the rate of growth of average duration affective and neurotic disorders has increased, compared with 2014, by 4%.

The study confirmed the provision that affective disorders F 30-39 and neurotic disorders and somatic disorders F 40.0-48 are affected not only by the conflict that occurs in Ukraine but also by the general socio-economic situation.

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LUBNY PHARMACY AS A FOUNDATING STRUCTURE OF MILITARY FARMACY IN UKRAINE

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ABSTRACT

Introduction: Military pharmacy has always been a priority, being widely supported by the state with any social order. Field pharmacy development has always been considered a national safety factor. After creation of the numerous military commands and improvement of medical conditions relating to preserving and restoring the military men health, the importance of development of pharmacy as a science has only been increasing. The object of the study in this article is development of Ukrainian pharmacy as illustrated by the Poltava region example. The aim: The study is research of the pharmacy development and its influence on to the neighbor fields within the Poltava region.

Material and methods: systemic approach, historical and dialectical methods, methods of theoretical and empirical learning.

Conclusions: The Lubny pharmacy was the basis for the military pharmaceutical service in Ukraine and triggered foundation of private pharmacies in the Poltava region. Also, the Lubny pharmacy had effected on the development of pharmaceutical service and industrial agricultural cultivation of medical plants in Ukraine.

KEY WORDS: history of medicine and pharmacy, medical education, medical training

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INTRODUCTION

Military pharmacy has always been a priority, being widely supported by the state with any social order. Field pharmacy development has always been considered a national safety factor.

The development of medical service of the military casualties attained a systemic characteristic within the Kyiv Rus period, which was reflected in the Kyiv Pechersk monastery chronicles. The notes evidence that in the 11th century some Kyiv Pechersk monastery monks provided medical service to other people. There were some accommodations in the monastery where people could receive free medical service. In the years that followed, the Vyshgorodskiy male monastery offered not only the service of treatment of the military men, but their medical and social rehabilitation.

After creation of the numerous military commands and improvement of medical conditions relating to preserving and restoring the military men health, the importance of development of pharmacy as a science has only been increasing. The military pharmacy development was based on the activity of the Lubny pharmacy.

AIM

The aim of the study is research of the pharmacy development and its influence onto the neighbor fields within the Poltava region.

MATERIALS AND METHODS

Materials and methods were include systemic approach, historical and dialectical methods, methods of theoretical and empirical learning.

REVIEW AND DISCUSSION

The demand for treatment of the military casualties during war actions is a fact characteristic for all society development periods. In ancient times the Slavs residing on the present Ukrainian territory widely used local medical plants for treatment. Systemic information presentations on the medical plants were found in literature sources of the 17th-18th centuries, e.g. in hand-written herbal books, garden books and medical books, but no military guides were edited at those times.

The first specialized military pharmacy was founded in a town Lubny, Poltava region, in the 18th century. The order on foundation of the military field pharmacy with two ground areas was edited by Peter the Great on July the 29th 1709, just after the Poltava Battle.

This choice of the Poltava region, Lubny in particular, was predisposed for the wide spectrum of medical plants growing in the area [1].

The oldest mode of medical plant cultivation was represented with the monastery gardens, some of which cultivating not only vegetables, but the "green plants" beds. The first industrial provision and cultivation of medical plants in Ukraine dates back to the 18th century.

The pharmacy activity until the middle of the 20th century stipulated for preparation of the drugs directly in the laboratory room of the pharmacy [2]. The medication timber was represented with medical plants and minerals. According to the "Pharmacy Statute" of 1789, the pharmacies had to use only newly gathered and dried medical plants of proper pharmaceutical properties, the storage of which corresponded to the pharmaceutical requirements. According to the European experience, the Russian Empire settled a network of new pharmacy gardens: in Moscow in 1706, in Lubny and village Terny of Poltava region in 1709, in Petersburgh in 1713 p. Then pharmacy gardens were created in certain hospitals. Some pharmacy gardens were transformed into the university botanical gardens, including that one of the St. Volodymyr University. So, pharmacy gardens served as a drug timber source, and became medical and biological training departments. The functions of the university gardens included not only fighting epidemics but creating new technologies of drug preparation and development of pharmaceutical industry, with foundation of the new branch of biology: selection and protection of medical plants [3].

As the numerical force of the army and its engagement in active military actions were increasing, the need for medications was increasing as well [3]. At that time the Lubny county became the center of industrial cultivation and provision of medical plants. That region had the highest in Ukraine and Russia number of common chambers where farmers stored dried plants. According to one historic reference, 83% of local people dealt with provision of the plants [4].

One of the first publications on Poltava region plants was the book by N. Aranarenko (1848), in which the author described 95 local medical plant species. In 1853 M. Avgustinovych described 110 basic species of medical plants and 11 "less important" species. V. Belyavskyj in 1893 described wild, cultivated and technical plants of Lubny County.

At that time military hospitals were provided with medications (according to the "Regulations on Keeping the Field Pharmacies") by two main pharmacies – the Moscow and Smolensk, and field pharmacies – the Lubny, Astrakhan and Smolensk ones [5]. According to the "General Regulations on Hospitals" (1735) all these pharmacies were to be run by "diligent, sober and scientifically able" people [5]. In Lubny it was Peterson who ran the pharmacy [6].

One of the first pharmacists in Lubny field pharmacy was I.I. Geuiter calling himself in his diary Yakov Markovych. There is a proof that the pharmacy was founded in 1721, basing on a complaint of house dwellers. Gradually the pharmacy was extending, requiring for new space. In 1754 the house owner Yevdokya Ivanyvna (Kulyakivna) Trotska wrote a complaint, stating that she was living in a separate additional building, but pharmacist Fermeren wanted to occupy the building. The complaint beingconsidered, General Chancellor's Office ordered to the Lubny Regiment Chancellor's office to find a new flat.

The archives prove that Fermeren paid much attention to pharmacy. Since 1764 he took many efforts to create the Botanical garden as well as build new constructions for the field pharmacy and dwelling for the people who served it. He reached complete success with this in 1766 [7].

According to the archives and literature data the building of Lubny field pharmacy (one of the first three pharmacies opened in Russia) was constructed in 1720-1730. It consisted of the overground one-store brick building, situated in the ancient "Tatar Path" which was the road to Tataria and Byzantium.

Throughout military actions the Army was supplied with medicines from the Lubny field pharmacy, which received medications from the basic pharmacies or bought timber from the farmers. The replenishment of regiment pharmacy stores was due to the medication purchase orders sent to Lubny. When military actions started, regiments could replenish their medication stocks from the field pharmacies accompanying the troops [8].

A. Obukhov in his guide "Medical Plant Timber of the USSR: Provision and Distribution", published in 1927, noted that in 1730 there was founded a permanent military pharmacy in Lubny, with two pharmacy gardens: the Lubny and Terniv ones. In 1736 the pharmacy was considered the best pharmacy of the Russian Empire [9].

Since 1767 the Lubny pharmacy extended its operation field by gathering wild medical plants, cultivation of medical plants and receiving financing for improvement of pharmacy garden farming. Further there were opened private enterprises of the plant timber production. In 1809 in Lubny there appeared a private pharmacy garden registered with the pharmacy of Frantz Delle. The successor of Delle was V.Belyavskij who by the end of the 19th century cultivated about 30 plant species in the garden of 10 desiatynas (a desiatyna was equal to 2.7acres) [3].

From the 10th of July till the 25th of August 1916 N.N. Montverde with his colleagues visited the Poltava County to learn on the medical plant provision. Except for visiting various county destinations and communication with the locals, they collected a unique herbarium of 78 medical plants species. They also brought 44 specimens of medical plants purchased from the collectors as they were sold and 35 specimens of the plants bought from local healer women in Poltava region. The plant specimens were passed to the Medical Plants department in the Museum of the Emperor Botanical Garden of Peter the Great.

The visit also resulted in the consideration of medical plants provision and cultivation by Counties. According to the author, all poor women residing in Lubny received proper reward for gathering medical plants in the suburbs. The gathered plants were purchased by the state pharmacy or other pharmacies of Poltava County. The Lubny pharmacy replenished its stores by 29 species of wild plants gathered by the pharmacy trainees [10].

Apart from this, selection studies were held on the territory of the Lubny and Terniv botanical gardens, which investigated properties of the plants: foxglove, wolfsbane, pod pepper, milkweed, belladonna, chamomile, mentha viridis, mentha piperita, poppy, salvia and black mustard to subsequently replenish pharmacy stores.

What refers to the subsequent history of the Lubny pharmacy and gardens, it is just known that in the 1860s the Military Department decided to close up the pharmacy, considering it as lossmaking, the medications to be delivered from abroad.

All the property of the pharmacy and laboratories was sold out; many items were sold for nothing, some were factually destroyed. The buildings were transferred into ownership of the Engineer Department, the garden area was sold [10].

Despite all the above mentioned conditions, which prevented industry from development, the Poltava County was the first among other counties in cultivation of medical plants (more than 150 species) and the provision extent.

To rearrange the plant purchase and preserve the defined prices for the plants in 1912 there was opened the Lubny Partnership of the Rural Property, headed by secretary P.I. Gavsevych; the Partnership obtained medical plants from the farmers, processed them and released them for further industrial processing.

The farmers brought their plants to the County council buildings. The plants were kept in some warehouses which were previously state warehouses of the agricultural technique [11].

In the late 19th century the botanical garden didn't expand, so the appropriate pharmacies gathered wild plant species of medical plants. It was rather obvious that the pharmacy had to cultivate the plants on itself and manufacture appropriate amount of the drugs.

To reach the goal two pharmacy gardens were again founded by the pharmacy, represented with two medical plantations: the Lubny and Tekhnar town plantation, with total area equal to 50 desiatynas. On both plantations there were built separate drying and distilling devices, with the whole team assigned to the pharmacy. This way, Lubny became the medication-supplying center of all the Russian Empire Armed Forces. In the Lubny County there was also founded the free pharmacy of Frantz Delle, which also gathered the plants, and possessed its own plantation and laboratory. The trainees gathered the plants, though, local citizens also helped it to become successful [12].

The "pharmacy gardens" cultivated some medical plants which are still widely used nowadays, such as calendula, mentha piperita, foxglove, etc. In the pre-revolution period the Lubny agricultural fellowship managed sales and cultivation of the medical plants. There are literature evidences that in 1901 400 000kg of medical plants were sent abroad from Lubny. The total cost of the timber prepared and brought to Germany, England, France and other countries made up about 200 000 roubles. So, the first center of the medical plants cultivation research in Lubny was deliberately founded [4].

The delivery of medications required for special "prescription decks" (closed carts for transport of medications). In the middle and late 18th century all Kyiv hospitals and the general hospital were supplied with medications from the Lubny pharmacy [13].

In the war period pharmacies sold drugs for 3915roubles 84 kopeeks compared to 2967 roubles 16.5 kopeeks in the peaceful period [14]. The drugs were covered and hospitals maintained for the cost of some sources, e.g. one kopiyka was withheld from each wage rouble in all ranks (except for soldiers) [15-17].

In the early 18th century in Lubny there was situated a rehabilitation and medical examination center which estimated ability of the rankers of the Hessen-Hamburgh Prince Corps to perform further military service. Physician Jogan Aruntsiy Attzari (personal physician of general field marshal Chrystophor Antonovych Minikh) signed in Lubny (1736) attestation papers to the rankers of the Hessen-Hamburgh Prince Corps which retired after severe illnesses [18].

With the onset of the 7-year war (1756) there increased the need for medications, colonel of Lubny regiment Petro Danylovych Apostol permitted to locate in his house pharmacy, due to sad experience with his father, who was severely ill and to obtain medications for him it was necessary to ask the assessor of the Foreign affairs collegium, Semen Ivanovych Ivanov to send him the drugs from Moscow, from physician Bidlow.

The medications were dispensed to the hospitals by pharmacist Genrich Fermeren (1756), according to the catalogue, signed by the physician. The required pharmacy dishes were produced on the glassware factories of Hetman Pavlo Polubotok successors, delivered in 1758 by the trainee of Lubny pharmacy Mykhailo Ovsyannikov. In 1764 the Lubny pharmacy also functioned in the yard of colonel Zelenskij.

Just before the Russian-Turkish war, in 1768 in Lubny pharmacy there was settled a surgical instrument repairment office. The peasant serf Samiylo Novogorodtsev, a master in medical equipment, was assigned there from Petersburgh. He founded the first medical instruments mechanical repairment and production workshop, collaborating with local blacksmiths as his apprentices [6]. Later he headed the pharmacy. His fellow country woman Hanna Petryvna Poltoratska (Kern by marriage) was a granddaughter of the famous court singer Mark Poltoratskyj and the muse of O.S. Pushkin. In 1800 she remembered him as "very old pharmacist who was kind and welcoming. He and his wife lived openly; they always very warmly welcomed the guests, like almost nobody at that time. Hanna Petrivna admired the cleanliness of the house as well [19].

In 1788 in Kriukiv, near Kremenchug, a field hospital was urgently established, which, in the war documents, was termed as the "general" one [20].

The medications were supplied in Kriukiv from the Lubny field pharmacy, as these were ethers, drops and other required drugs [21].

The Kriukiv hospital pharmacy was functioning even in the post-war period. In 1793 pharmacist Karl Toryan sent to Kriukiv from the Gradyzh field pharmacy, located in Lubny, "the required on May the 6th box with medical instruments set" [22]. The old instruments, which "due to their long use became useless, partly require for repairment, and partly don't require it at all", were transported to Lubny from Kriukiv by junior physician Podolskij" [3]. After this all the war-spoilt medical instruments were delivered to Moscow, to the Medical collegium department which re-sent them to the "instrumental master Ketsher" [23].

The co-workers of the Lubny pharmacy attentively followed all the news of medicine and pharmacy. In the late 18th century (1792) the first capital medical magazine "St. Petersburg bulletin" was printed to be widely spread. In Lubny this magazine was received by pharmacist P. Gilderbant, in Lyiv- headquarter physician Shchpu and pharmacist F. Bunge, in Kozelets –headquarter physician H.Krumreich, in Nyzhyn – pharmacist I. Tzygra, in Romny- headquarter physicians A.I. Wilmerding and G.Ye.Vihman [5].

Apart for the achievements, the Poltava pharmacists were the first to be nationally complained at in history of Ukrainian pharmacy. The first written complaint is kept in the Lviv Pharmacy Museum. It was written by T.G. Shevchenko in 1845 during his stay in Poltava region, in which he wrote to M.V. Rodzyanko: "As I was in Khorol, I caught a severe cold, but the glorious Mirgorod city possesses neither a physician, nor a pharmacy, though there is a city hospital situated on the main street" [19].

The progress of pharmaceutical technologies triggered many transformations in the military medical service in the late 19th century. In the period from 1887 till 1902 new catalogues of medications and medical items were approved. Particularly, in 1895 in the current catalogues of the Russian Army supply there first appeared ready to use antiseptic packages and tableted preparations. As pharmaceutical technologies were undergoing changes, the pharmacy realities in Lubny were changing as well. The foundation of the department of tableted drug production affiliated to the St.Petersburgh factory of military medical provision not only altered production of medical preparations, but all medical provision of the Army. This was a kind of a paradigm shift in pharmacy, particularly of the War time pharmacy, as it was no longer necessary to take to the war regions large carts with heavy pharmaceutical equipment for drug production. From that since on, it was always possible to provide the tableted medications to any place and at any time.

In the early 20th century the demand for medical plants decreased and the provision system declined. In 1915-1916 the Lubny botanical garden which was situated in the city suburbs, according to N.N. Monteverd, presented only slight resemblance of the former. No medical plants were grown there. But each spring the remaining medical plants were restored. There preserved a two-floored wooden barn which was previously used for drying of the medical plants, which was previously occupied with military stable.

This gave an impulse to quick development of the Lubny pharmacy as a scientific center of production and distribution of natural timber producing technologies of Ukrainian pharmaceutical industry.

CONCLUSIONS

The article describes factors of the pharmaceutical service development in the Poltava region, state importance of the Lubny pharmacy for providing military combativity of troops; proves its effect on the development of pharmaceutical service and industrial agricultural cultivation of medical plants in Ukraine. The Lubny pharmacy was the basis for the military pharmaceutical service in Ukraine and triggered foundation of private pharmacies in the Poltava region.

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PROBLEMS OF COUNTERFEITING MEDICAL PRODUCTS IN UKRAINE

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ABSTRACT

Introduction: The provision of medical products of adequate quality should be considered as constituent element of the human right to life, inextricably linked with the right to health care protection and medical care. However, the Ukrainian market of counterfeit medical products affects the guaranteeing of the right to health care protection and medical care in Ukraine. The current situation necessitates a study of the legal regulation of counterfeiting of medical products in Ukraine and an increase in its effectiveness. The aim of the research is the formation of scientifically based approaches to improve the activities on counterfeiting of medical products in Ukraine in the aspect of normative regulation.

Materials and methods: The empirical base of the research is the national legislation of Ukraine, data from the General Prosecutor's Office of Ukraine and the Unified State Register of Court Decisions. The methodological basis is a set of general and special research methods of scientific cognition, namely: the logical and normative method; statistical method, as well as methods of comparative analysis and logical methods of research.

Review: In the course of the research, the authors have analyzed international acts, national legislation of Ukraine determining the directions and specific features of the activities of state agencies in counterfeiting of medical products in Ukraine, the data of the General Prosecutor's Office of Ukraine and the Unified State Register of Court Decisions. On the basis of the performed analysis, the authors have suggested measures aimed at increasing the effectiveness of counterfeiting of medical products.

Conclusions: The imperfection of the existing system of counterfeiting of medical products in Ukraine has been proven. The authors have offered organizational measures to increase the effectiveness of counterfeiting of medical products, as well as to amend the current criminal, criminal and procedural legislation, taking into account the MEDICRIME Convention ratified in Ukraine.

KEY WORDS: falsification, medical products, counteraction, investigation, damage reimbursement

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INTRODUCTION

The realization of the inalienable human right to life is inextricably linked with the right to health care protection and medical care. At the same time, the provision of medical products of adequate quality should be considered as an integral part of these rights. As stipulated in the Fundamentals of the Legislation of Ukraine on Health Care, citizens are provided with medical products and immunobiological drugs through health care institutions that are entitled to perform this task in accordance with the law (Part 1 of the Art. 54). Health care institutions that are entitled to perform this task in accordance with the law can only dispense such medical products and immunobiological drugs that are allowed for use by the central executive agency ensuring the formation of state health policy (Part 3 of the Art. 54). The quality of medical products and immunobiological drugs must comply with the requirements of the State Drug Codex of Ukraine and the specifications approved in the prescribed manner (Part 2 of the Art. 55). Control over the quality of medical products and immunobiological drugs manufactured by the Ukrainian enterprises is exercised by the central executive agency implementing the state policy in the field of quality control and safety of medical products (Part 3 of the Art. 55) [1]. Law of Ukraine dated from November 19, 1992 No. 2801-XII.

The aspects of ensuring the right to health care, in particular access to medical products, were considered by the European Court of Human Rights. In particular, the issues on the access to experimental drugs were researched in the judgments of the cases "Hristozov and Others v. Bulgaria" (applications No. 47039/11 and 358/12), "Durisotto v. Italy" (application No. 62804/13). The judgment of the case "Center of Legal Resources on behalf of Valentin Câmpeanu v. Romania" (application No. 47848/08) addressed the issue of not providing adequate medical care, including the aspect of failure to provide antiretroviral therapy.

The situation with the presence of the market of counterfeit drugs in Ukraine directly affects the guaranteeing of the right to health protection and medical care.

The Criminal Code of Ukraine provides criminal liability for the manufacture, acquisition, transportation, shipment, storage for the purpose of selling or selling scienter counterfeit drugs (the Art. 321-1).

According to the statistics from the General Prosecutor's Office of Ukraine [2], the year dynamics are as follows (Table I).

In the period from January 1, 2013 to March 28, 2019 the Unified State Register of Court Decisions revealed 27 sentences under the Art. 321-1 of the Criminal Code of Ukraine (Table II).

We believe it proves, first of all, the high latency of this crime, secondly, the difficulties in establishing the factual circumstances of this crime, thirdly, the need to clarify the methods for identifying, preventing and investigating this crime, and creating methodological recommendations for practitioners with regard to new technologies; fourth, the actual lack of studying the experience of law enforcement agencies of other countries.

THE AIM

The aim of the presented article consists in the analysis and systematization of existing problems occurring in counterfeiting of medical products in Ukraine.

The main objective of the article – is to analyze international documents, national legislation of Ukraine, data of the General Prosecutor's Office of Ukraine for the period of 2016 – 2019 and the Unified State Register of Court Decisions for the period of 2013-2018. On this basis to suggest a set of measures aimed at their elimination.

MATERIALS AND METHODS

The national legislation of Ukraine, international acts, statistical data of the General Prosecutor's Office of Ukraine for the period of 2016–2019, data of the Unified State Register of Court Decisions for the period of 2013-2018 were the materials for studying the methods of falsification of medical products and existing problems of counteraction in Ukraine. The methodological basis was the totality of general and special scientific methods of scientific cognition. The logical and regulatory method was used to justify the need for making amendments and alterations to the existing criminal, criminal and procedural legislation of Ukraine. The statistical method was used in the analysis of sentences on the relevant corpus delicti in Ukraine. While analyzing the data of the Unified State Register of Court Decisions, we used the methods of comparative analysis, as well as logical methods of research.

REVIEW AND DISCUSSION

The problem of counterfeit medical products is widespread not only in Ukraine (published results of scientific research in foreign editions [3, 4] testify to this).

The existing state of counterfeiting of medical products in Ukraine also requires an appropriate criminal and legal response to the relevant criminal acts, their effective investigation, and therefore there is the need to adapt the existing criminal, criminal and procedural legislation of Ukraine to international documents.

Thus, the Council of Europe Convention on the counterfeiting of medical products and similar crimes involving threats to public health (MEDICRIME Convention), ratified by Ukraine by the Law of Ukraine dated from June 7, 2012 No. 4908-VI, which entered into force for Ukraine on January 1, 2016, provides a positive obligation of the state to criminalize the corresponding act in the aspect of substantive law: Each Party shall take the necessary legislative and other measures to establish as offences under its domestic law, the intentional manufacturing of counterfeit medical products, active substances, excipients, parts, materials and accessories (the Art. 5). Ukraine has criminalized this act and the Art. 321-1 of the Criminal Code of Ukraine provides liability for: manufacturing, purchasing, transporting, shipping, storing for the purpose of selling or selling scienter counterfeit medical products; the same actions committed repeatedly or by prior agreement by a group of persons, or on a large scale, or if they resulted in prolonged human health disorder, as well as the production of counterfeit medical products; actions provided in Parts 1 and 2 of this Article, if they resulted in the death of a person or other grave consequences, or committed on a particularly large scale.

This Convention establishes a number of procedural norms, and therefore it is necessary to consider the procedure of their correlation with the provisions of the Criminal Procedural Code of Ukraine dated from April 13, 2012.

Each Party shall take the necessary legislative and other measures to ensure that investigations or prosecution of offenses established in accordance with this Convention should not be subordinate to a complaint and that the proceedings may continue even if the complaint is withdrawn (the Art. 15 of the Convention). We should note that the offense under the Art. 321-1 of the Criminal Code of Ukraine is a crime of public prosecution, in this regard the commencement of criminal proceedings under the Art. 214 of the Criminal Procedural Code of Ukraine is possible without a complaint, so that the requirements of the Convention in this part are fully complied.

Investigation of criminal cases, in accordance with the Art. 16 of the Convention, should be carried out by persons, units or services competent in counterfeiting of medical products and similar crimes involving threats to public health, or that the relevant personnel have the necessary training for these purposes, including financial investigations. Such units or services shall have adequate resources. We should note that the Art. 216 of the Criminal Procedural Code of Ukraine, in accordance with the rules of the substantive jurisdiction, refers to the investigation of this crime by the investigative units of the National Police of Ukraine. It means that there is no agency that would be specialized in investigating this act, which indicates the inconsistency of the Convention in this part and the need to solve this problem. It is possible in several ways: by creating a unit within the National Police of Ukraine that would be specialized in investigating exclusively this crime (which seems at least premature, considering the dynamics of entering information into the Unified Register of Pre-Trial Investigations) or by introducing specialization of investigators to investigate a crime under the Art. 321-1 of the Criminal Code of Ukraine, who must undergo special

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	Registered	Notified about the Suspicion	Filed to the Court with Indictment	Terminated proceedings	No Decision Taken					
2016	27	5	3	8	24					
2017	23	3	3	9	20					
2018	40	2	1	7	39					
2019	9	0	0	0	9					

Table I. Criminal liability for the manufacture, acquisition, transportation, shipment, storage for the purpose of selling or selling scienter counterfeit drugs, the Art. 321-1 (2016-2019).

Table II. Sentences under Art. 321-1 of the Criminal Code of Ukraine (01.01.2013-28.03.2019).

Year	2013	2014	2015	2016	2017	2018	2019
Number	6	3	6	5	3	2	2

training and / or advanced training, taking into account the specifics of this crime, which also requires the investigators to have basic pharmaceutical knowledge (which is currently more realistic and affordable way).

Each Party shall take the necessary legislative and other measures, in conformity with the principles of its domestic law, to ensure effective criminal investigation and prosecution of offences established in accordance with this Convention, allowing, where appropriate, for the possibility for its competent authorities of carrying out financial investigations, of covert operations, controlled delivery and other special investigative techniques.

In terms of audits of financial statements, there is now a common problem related to the fact that the prosecution party does not have the authority to initiate audits and inspections within criminal proceedings. And in this regard, there is a problem of the validity of conducting, for example, economic expertise, since audit certificates are provided to an expert, and conducting audit activities (determination of any economic indicators by experts in the economic field without prior documentary inspections of financial and economic activities by the control subject) does not relate to the tasks of economic examination, which is provided by the Instruction on the appointment and conduct of forensic examinations and expert studies, approved by the order of the Ministry of Justice of Ukraine (as in force on December 26, 2012, No. 1950/5).

To special methods of investigation should include a complex of covert investigative (search) actions provided by the Chapter 21 of the Criminal Procedural Code of Ukraine. However, taking into account the requirements of the Criminal Procedural Code of Ukraine to the severity of crimes, they are not carried out under Part 1 of the Art. 321-1 of the Criminal Code (manufacture, purchase, transportation, shipment, storage for the purpose of selling or selling deliberately falsified drugs), in the proceedings of which such actions can be carried out, since these are crimes of moderate gravity. Thus, these tools are not applied to acts in the form of manufacturing, purchasing, transporting, shipping, storing for the purpose of selling or selling deliberately counterfeit medical products, which clearly

does not correspond to the degree of their public danger and the requirements of the Art. 16 of the Convention.

However, it should be noted that there is a positive fact that under Part 2 and Part 3 of the Art. 321-1 of the Criminal Code of Ukraine (the same actions committed repeatedly or by prior agreement by a group of persons, or on a large scale, or if they resulted in a long-term human health disorder, as well as the production of counterfeit drugs; actions provided in Parts 1 or 2 of the Article 321-1, if they entailed the death of a person or other grave consequences, or committed on a large scale), it is possible to apply the procedure provided in the Art. 250 of the Criminal Procedural Code of Ukraine, namely, to start conducting covert investigative (search) actions in the form of establishing the location of the radio-electronic means and surveillance over the person before obtaining the decision of the investigating judge in cases, when it is associated with saving lives and preventing the commission of these crimes.

In the aspect of covert measures, we should also note that such effective means within financial investigations (referred to, in particular, in the Article 16 of the Convention), as the monitoring of bank accounts can not be used in the investigation of a crime under the Art. 321-1 of the Criminal Procedural Code of Ukraine. This seems to require clarification in the aspect of expanding the scope of this covert investigative (search) action and removing the limitations of the investigative jurisdiction of criminal proceedings, where its conduction is possible [5].

Pharmaceutical and pharmacological expertise is necessary for the effective investigation of a crime under the Art. 321-1 of the Criminal Code of Ukraine. In practice, a complex forensic examination is also appointed (for example, the case No. 522/14195 / 15-k), a forensic and medical examination (the case No. 647/2502/13-k), a forensic and chemical expertise (the case No. 643/15936/15-k), a comprehensive forensic and chemical, pharmaceutical expertise (the case No. 643/15936/15-k). They are not classified as mandatory in accordance with the Art. 242 of the Criminal Procedural Code of Ukraine, although it is impossible to establish the fact of falsification of a medicinal product without them. At the same time, there is a problem in practice of expediting

the appointment of examinations, in particular, related to amendments and alterations to the Criminal Procedural Code of Ukraine on the possibility of attracting an expert only by the investigating judge and the court. The literature suggests propositions to change this procedure [6]. At the same time, one can now state that the adoption of the Law of Ukraine No. 2147-VIII created conditions for the loss of objects, tools, traces of crimes, and prevention of the implementation of a complete, timely and objective pre-trial investigation of a significant number of crimes. Besides, the investigative judges, who now have to consider a petition for examination, often have lack of the necessary knowledge on the subject of expert research, as well as the capabilities of a particular type of examination. The real need for an examination of the relevant criminal proceedings and the formation of the list of questions that are offered for an expert, are open questions. And this may entail certain unjustified refusals to satisfy the relevant petitions of the parties [7].

The Article 19 of the Convention provides that Each Party shall take the necessary legislative and other measures to protect the rights and interests of victims, in particular by providing, in its domestic law, for the right of victims to compensation from the perpetrators. It should be noted that the civil legislation of Ukraine provides compensation for harm caused by injury or other harm to health, which may occur as a result of the use of counterfeit medical products. An individual or a legal entity caused harm to an individual by injury or other harm to his health is obliged to compensate the victim for earnings (income) lost by him due to the loss or reduction of professional or general working capacity, as well as to compensate additional expenses caused by the need for enhanced nutrition, sanatorium-and-spa treatment, the purchase of drugs, prosthetics, external care, etc. (the Art. 1195 of the Civil Code of Ukraine dated from January 16, 2003). The procedure for the realization of this right within criminal proceedings is manifested in the institution of a civil claim in criminal proceedings. To establish the amount of harm that is subject to compensation due to the harm to human health, it is necessary to use special knowledge, where an expert (experts) should be involved in accordance with the Art. 242 of the Criminal Procedural Code of Ukraine. At the same time, it should be noted that there are gaps in the criminal procedural regulation of involving an expert to determine the harm to human health, since this case is not related to cases of mandatory involvement of an expert (the Art. 242 of the Criminal Procedural Code of Ukraine), which requires correction and amendment to the Criminal Procedural Code of Ukraine.

CONCLUSIONS

Analysis of criminal activities related to falsification of drugs, as well as the state of counteraction to its manifestations, makes it possible to offer the following measures aimed at increasing the effectiveness of such counteraction: the creation of special state authorities of public administration for the pharmaceutical industry; change (simplification) of the licensing system of pharmaceutical enterprises, the transparency of the activities of state agencies endowed with such powers, their reduction; the introduction in Ukraine of an automated tracking system for drug turnover using a unique identifier; equipping drug packages with special protective "locks" that do not allow changing the content; introduction of electronic recipes; carrying out (without exceptions) inspections of imported drugs in places of entry into Ukraine in order to identify and confiscate counterfeit medical products; establishing interaction between bona fide drug manufacturers, government agencies (including law enforcement agencies), the media and public organizations; raising public awareness about the existing system of drug protection from counterfeiting.

In order to improve the effectiveness of investigating crimes under the Art. 321-1 of the Criminal Code of Ukraine, it is necessary to make amendments and alterations to the Criminal Code and the Criminal Procedural Code of Ukraine, namely: to refer the crime under the Art. 321-1 of the Criminal Code of Ukraine, to serious crimes, by changing the sanction in Part 1 of the Art. 321-1 of the Criminal Code of Ukraine, in particular, by providing the sanction of more than 5 years of imprisonment; to regulate the proper legal procedure providing inspections and audits in the framework of criminal proceedings, in particular the possibility to appoint inspections and audits by the investigating judge at the request of the parties; to change the procedure of involving an expert, providing the possibility of involving an expert by the parties and victims, including on the basis of an agreement between the defense party, the victim and the forensic institution; to establish the provisions on the mandatory involvement of an expert to determine the physical harm to human health in the Art. 242 of the Criminal Procedural Code of Ukraine, which is obligatory within criminal proceedings under the Art. 321-1 of the Criminal Code of Ukraine in order to fully and complete establishment of the actual circumstances.

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ANALYSIS OF MORBIDITY AND CAUSES OF INFANT MORTALITY IN POLTAVA

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ABSTRACT

Introduction: Providing high-quality health care to the newborn is part of the national health system. The number of healthy children in Ukraine decreases annually. One of the main directions of development of the pediatric service is reduction of indicators of child mortality, increase of birth rate and strengthening of children's health. The aim: To analyze the dynamics of morbidity and causes of infant mortality in the city of Poltava.

Materials and methods: Medical and statistical - for collecting, processing and analyzing data, (descriptive and analytical statistics for determining relative indicators, absolute growth indicators), a systems approach and system analysis.

Review: According to a study in the city of Poltava, there is a negative absolute increase in the birth rate of children. In the structure of the causes of death of the child population in the first place are the diseases of the period of birth of the newborn, in the second place - congenital anomalies of development. The third place in the structure of causes of death is occupied by diseases of the central nervous system. There is a clear decrease in the incidence of hemolytic disease, anemia, cardiac disorders, intrauterine hypoxia and asphyxiation. In the structure of birth injuries in newborns occupy closed clavicle fractures, plexitis of the newborn.

Conclusions: Analysis of the incidence and causes of infant mortality in the city of Poltava suggests that in recent years there has been a decrease in fertility rates, an increase in morbidity rates. The reform should be aimed at improving the state of the pediatric service and the prevention of preterm labor.

KEY WORDS: reforming, newborns, mortality, morbidity

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INTRODUCTION

Providing high-quality nursing care is part of the national health system [1,2]. The socio-economic crisis in Ukraine, the prolonged military actions, caused significant irreversible demographic losses. The number of completely healthy children in Ukraine decreases annually [3, 4]. The deterioration of the quantitative and qualitative indicators of population reproduction has become the character of a steady trend [5, 6, 7]. The social situation of mothers and children noticeably deteriorates. Therefore, one of the main directions of the development of the prenatal service is reducing infant mortality rates, increasing fertility rates, improving the condition of newborn babies, preventing maternal and infant mortality (mortality in children of 1 year of life), and strengthening the health of the children population [8, 6].

THE AIM

The aim our work was to analyze the dynamics of indicators of morbidity and causes of mortality of newborns in the city of Poltava.

MATERIALS AND METHODS

The research was conducted on the basis of state and sectoral statistics. In order to achieve the goal, research

methods such as medical statistics were used to collect, process and analyze research materials (descriptive and analytical statistics for the determination of relative indicators and absolute growth rates, growth rates and growth rates), system approach and system analysis.

REVIEW AND DISCUSSION

In 2017, 364,0 thousand children were born in Ukraine, in particular in the Poltava region, the birth rate was 7.8 per 1,000 population (in 2016 it was 8.7 per 1000 inhabitants) [3, 2]. According to the study, in Poltava, a negative absolute increase in births is observed in the maternity hospital in 2015 and 2017 [6]. The proportion of childbirth by Caesarean section increased during 2015-2017 (Table I). The rate of growth of pathological births has increased, the number of women with drug dependence has also increased, and the absolute increase in the number of children with somatic pathology has decreased during this period.

In the structure of the causes of death of the child population in the first place are diseases of the period of newborn birth, in the second place - congenital malformations. Third place in the structure of causes of death in 2014-2017 occupy the diseases of the central nervous system (Table II).

Among the diseases of the period of newborns in the structure of the causes of death in the first place are symp-

	2015			2016			2017		
	Absolute index	Absolute increment	The pace of growth, %	Absolute indicator	Absolute increment	The pace of growth, %	Absolute indicator	Absolute increment	The pace of growth, %
Born in a maternity hospital, of which:	3062	-197	93,9	2959	103	96,6	2799	-160	94,5
finished ones	2933	-169	94,5	2824	109	92,6	2650	-174	93,8
prematurely	129	-28	82,1	135	+6	104,6	149	+14	110,3
Outside the maternity home	4	-3	57,1	2	-2	50	3	+1	150,0
Rejected children	4	+2	-	5	+1	-	4	-1	-
Pathological birth	41	+4,7	112,9	35	-6	85,3	40,2	+5,2	114,8
Specific gravity of labor by caesarean section	17,2	+2,8	119,4	18,4	+1,2	106,9	19,9	+1,5	108,1
Born with drug addiction	6 cases	+1	120,0	4 cases	-2	66,6	4 cases	0	100,0
Breast with somatic pathology	56	+10	121,7	56,8	+0,8	101,4	53,6	-3,2	94,3

Table I. Dynamics of fertility rates in Poltava maternity hospital for 2015-2017

Table II. The structure of the causes of death of the children's population of Poltava in 2014-2017.

	Diseases Ye	ar	2014	2015	2016	2017
1.	Diseases of the period of newborn, includin	g:	15	20	19	10
	hypoxia, asphyxia		3	4	3	1
	systems of respiratory disorders		4	5	6	3
	sepsis		3	2	4	2
	pneumonia		2	5		1
	intragastric hemorrhages		1	3	3	
	neonatal ascorbation with meconium		1	1		1
	extreme degree of immaturity		-		1	1
	primary atelectasis of the lungs		-		1	
	hemolytic neonatal disease		-		1	
	diseases of hyaline membranes		-			1
2.	Congenital malformations		4	4	3	6
3.	Diseases of the central nervous system		4	5	2	
4.	Diseases of the cardiovascular system		1	1		
5.	Accidents		1	1	1	1
6.	Infectious diseases		-	1	1	
7.	Diseases of the digestive system		1		2	
8.	Diseases of the respiratory organs		1		1	

toms of respiratory disorders, the second place is occupied by death from hypoxia, asphyxia and sepsis. Third place among the diseases of the period of newborn birth congenital pneumonia.

The index of morbidity refers to the main demographic indicators that characterize the health of newborns and the quality of medical care for women and children. Studying the causes of morbidity and mortality of newborns, its frequency, analysis of factors influencing these indicators, is an actual problem of modern obstetrics [7]. In the structure of the general morbidity of newborns in Poltava, for the period 2014-2017, the first place is marked by developmental abnormalities, in the second place - cerebral disorders, the third place occupy maternal traumas of newborns (Table

	2014		2015		2016		2017	
Diagnoses	Abs. indicator	%	Abs. indicator	%	Abs. indicator	%	Abs. indicator	%
Developmental anomalies	114	48,0	107	36,6	102	26,2	80	10,3
Cerebral disorders	19	4,7	27	9,2	93	23,9	99	12,8
Maternal injuries	18	3,9	26	8,9	22	5,6	161	20,9
Hemolytic disease	43	12,5	31	10,6	22	5,6	20	2,5
The weight is too short gestational	32	11,0	24	8,2	14	3,5	11	1,4
Jaundice	4	1,3	6	2,0	11	2,8	23	2,9
Anemia	3	0,9	6	2,0	3	0,7	1	0,1
Heart violations	3	1,2	5	1,7	7	1,7	3	0,3
Intrauteine hypoxia and asphyxia	2	0,8	5	1,7	8	2,0	1	0,1
Abstinent syndrome	7	1,9	5	1,7	4	1,0	3	0,3

Table III. The structure of the general morbidity of newborns

Table IV. Structure of maternal traumatism of newborns

	2014		201	2015		2016		2017	
Diagnosis	Abs. indicator	%	Abs. indicator	%	Abs. indicator	%	Abs. indicator	%	
Maternal injuries, including:	18	3,9	26	0,8	22	0,7	161	5,7	
Kefalematomy	30	47,6	11	42,2	10	45,4	125	77,6	
Closed fractures	23	36,5	9	34,6	8	36,3	34	21,1	
Plexit	10	15,8	6	28,0	4	18,1	2	1,2	

III). There is a clear decrease in the incidence of hemolytic disease, anomalies of newborns development, anemia, cardiac violations, intrauterine hypoxia (I / O) and asphyxia and withdrawal syndrome, as well as an increase in incidence of cerebral disorders, birth trauma, jaundice during 2014-2017.

In the structure of childbirth infants newborns in the first place isolate kefalgematomy, in the second place - closed fractures of the collarbone, and in the third place are plexitis of newborns (Table IV). During the period of 2014-2017, there was a decrease in the incidence rate of plexitis and a closed fracture of the collarbone.

CONCLUSIONS

The analysis of the morbidity and causes of newborn mortality in Poltava shows that in recent years there has been a decrease in fertility rates, and indicators of morbidity and sex traumatic disease remain at a rather high level. The reform of prenatal care should continue in the direction of improving the state of work of the pediatric service and preventing early childbirth. To do this, it is necessary to provide pregnant women with timely and qualified medical assistance, to equip modern maternity hospitals with modern medical equipment to provide high-tech care to preterm infants, to provide the population with affordable family planning services. All these measures will help reduce the morbidity and mortality of newborns, and as a result, improve the demographic situation in Ukraine.

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PRACA POGLĄDOWA REVIEW ARTICLE



CURRENT LEGAL ISSUES OF CONDUCTING A FORENSIC MEDICAL EXAMINATION OF NEWBORNS' CORPSES

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ABSTRACT

Introduction: Forensic medical examination is a mandatory investigative action in determining the causes of death of newborns. It is especially significant and occupies a key place in proving the corpus deliciti.

The aim is to study the current legal issues of a forensic medical examination of newborns' corpses.

Materials and methods: The study of legal and literary sources was carried out. The library-semantic and the content analysis methods were applied.

Conclusions: Forensic medical examination should also include questions regarding the mother of the newborn: whether she was healthy at the time of delivery; if the medical staff caused any harm to her or her child; if she had the necessary help before and during the childbirth, etc. Examination should be appointed if one of the parents has the desire, which must be expressed in writing in the form of a motion.

KEY WORDS: forensic medical examination, newborn's corpse, fetus, maturity, criminal proceedings

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INTRODUCTION

According to Part 2 of Art. 242 of the Criminal Procedural Code of Ukraine, the investigator or the prosecutor must move a motion to the investigating judge in order to determine causes of death. Thus, conducting a forensic medical examination is an obligatory investigative action in determining causes of death, but at the same time in investigating the facts of death of newborns it becomes especially significant and occupies a key place as a means of proving the existence of a crime. This is due, on the one hand, to the special characteristics of the object of the forensic medical examination of this category, and on the other hand, to the considerable difficulties in solving specific questions that are posed to the expert.

In Ukrainian legislation there is a problem of regulating this issue, since the immediate regulatory framework for conducting forensic medical examination of newborn's corpses can be found only in clause 2.1.10 of the Rules for Conducting Forensic Medical Examinations in the Departments of Forensic Medical Histology of the Forensic Medical Bureau and in clause 2.2.10 of the Rules for Conducting a Forensic Medical Examination of Corpses in the Bureau of Forensic Medical Examination.

A special place in the practice of forensic medical examination is the study of corpses of newborns and fetuses, which is due to: a) the reasons for the appointment of this kind of examination; b) a list of specific questions that, as a rule, are put by the investigator to a forensic expert; c) the use of special methods and methods by which the corpses of newborns and fetuses are examined; d) features of the substantiation of the expert opinion [1, p. 566]. That is why, according to some scientists, the need for such an examination arises in the following cases:

- if the corpse of a baby of an unknown mother is found in a cesspool, rubbish container, in the attic, in the basement, in the forest, extracted from the water, etc. (such options are the most common);
- if the mother is known but she was not registered at the maternity welfare clinic, and the child was born dead or died shortly after birth without the presence of medical staff;
- if there are complaints about improper management of labour in the maternity hospital in the presence of injuries on the body of the child or the mother [2].

THE AIM

The aim of this article is to study the current legal issues of the appointment and conduction of a forensic medical examination of newborns' corpses.

MATERIALS AND METHODS

The study of legal and literary sources on the studied topic, among which there are the works of such scholars as: A. P. Ardashkin, E. Kh. Barinov, T. L. Domoratskaya, N. N. Kachina, V.V. Kolkutin, G. F. Puchkov, O. F. Fedorova, V. A. Chuchko, N. V. Shakhman, and others. In this case, the library-semantic method and the content analysis method were applied.

REVIEW AND DISCUSSION

Issues of the appointment and conduction of a forensic medical examination of the corpses of newborns in Ukraine are regulated on a general basis by the Criminal Procedure Code of Ukraine, the Law of Ukraine "On Forensic Examination", as well as the by the Instruction on Conducting a Forensic Medical Examination. In addition, certain types of investigations are legislated in other regulatory legal acts.

Thus, according to the clause 2.1.10 of the Rules for Conducting Forensic Medical Examinations in the Departments of Forensic Medical Histology of the Forensic Medical Bureau when examining the lungs of the corpses of newborns, the following issues are resolved: if they breathed or not, the airiness of the parenchyma is noted as well as the condition of the lumen of the bronchi. Additional paint on elastic fibres in the interalveolar septa is used, their condition is noted. In addition, the state of the lumen and the presence of red blood cells in the bronchiolar arteries, capillaries of the interalveolar septum and small arteries of the pulmonary artery system are identified. Attention is paid to the state of respiratory alveolocytes and their shape. In order to exclude aspiration of amniotic fluid, traces of the latter are searched for in the alveoli: vellus hair, horny scales, meconium, squamous epithelial cells. In the umbilical ring, the presence (or absence) of leukocytes (demarcation shaft), the state of the vessels and the cellular composition around are indicated. In a labour tumour, blood vessels, haemorrhages and cellular reaction around are noted. In the excrements blood filling, villus condition, presence (or absence) of heart attacks, calcification, foci of inflammation, necrosis are identified [3]

It should also be noted that in accordance with clause 2.2.10 of the Rules for Conducting a Forensic Medical Examination of Corpses in the Forensic Medical Bureau when examining corpses of newborn children: 1) the corpse is weighed, the circumference of the head, shoulders and chest is measured; 2) radiography of the hands and feet (the presence and size of ossification centres) is performed; 3) an opening of the epiphyses (distal) of the femur, calcaneal bones and handles of the sternum is added to the normal volume of dissection in order to identify ossification centres, as well as the opening of the spinal column in order to remove the spinal cord and to see if it was a birth injury or not; 4) swimming tests are conducted (Galen, Breslau); 5) a set of pieces of internal organs is sent for forensic histological examination, to which the umbilical cord and the umbilical ring are added; 6) liquid blood from the cavity of the heart or vena cava and blood on gauze is sent for forensic immunological research; 7) when signs of traumatic exposure are detected, the whole complex of studies characteristic of this type of injury is carried out [4].

If to talk about the features of the examination of the corpses of newborns, then this means not only a special autopsy technique, but also the fact that, in addition to determining the cause of death, a number of specific issues inherent only in this type of examination must be solved.

Moreover, according to E. Khrushchelevsky, specialists who conduct such studies often face great difficulties in recognizing morphological changes and determining the true cause of the death. These difficulties are due, first of all, to the peculiarities of the physiology and pathology of the early period of life [5].

Traditionally, a child who was born dead or lived after birth for a very short period of time (usually not more than 1 day) has been considered as a newborn from the forensic medical positions. Such a specific and rather narrow concept of a newbornness exists in forensic medicine so far, although attempts are being made to bring it under the generally accepted standards [6, p. 47]. In forensic medicine, a newborn is considered a child who has signs characteristic of the fetus (umbilical cord, vernix caseosa, labour tumour, first stool – meconium) [7].

Therefore, if to talk about the umbilical cord as a material for forensic medical research, then it is juicy and moist in newborns, white in colour, gelatinous, strongly changing during drying. The length of the umbilical cord in a corpse of a newborn may be different, both as a result of the anatomical features of its structure, and as a result of various manipulations with it (breakage or cutting at different levels). The drying of the umbilical cord can occur both in vivo and posthumously. In a live newborn baby, the drying of the umbilical cord occurs evenly. At the base of the drying umbilical cord, in the region of the umbilical ring, after a few hours, and sometimes by the end of 1 day, a ring of reactive inflammation appears in the form of a reddish rim, called the demarcation line. In this place, the umbilical cord is subsequently separated and falls away. As a rule, this happens on the 4-7 day, but for a number of reasons this process can be delayed up to 10-11 days. On corpses, a portion of the surface of the umbilical cord adjacent to the umbilical ring dries out more slowly. The possibility of post-mortem drying of the umbilical cord that develops in dry and warm weather should be noted [8].

Consequently, the mere fact of the presence of signs of the umbilical cord drying does not exclude the fact of newborness. Proof of this is the presence of the umbilical cord that connects the anterior abdominal wall with the afterbirth or placenta. If the corpse of a child with an unseparated afterbirth comes for examination, then this is an indisputable sign of the newborness.

In addition, antenatally sebaceous glands of the skin of the fetus emit a fatty curd-like mass consisting of fat droplets, cholesterol crystals and fatty acids, which, mixed with desquamated epithelial cells and vellus hair, cover its body, forming a so-called vernix caseosa, which by the time of the birth the fetus is covered with, and its quantity may be different. If the body of the child has not been washed, then the vernix caseosa on the surface of its body after birth can last up to 3 days or more [8].

It should also be emphasized that the importance of this feature increases in the examination of rotten-modified corpses of newborns, as in this situation the question of the newborness expert is forced to decide only tentatively (based on the presence of the umbilical cord and vernix caseosa). A labour tumour is a limited swelling of the soft tissues of the presenting part of the fetus (usually the head), usually accompanied by slight haemorrhage. It arises in the process of childbirth, so it can be found on the corpses of babies who died both during childbirth and after birth. The presence of a labour tumour suggests that the child is the newborn [8].

In addition, the presence of meconium, first stool consisting of cells of the desquamated epithelium, secretion of the glands of the gastrointestinal tract and bile pigments, which are contained in the colon, are also among the neonatal signs.

In the process of examination of a baby corpse, the expert should pay attention to the engorgement of the mammary glands, the presence of discharge from them, and bloody discharge from the vagina. Their presence can be explained by the fact that a so-called hormonal crisis occurs at this time and indicates that the child has lived for at least 3-4 days and is not a newborn in the forensic medical sense [8].

However, A.P. Ardashkin and G.V. Nedugov consider that only corpses of stillborn fetuses and live-born babies who died in the early neonatal period actually come in for forensic medical examination unidentified (respectively, with unidentified circumstances of birth). This approach to defining a newborn from a practical point of view is convenient because it allows recognize any live-born baby as the newborn. At the same time, "neonatal signs" traditionally indicated in the forensic medical literature (state of the umbilical cord, presence of vernix caseosa, blots of blood and meconium, labour tumour, etc.) can only be used to establish the duration of extrauterine life and indicate the absence of care (if there are some signs and, conversely, about the care provided, in the absence of signs) [9].

Therefore, it should be borne in mind that full-term and maturity are extremely close concepts, therefore, they are often identified. However, this is not entirely correct. Full-term refers to the normal period of the fetus in the maternal organism, which lasts an average of 10 lunar months or 280 days. Under maturity should be considered the degree of physical development of the fetus at the time of birth. As the gestation period increases, the degree of maturity of the fetus increases as well, and upon reaching the 10th lunar month the fetus usually becomes mature. However, there are options when the child is full-term and immature (in certain pathologies) [10].

Morphological signs of a premature baby are the following: - disproportionate body build: the head is 1/3 of the body part, the predominance of the cranial skull over the face, the umbilical ring is below the midpoint of the body, large body, short legs;

- thinning of the subcutaneous base;
- abundant vellus hair, the presence of thicker hair on the head and low growth on the forehead and the back of the head compared to full-term baby;
- open anterior fontanelle, occipital fontanelle, lateral fontanelles and sutures of the skull;
- bones of the skull are thin and soft on palpation due to their low mineralization;
- auricles are soft, etc. [10].

The criterion of live birth is the appearance of extrauterine pulmonary respiration in a viable fetus. With the first cry and inhale, the lungs, which were collapsed in the uterine state, are straightened. The child begins to swallow the air at the same time. The latter fills the stomach and small intestine within the next hours after birth. A viable fetus that is dead before the onset of respiration is considered stillborn. To determine the live birth, the so-called vital tests (pulmonary and gastrointestinal) are applied and histological examination of the lung tissue is carried out. The presence of air in the lungs and in the gastrointestinal tract before dissection can be established by conducting a visual examination (Bush-Haberdi test) and radiographically (Ya.G. Dillon's test) [11].

In addition, we agree with the opinion that a histological examination of the lungs to establish live birth and stillbirth is mandatory. The alveoli and bronchioles of the lungs of the stillborn are spawned, are of various shapes and sizes, the alveolar epithelium is cubic, elastic fibers are arranged in the form of bunches and spirals. In the breathing lungs, the alveoli are flattened, their walls are thin, the alveolar epithelium is flattened, the capillaries are full-blooded, and the elastic fibres follow the contours of the flattened alveoli. Indeed, in some forms of congenital pulmonary insufficiency (especially in premature newborns), hyaline membranes are found in the alveoli and alveolar passages. They are not detected in the stillborn baby, so their presence can be considered a sign of live birth [10].

The forensic medical examination of the corpse of a newborn is subject to obtaining data in order to answer all the necessary questions raised by the investigating authorities. Their specificity causes the use of special technical means of external and internal examination. In addition, the algorithm for the examination includes the familiarization of the forensic medical expert with the materials of the criminal case and a thorough study of the protocol of the scene of the incident [1].

During the external examination of the baby the manifestation degree of the corpse phenomena is noted. It should be taken in consideration that the skin of the corpse has a common blue-red colour, against which the spots are poorly expressed. Rigor mortis occurs after 0.5-1 hour and manifests quite well. Wet skin after birth and much more surface of the skin in relation to body weight (compared to these indicators of an adult) cause the cooling of the body, and the relatively thin and delicate mucous membranes lead to rapid drying. Also the colour of the skin and the presence of blood, vernix caseosa, signs of mesonium, haemorrhages in the skin and mucous membranes are noted.

In the course of internal examination, the procedure of taking materials for laboratory research is obligatory: pieces of internal organs, a labour tumour, and an umbilical cord from the umbilical ring – for forensic histological examination; fetal blood and washing of blood from the fetus body for forensic immunological study; vernix caseosa – for forensic cytological studies; free end of the umbilical cord – for medical and forensic investigation [1].

And only after an internal examination, the forensic expert makes an analysis of the corpse's examination results and data from laboratory research methods and draws up the results (conclusions) with answers to questions from investigative or judicial authorities.

For providing forensic medical examination of the corpse of a newborn baby or fetus, the following main questions are posed:

- whether this child was a newborn;
- whether this child was full-term and mature or premature and immature;
- whether this child was born dead or alive;
- whether this child was viable or non-viable;
- how much time the child lived after birth;
- whether the young child received the necessary help and proper care;
- the cause of his death [12].

From the point of view of ensuring the correct qualifications of crime and qualitative proof, one of the key questions of the forensic medical examination of the corpses of newborns, we believe, is the question of whether the child was born dead or alive.

Because, if the expert states stillbirth, it thereby excludes the act of the killing of the child, which does not give grounds to bringing the mother to criminal responsibility, excluding intentional or as a result of improper fulfillment of the child care duties leading to death and vice versa. For example, PERSON_2 during January 2014 by INFORMA-TION_2, being in a state of pregnancy, deliberately hiding the pregnancy from relatives and their surroundings, not registering at the medical institution, having the intent to leave the newborn child at risk at around 7:00 in the morning INFORMATION_2 living in the house according to ADDRESS_1 in the toilet room located in the territory of her household, in the absence of unauthorized persons during physiological births, gave birth to a full-term and lively female child weighing 3000 grams, 48 cm long. After that PERSON_2, contrary to the requirements of Article 150 of the Family Code of Ukraine, hid the newborn child under wooden planks near the toilet, did not take measures to save her life, returned to the room of the house and didn't tell her close relatives about childbirth, that is, intentionally left the child in a state dangerous to life. According to forensic medical examination No. 726 of September 19, 19.10.2014, the newborn PERSON_2 female child died and her death was caused by mechanical asphyxiation from closing the respiratory tract with foreign matter, confirmed by histological examination of foreign particles in the bronchiole mineral particles) [13]. Therefore, attention should also be paid to what caused the death of the newborn: passive actions of the mother, health workers (another person) (for example, failure to provide assistance and proper care) or their active actions aimed at deprivation of the child's life.

In addition, it should be borne in mind that a viable child can be born dead in the event of fetal death for various reasons, and, conversely, sometimes a non-viable child is born alive and can live for some period of time.

Therefore, we believe that issues related to the condition of the mother of the newborn should be attributed to the

issues of this kind of expertise: whether she was healthy at the time of birth; what characteristics of her physical health she had (condition of the birth canal, level of intensity of labour activity, etc.); if the medical staff caused any harm to her which resulted in the death of the child; if she had the necessary help before and during childbirth, etc. This approach, despite its perception of the results of the survey, is rarely used in investigative practice. An example of positive practice is the following procedural act. 18.09.2018 Investigator of the Investigation Department of Ternovsky Police Office of National Police Headquarter in Dnipropetrovsk region PERSON_1 appealed to the investigating judge with a motion to conduct a forensic medical examination, in which he noted that on September 15, 2018, at approximately 09:20 in the morning, in the area close to abandoned building, which is located near the communal preschool institution No. 218 on the Ukhtomsky Street in Ternovsky district, Krivoy Rog, the corpse of a newborn baby was found. According to the results of the review, the motion was granted. Among the questions posed to expert for solving were: Does the child have injuries? If so, what is their severity, localization, mechanism of formation, etc.? Did the baby have a head injury while passing through the birth canal of the mother? Could damage occur from self-help during childbirth or during intensive labour? [14]

Thus, we focus on the feasibility of a thorough examination not only of the corpse of the newborn, but also of the state of the mother on the issues indicated above, if the expert has a reason for this, within the framework of the right to an expert initiative, or the subject of criminal proceedings who appointed the examination.

It is worth noting that during the survey interviews of investigators, who had criminal cases concerning the fact of the death of the newborn, as well as experts who conducted forensic medical studies to determine the causes of death of the newborn, it was summarized that 87% of them believe that questions concerning the corpse of a newborn or fetus are as necessary as questions about the state of health of the biological mother of the deceased child, since this group of questions has no less forensic value, and their solving will provide savings of procedural resources and an investigation within a reasonable time period according to the requirements of the Criminal Procedure Code of Ukraine.

According to the results of the survey, we found that 62% of respondents draw attention to the need for an integrated approach to raising issues for expert investigation and examination, including also those that will allow understanding the state of physical health of the mother. This again indicates that the question of the causes of the child's death is in correlation with the physical condition of the mother, and negative characteristics of her health condition could entail death.

CONCLUSIONS

Thus, it can be argued that the forensic medical examination of the corpses of newborns in criminal proceedings for the fact of death is carried out in accordance with specific rules established by the legislation and methods of expert research. However, it has been concluded that there is a need to expand the list of objects of this kind of research and questions that may be brought to the expert's consideration regarding the state of health of the mother in terms of indicators that could have negative consequences for the child, including: whether she was healthy at the time of delivery; what characteristics of her physical health she had (condition of the birth canal, level of intensity of labour activity, etc.); if the medical staff caused any harm to her which resulted in the death of the child; if she had the necessary help before and during childbirth, etc.

From the point of view of the criminal procedural law, these questions are formulated independently by the investigator or prosecutor in the motion during the pre-trial investigation or in the presence of a written motion of the participant in the proceedings, in particular, one of the parents of the newborn. If the relevant motion is granted by the investigating judge, the list is suggested in his decision and can be further expanded by the expert within the framework of his right to an expert initiative.

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CALCULATION OF LOSS OF CHILD MORTALITY IN UKRAINE AS AN INSTRUMENT FOR ESTIMATION OF ACHIEVEMENTS OF SUSTAINABLE DEVELOPMENT GOALS IN UKRAINE

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ABSTRACT

Introduction: Ukraine has made a commitment to reduce preventable deaths of newborns and children under 5 years of age, within the framework of the relevant task of the Sustainable Development Goals. For a purposeful and effective struggle, it is necessary to realize the scope and structure of losses.

The aim: Identify differences in child mortality rates in Ukraine compared to other countries, to calculate and estimate the number of years of potential life lost (YPLL) due to infant mortality.

Materials and methods: The information base of the study was official data of the State Statistics Service of Ukraine on the distribution of the deceased by age and causes of death in 2017 and World Health Statistics 2016 data. The method of potential demography was used to estimate demographic losses.

Review: In Ukraine, in 2017 the absolute number of years of potential life lost (YPLL) was estimated to be almost 217,000 person-years due to under-five mortality, most of them - more than 179,000 person-years - due to infant mortality. The rest were losses due to mortality within the interval of 1-4 years - almost 40 thousand person-years. 55.6% of all potential life losses due to infant mortality determined Certain conditions occurring in the perinatal period, Congenital malformations, deformities and chromosomal anomalies - 23.4%.

Conclusions: Ukraine has significant reserves for reducing under five mortality rates, primarily through minimization of preventable mortality.

KEY WORDS: Sustainable Development Goals: Ukraine, child mortality; years of potential life lost, person-years, health-related goals, targets, and SDG indicators

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INTRODUCTION

A recognized indicator of the health and well-being of children - child mortality is one of the most important indicators of progress towards achieving the Sustainable Development Goals (SDG). The Agenda for Sustainable Development for the period up to 2030, adopted by 193 countries (including Ukraine) under the auspices of the United Nations entered into force in January 2016. An estimated 5.9 million children under 5 years of age died in 2015, with a global under-five mortality rate of 42.5 per 1000 live births [1]. Globally, under-five morality rate has declined by 58 % since 1990, and the number of under-five deaths dropped from 12.6 million in 1990 to 5.4 million in 2017 [2]. Target 3.2: By 2030, end preventable deaths of newborns and children younger than 5 years, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1000 livebirths and under-5 mortality to at least as low as 25 per 1000 livebirths. Under-5 mortality and neonatal mortality rate had the most countries with at least 95% probability of target attainment [3].

The death of a child causes the greatest number of years of potential life lost. On a global scale, neonatal disorders are among the top five causes of death leading to the greatest number of years of potential life lost (YPLL). Globally, the five leading causes of total years of potential life lost in 2016 were cardiovascular diseases; diarrhea, lower respiratory infections, and other common infectious diseases; neoplasms; neonatal disorders; and HIV/AIDS and tuberculosis [4].

The extent of the harm caused, the volume and structure of the losses should be clearly understood for a effective activities to achieve the reduction of infant mortality in Ukraine.

THE AIM

Identify differences in child mortality rates in Ukraine compared to other countries, to calculate and estimate the number of years of potential life lost (YPLL) due to infant mortality.

MATERIALS AND METHODS

The information base of the study was the official data of the State Statistics Service of Ukraine on the distribution of the deceased by age and causes of death in 2011, 2017 and World Health Statistics 2017 data.

The method of potential demography was used to esti-

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Causes	Number of deaths		Number YPLL	% total YPLL		
Causes	2011	2017*	2011	2017*	2011	2017*
l Certain infectious and parasitic diseases	141	70	9094,5	4515	3,1	2,5
II. Neoplasms	26	24	1677	1548	0,6	0,9
X. Diseases of the circulatory system	81	38	5224,5	2451	1,8	1,4
X. Diseases of the respiratory system	133	99	8578,5	6385,5	2,9	3,6
KVI. Certain conditions originating in the perinatal period	2339	1550	150866	99975	51,9	55,6
XVII. Congenital malformations, deformations and chromosomal abnormalities	1100	653	70950	42118,5	24,4	23,4
KX. External causes of morbidity and mortality	262	140	16899	9030	5,8	5
All causes	4511	2786	290960	179697	100	100

Table I. The distribution of the number of years of potential life lost due to deaths of up to one year, the main causes of death, Ukraine, 2011, 2017

Note: * author's calculations based on the State Statistics Service data

Table II. Years of potential life lost as a result of Under-five mortality, person-years per 100 000, Ukraine, both sexes, 1990, 2017

rank	1990	rank	2017
1	Congenital heart anomalies	1	Other neonatal disorders
2	Neonatal preterm birth	2	Neonatal preterm birth
3	Lower respiratory infections	3	Congenital heart anomalies
4	Other neonatal disorders	4	Neonatal encephalopathy due by birth asphyxia and trauma
5	Neonatal encephalopathy due by birth asphyxia and trauma	5	Other congenital birth defects
6	Other congenital birth defects	6	Neonatal sepsis and other infections
7	Neonatal sepsis and other infections	7	Lower respiratory infections

Note: Institute for Health Metrics and Evaluation (IHME). GBD Compare Data Visualization. Seattle, WA: IHME, University of Washington, 2018. Available from http://vizhub.healthdata.org/gbd-compare. (Accessed [18.03.2019])

mate demographic losses. The number of YPLL is calculated as the sum of the differences of years between the threshold values of the death age and the actual mortality age (before 65) of all persons who died during the year at the younger than the threshold age intervals (under 5).

REVIEW AND DISCUSSION

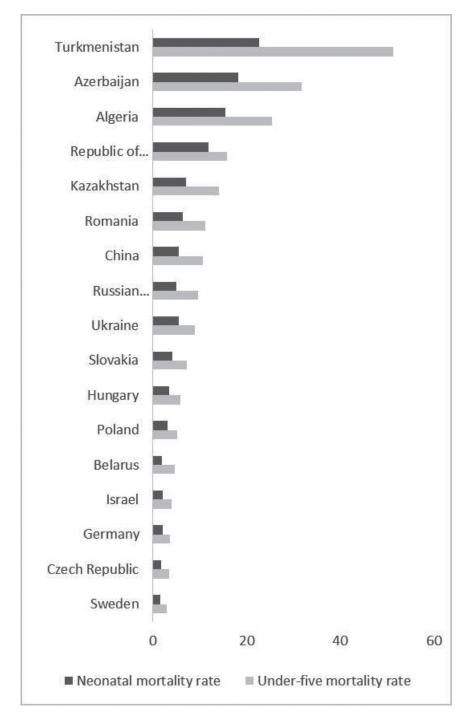
In Ukraine, in 2017, the absolute number of years of potential life lost (YPLL) was estimated to be almost 217,000 person-years due to under-five premature mortality, most of them - more than 179,000 person-years - due to infant mortality. The rest were losses due to mortality within the interval of 1- 4 years - almost 40 thousand person-years.

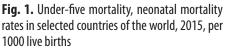
Compared to 2011, a decrease in the absolute number of YPLL due to the mortality of children under one year can be noted (Table I). This is primarily due to the significant decrease in the registered number of infant deaths (up to 2786) owing to the lack of information from the territories of the Autonomous Republic of Crimea annexed by the Russian Federation and part of the Donbass territory outside the control of the government of Ukraine. Given the inaccuracy of statistical information on population size, we did not calculate the per capita YPLL index, but focused on structural changes.

The major part in the structure of losses accounted for the Class "Certain conditions occurring in the perinatal period."

Despite the fact that the majority of losses due to under five infant mortality are under one year deaths, 188 infants aged 1-4 of out 598 died due to external causes. Accordingly, out of all 37,674 person-years of life lost, 11844 occurred due to precisely unnatural causes. This should focus attention of the Ukrainian society on the urgent need to clarify and eliminate the circumstances and conditions that enable such deaths.

Decrease in mortality rates among children under five years of age will illustrate the progress in preventing the loss of life of children from a number of diseases and conditions that can be prevented or treated. Although





Source: WHO World Health Statistics 2016: Monitoring health for the SDGs Last Access: 28.03.2017 https://www.who.int/gho/ publications/world_health_statistics/2016/ Annex_B/en/

Ukraine has relatively low infant mortality rate, and since 2000 it has been decreasing¹, however, its level still does not meet the European average values. (Fig. 1, 2, 3) [5]. For example, almost one-third of deaths between one and five years of age are due to external causes (injuries, poisoning, accidents), that is, those ones deaths from which can be avoided with proper child care.

According to the Institute for Health Metrics and Evaluation, the highest proportion (about 40%) of all years of potential life lost due to under-5 mortality in Ukraine was determined by various conditions of the neonatal period (Table II). Congenital malformations accounted for the next largest contribution (about 22%). It should be noted that in neighboring Poland the significance in the formation of the congenital pathology losses is relatively higher [6]. A certain part of these deaths could have been avoided or prevented in case of proper preparation for conception, adequate supervision during pregnancy and timely diagnosis of pathologies, effective skilled care during childbirth and in the postpartum period.

¹ We emphasize that the data from Donetsk and Luhansk regions are incomplete, and namely Donetsk Region is one of the leaders in the regional ranking with the highest under 1-year child mortality rate.

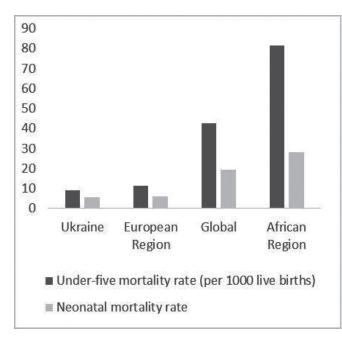


Fig. 2. Under-five mortality, neonatal mortality rates in regions of the world, per 1000 live births

Source: World Health Statistics 2016: http://who.int/entity/gho/ publications/world_health_statistics/2016/en/index.html

Measures aimed at creating behavioral changes at the community level have been recognized as essential for empowering individuals, families and communities in order to promote the health of women and children. Scientifically-based map is the starting point to study the effectiveness of such measures and will allow to identify areas where investments yield better results [7] which is extremely relevant in the context of decentralization in Ukraine. Policy aimed at reducing the risk of premature death is one of the priorities of the Sustainable Development Goals [8,9].

CONCLUSIONS

Certain conditions, occurring in the perinatal period determined 55.6% of all potential life lost in Ukraine in 2017 due to infant mortality. Along with congenital malformations, deformations and chromosomal anomalies, they formed nearly 80% of all losses. A significant part of these deaths could have been avoided or prevented in case of proper preparation for conception, adequate supervision and timely diagnosis during pregnancy, effective skilled care during childbirth and in the postpartum period.

Particular attention should be paid to the prevention of high mortality due to the external causes that can be prevented under proper child care. Upbringing of conscious parenthood is of great importance not only for reducing child mortality, but also for preventing social orphanhood.

Estimation of child mortality losses will help managers and policy makers, scientists and the general public to describe the real situation in the area of mortality, to realize the scope of potential losses of short-lived life, to evaluate the effectiveness of the measures and programs being implemented. At the same time, this is the basis for prognostic conclusions and further strategic planning.

Quantitative estimation of losses is a tool for substantiation of political decisions which provides arguments for prioritizing certain actions towards achieving the Sustainable Development Goals.

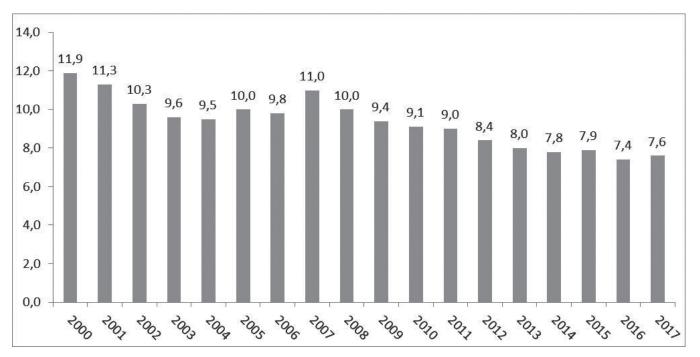


Fig. 3. Child Mortality in Ukraine in 2000-2017 per 1000 live births Source: State Statistics Service of Ukraine

CALCULATION OF LOSS OF CHILD MORTALITY IN UKRAINE AS AN INSTRUMENT FOR ESTIMATION OF ACHIEVEMENTS...

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STRESZCZENIA WYSTĄPIEŃ NA KONFERENCJI / ABSTRACT BOOK ALL-UKRAINIAN SCIENTIFIC AND PRACTICAL TELECONFERENCE WITH INTERNATIONAL PARTICIPATION

"POLTAVA'S DAYS OF PUBLIC HEALTH" MAY 31, 2019, POLTAVA, UKRAINE

MAIN ISSUES OF MEDICAL-SOCIAL EXPERTISE IN REFORMING CONDITIONS

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Introduction: Medico-social expertise lies in the sphere of important human rights, which concern not only medicine, but also rehabilitation, restoration of work capacity and social protection of the disabled. In the conditions of the implementation of the reform of primary medicine, the issue of the activities of the centers of primary health care and directions of the provision of medical care to certain categories of citizens acquires practical significance.

In particular, on current issues of implementation of medical and social expertise and rehabilitation of persons with disabilities in new conditions.

The aim: To study the main issues of medical and social examination in the context of reform, which may cause difficulties for general practitioners.

Materials and methods: Regulatory framework that regulates the implementation of medical and social expertise in Ukraine, disability indicators for 2018 (analytical and informational directory).

Results: On December 3, 2009, the Cabinet of Ministers of Ukraine adopted Resolution Nº1317 «Issues of medical and social expertise». This Resolution approved the «Regulations on medical and social expertise» and «Regulations on the procedure, conditions and criteria for the establishment of disability.»

In accordance with paragraph 17 of the above-mentioned Resolution, «Medical and social examination is carried out after a complete medical examination, carrying out the necessary examinations, assessing the social needs of the disabled, defining the clinical and functional diagnosis.» And according to the Order of the Ministry of Health of 29.07.2016. No. 801 «Regulations on the Center for Primary Health Care and Provisions on its Divisions», Section II of this Order clearly defines the tasks the primary link, namely: item 10) preparation medical documentation for referring persons with signs of persistent disability to medical and social examination and for medical and social rehabilitation; Item 13) continuity and sequence of medical examination, treatment and rehabilitation of patients. The figure for the first time recognized by persons with disabilities for 10 thousand people increased somewhat and amounted to 36.1, and in 2017 - 35.1. Particularly, the indicator of primary disability has increased among military personnel by 15.5% compared to 2017.

Conclusions: Thus, responsibility for the volume, conduct and control of the implementation of measures for the rehabilitation of persons with disabilities, within the limits of their powers, is assigned only to family doctors and the sequence of the medical and social examination and medical and social rehabilitation of persons with disabilities is maintained. Changes in the legislation of Ukraine identified new categories of people affected by events in the east of Ukraine, which requires a more detailed explanation of the norms and procedures for establishing certain statuses and a wider scope of rehabilitation services for family physicians.

KEY WORDS: medical and social examination, legal framework, rehabilitation, family doctors

FEATURES OF THE MODERN PESTICIDES MODES OF ACTION ON THE THYROID GLAND FUNCTIONALITY

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Introduction: A large number of xenobiotics, entering the human body from the environment, may disrupt normal functioning and contribute to the development of various diseases of the thyroid gland. The relevance of our study is confirmed by the joint report of WHO and UN on Feb. 19, 2013 in Geneva and the Report of WHO National Experts in Ukraine, October 15-16, 2018, on the results of negative effects on the people's health of the so-called endocrine disruptors study.

The aim of our work was expert-analytical study of pesticides (as chemical environmental factor) mechanisms of action on the functioning of the thyroid gland.

Materials and methods: For the review we have selected a group of herbicides (triketones, benzoilpyrazole, oxazoles, bicyclooctenones), fungicides (pyrazolecarboxamides), insecticides (tetram and tetraic acids derivatives). The methods of empirical and theoretical research of scientific information, namely analysis, synthesis, induction, deduction and systematization were used. The sources of information were EPA US, EFSA, WHO, IUPAC, research articles on the topic etc.

Results: Pesticides (for example, DDT, amithyol, carbamates and dithiocarbamates classes compounds, including mancozebe metabolite - ethylenethyourea) belong to one of the most studied in terms of adverse effects on the thyroid gland of chemicals. It was found that the effect of studied compounds background concentrations does not have a negative effect on the thyroid gland, while the effect at higher levels, whether professional or incidental, may lead to changes in the thyroid gland.

Numerous studies have shown that chemicals may disrupt the thyroid function at different levels: the central one, breaking the formation or release of thyroid stimulating hormone in pituitary gland; thyroid gland level, acting on the synthesis or secretion of thyroid hormones; peripheral, competing with thyroid hormones during the binding with transport proteins, or through effect on catabolism and excretion of thyroid hormones. The pesticides selected for review influence on the thyroid gland at the peripheral level, interfering with the metabolism of thyroid hormones.

Thus, fungicides-pyrazolecarboxamides, inducing the monooxygenase system enzymes of liver, lead to an increased degradation of thyroxine, an increase synthesis of thyroid stimulating hormone of the pituitary gland in the feedback mechanism, which, in turn, leads to hypertrophy of the thyroid gland.

With inhibition of the 4-HPPD enzyme by herbicides, the main enzyme that catalyzes tyrosine transformation became tyrosine aminotransferase (TAT). Since the reaction with TAT is reverse, the concentration of tyrosine in blood is significantly increased. Tyrosinaemia leads to development of so-called critical effects - eye damages and less pronounced thyroid gland hypertrophy.

Investigated insecticides have a polytropic action on the thyroid gland. They combine the induction of microsomal enzymes with stimulation and subsequent hypertrophy of the thyroid gland and 4-HPPD inhibition with eye damage, which is manifested only in rats. It should be noted that the manifestations of both mechanisms of action are much less pronounced than the corresponding deviations found during the action of the studied fungicides and herbicides.

It is worth noting when extrapolating such results receiving on animals, it is necessary to take into account the peculiarities of metabolic processes and the initial level of thyroid hormones in human and experimental animals organism. For example, rats have a much lower reserve of thyroid hormones, and T₄ half-life in human organism is much longer due to its binding to blood proteins. Also, there is no evidence in the literature that substances that lead to a decrease in the level of thyroid hormones in humans, can increase the number of tumors.

Conclusions: The analysis of pesticides mechanisms of action on the thyroid gland allowed to establish two main ways of its hypertrophy development: 1) inhibition of hydroxypyruvate transformation, and 2) activation of the monooxygenase system in the liver. The obtained data should be taken into account when substantiating the possibility of these pesticides application on territories with radiation load or industrial regions that are subject to additional chemical contamination.

KEY WORDS: pesticides, thyroid gland, expert-analytical study.

ON THE ISSUE OF ENSURING THE INFORMATION NEEDS OF THE PUBLIC HEALTH SYSTEM OF UKRAINE

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Introduction: Modern healthcare Ukraine needs a science-base, well-established system of information provision. Qualitative information is the main tool in the development of management decisions. Also, properly collected and analyzed information will allow international comparisons of indicators, to determine priorities in the policy of preserving public health, to predict the further development of the situation in public health and health care, depending on the measures taken.

The aim: The aim of the work is to analyze the information needs in the period of development of the public health system of Ukraine.

Materials and methods: To achieve this goal, literary sources, regulatory framework, accounting and reporting forms of medical institutions were analyzed. Used library and method of system analysis.

Results: The development of a public health system is a process of reorientation from treatment policies to policies that promote and maintain public health. In this aspect the need of the system for information should be considered. From the point of view of information management, it is important to clear understand what information on the content is needed, what category of consumers it is needed and in which lines and in what form it is needed.

The producers of the information product should be, first of all, medical institutions, regardless of ownership. Participants of information exchange should become not only medical institutions, but also partner organizations. Consumers of the information product are divided into macro, regional and micro levels. Consumers of the information product are divided into macro, regional and micro levels. Information needs vary depending on the level of decision making.

The strategic goal of building a model of an information and analytical system is to provide consumers with timely, reliable, "just in time" information; constant improvement of the quality of statistical information and alignment of data processing methods with international requirements.

Conclusions: There is an objective need to modernize the information and analytical health system. Ignoring the methodological approaches to data analysis leads to the receipt of unreliable, distorted data, to the adoption of erroneous management decisions that are not able to improve the results of the system.

KEY WORDS: public health, medical information, management

EVALUATION OF THE MEDICAL STUDENTS' BASIC LIFE REGIMEN COMPOUNDS

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Introduction: Healthy lifestyle provides for good health and longevity. It is only complex approach which permits to predict the effect of healthy lifestyle on the health of the youth, to study and implement all possible ways of the alimentary and alimentary-dependent diseases primary prevention. Rational nutrition, healthy habits and regular physical activity make up the necessary and indispensable component of the healthy lifestyle. Healthy lifestyle promotion and interaction with society groups regarding choice and correction of the alimentary behavior, smoking, alcohol intake and physical activity are the main ones in professional activity of future physicians. The risks for the modern human's health are related to neglecting healthy lifestyle bases.

The aim: Evaluation of the medical students' lifestyle basic compounds in order to ground the primary alimentary-dependent diseases prevention.

Materials and methods: the authors surveyed the 0. Bogomolets National medical university students of the 2nd, 4th and 6th study years, using the questionnaire, and analyzed the obtained data on the medical students' diet and dietary regimen, life and work conditions, including the unhealthy habits. The study includes the data of 858 respondents, aged 18-25 years, 570 females and 288 males.

Results: The conducted evaluation and further analysis of the frequency and daily average consumption of the basic food products in the medical students' food ratio shows that more than 70% of the ratios don't correspond to the national recommendations on the people nutrition. The authors have revealed that 50% of the respondents are characterized with disordered nutritional regimen: they don't consume the food within the basic daily schedule, the speed of food consumption and amount of courses are decreased, intervals between the food consumption are high, distribution of the consumed food volume is irregular. It has been established that the unhealthy habits (smoking and alcohol intake) are characteristic for one third of all respondents, though a tendency towards decrease of smokers is observed, dependent on the increase of the students' study year. The study has revealed that only one third of the respondents with disordered nutrition and unhealthy habits undergo adequate physical loading.

Conclusions: The received results dwell on the necessity of the aimed personal correction of the medical students' lifestyle compounds correction. These data will be implemented in the education of medical students.

KEY WORDS: medical student, diet scheme, bad habits, diet.

ABILITY OF PARENTS OF CHILDREN OF SCHOOL AGE ON PERSONAL FAILURE OF THE DENTAL-JAW SYSTEM

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Introduction: The problem of providing orthodontic care remains relevant due to the significant prevalence of dental anomalies (an average of 53.5%), large material costs for the treatment of already formed pathology, an increase in the cost of medical care with the advent of new technologies in the context of insufficient budget financing. **The aim:** To analyze the results of questionnaires of schoolchildren's parents residing in the city of Poltava concerning knowledge of disorders of the dental-jaw system (orthodontic pathology) and risk factors for its occurrence.

Materials and methods: Sociological (questionnaire), medical-statistical, bibliosemantic. The analysis of 408 questionnaires filled with parents of school-age children living in Poltava city. Results: An important step in early detection of violations of the tooth-jaw system in children is the alertness of parents about their occurrence. As parents are better informed about dental anomalies, the sooner they will take the child to a doctor's consultation, and the more likely they will be in favor of prevention or treatment. Therefore, when we interviewed parents we aimed not only to study the state of their awareness, but also to inform them about the possible presence of this pathology in a child and the factors that can induce her.

To the question "Did you know that such an orthodontic pathology", 164 answered "yes" ($40.4\% \pm 4.5$), but only $45 (11.1\% \pm 2.1)$ could accurately explain. The fact that breastfeeding prevents orthodontic pathology was known only by 207 ($51,0 \pm 5,9\%$) respondents, but the majority indicated that the use of an abscess was a harmful factor for a child, not focusing on orthodontic pathology - $374 (92.1 \pm 8.9\%)$. The answers were divided almost equally on the question of the importance of heredity in the formation of tooth-jaw abnormalities: 209 ($51,5 \pm 5,9\%$) were answered "yes". It is important to give the child as early as possible a consultation of a dentist-pediatrician with 147 ($36,2 \pm 3,8\%$) parents. **Conclusions:** Thus, the questionnaire of parents showed a low level of knowledge about violations of the dental-jaw system (orthodontic pathology) and risk factors for their occurrence. Only a third part of parents understand the importance of early consultation at a pediatric dentist. The data of sociological research demonstrate how important it is to conduct high-quality sanitary and educational work among parents.

KEY WORDS: awareness of parents, violation of tooth-jaw system.

PSYCHOMETRIC SCREENING OF THE "NON-EXISTENT ANIMAL" PROJECT METHOD RESULTS

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Introduction: The popularity of designing methodologies has being growing recently since them less disposed to falsify data from the subjects than interviewers can. Its aim is hidden so the testee cannot guess the interpretation methods of diagnostics markers and its connection with the different personality demonstration. The methodology called "The Picture of Non-existent Animal" is used very often for personality examination. The group of psychologists performed "psychological qualification of methodology" in 2004. The particular features of non-existent animal related to some psychological characteristics, were joint into eight symptom-complexes. The picture interpretation was like details rendering according to the specific catalogue. There is a problem of designing methodologies standardization. First, they are characterized by the qualitative approach of personality examination, but not the quantitative one. Some methodologies have no mathematical tool to process data results.

The aim: Creation of a computer software application to object and standardize the picture analysis and interpretation.

Materials and methods: The picture of "Non-existent Animal" methodology was represented according to the standards. The picture was estimated by the 141 indicators (the picture moved above, moved down, picture moved to the right, a big picture, full-page image, a small picture in the lower angle of the page), the position of the picture to the page were connected into 34 groups (the location of the picture in the page, the size of picture, the character of the lines, the representation of the head, eyes etc.). Each feature is converted into the particular amount of the points depending on the characteristic degree. The emotional and personal sphere was estimated integrally in points by 11 scales: anxiety, scares; aggression, auto-aggression; active defense; passive defense; asthenization, depression; hysteroid demonstrative actions; infantilism; introversion, scare of active actions; the high social adaptation; rationality; extraversion.

Results: The psychological symptoms of dominative scales need the correction first. The psychometrical screening was designed to the psychoemotional status evaluation of the mentally healthy people. It can be included into the complex examination of patients in the hospital of internal diseases alongside with "State of health, Activity, Temper" (SAT) methodology, especially when the pathology has the psychosomatic direction. The quantitative approach in psychoemotional sphere estimating gives us an opportunity to estimate the psychological status in dynamics, before and after the treatment for example. While examining a picture the psychologists avoid the psychologist's fallacy of individual data interpretation thanks to their "clinical experience". Usually there is no need to diagnose many patients and examination of their pictures. In case of patients' personal characteristics estimation, as examining dehelminitization effectiveness (especially enterobiasis) of the organized collective members, there is need to process many pictures. It is easy to perform if using a software application.

The suggested software application for results processing allows using the methodology "Picture of Non-existent Animal" by not only the psychologists, but also family doctors, pediatricians, obstetrician-gynecologists as well. Specialists noted the objectivity and easiness to use of this additional psychological tool. It is in progress of implementation into academic institutions nowadays.

Conclusions: 1.The digital approach to evaluation of the designing methodology "The Picture of Non-existent Animal" gives the opportunity to examine quantitatively the psychoemotional status of the patient, also in dynamics if needed. 2. The screening methodologies can be implemented widely in Health-Care institutions and Education and Training centers, even if there is no a salaried psychologist. 3. The timely revealation of psychoemotional abnormalities and its naturopathic correction are the preventive vectors for the psychosomatic diseases.

KEY WORDS: psychoemotional status, designing methodologies, aggression, asthenization, introversion.

THE STUDY OF AWARENESS OF SMOKING AS SOCIALLY NEGATIVE FACTOR AMONG POLTAVA CITIZENS

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Introduction: The topic of smoking is currently the leading place in research and discussion. Taking into account that Ukraine is the leader among the European countries in mortality from non-infectious diseases (cardiovascular, oncological, respiratory diseases, diabetes) - as much as 86% of all deaths. Tobacco is one of the leading risk factors for non-infectious diseases.

The aim: To study the awareness of the population of Poltava about the effects of smoking, with the further development of effective preventive measures depending on the age of people and the frequency of smoking.

Materials and methods: Based on the medical-statistical method of research, as well as a survey and questionnaire survey among the city's population, we analyzed 400 questionnaires.

Results: 88% of the respondents are persistent smokers, among them 48% of men and 40% of women, 12% - do not smoke at all. 47% of the respondents first tried to smoke at the age of 10-20 years, 13% - 20-30 years, 18% - 30-40%, 15% - 40-50%, 5% - 50-60%, and 3% over the age of 60 years. In addition, the reason for trying to smoke at 36% was the desire to appear to adults, 28% - personal drama, 26% - simple curiosity, 10% - an example of smoking parents. In the first place among the effects of smoking, which people have indicated is lung cancer - 100% of the respondents, among other responses were also: breathing problems, yellowing of the skin, dizziness, insomnia. **Conclusions:** The main emphasis in preventive work is to be done on the age group of 10-20 years. It is important to use the various format of work with the audience, including the work of psychologists, in the sanitary-educational work. Also, during thematic events to focus attention and increase awareness of people about the possible other consequences of tobacco smoking: chronic bronchitis, COPD, and others.

KEY WORDS: Smoking, chronic bronchitis, COPD, preventive measures.

CHARACTERISTIC OF THE BIOLOGICAL VALUE OF FATTY ACIDS IN GOAT CHEESES

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Introduction: There are trends in the consumption of healthy and healthy foods, in particular, to sour milk goat cheese in Ukraine

The aim: To carry out the comparison of goat cheeses chemical composition and substantiate biological value based on its fat content, to perform experimental tests of the fatty acid composition in soft goat cheeses, to describe beneficial microflora of goat cheeses, to draw a conclusions on the effect of tested products quantitative fat content on nutritional and biological value, to prove purposefulness of goat cheese consumption as a preferred choice in human diet.

Materials and methods: Soft goat cheeses: homemade goat cheese with 20% fat content (Ukraine) and goat cheeses with 13% fat content – Chavroux (France) and Doobryi Syr (Ukraine).

We evaluated the chemical composition (proteins, fats, carbohydrates) and the content of amino acids, minerals, and vitamins (according to the chemical composition tables). We performed the analysis of goat cheese microflora (Medical academy, Paris). We studied the fatty-acid composition of lipids for three kinds of cheese (5 samples for each kind) at the NMU laboratory using chromatography.

Results: The measurement of essential amino acids content in the mentioned cheeses showed both high proteins content in goat cheeses among dairy products, and high essential amino acids content, which pointed out its high nutritional and biological value.

Determination of the soft goat cheeses fatty-acid profile demonstrated that saturated fatty acids content (SFAs) is higher in the lipids of cheese having fat content at a level of 20% and makes up to 49,0±2,0 g/100 g of lipids, meanwhile for 13% (France) – 40,3±0,8, 13% (Ukraine) – 39,2±1,0, respectively. Monounsaturated fatty acids content (MUFAs) is higher in the lipids of cheese with 13% fat content, respectively: France – by 17% (20,3±1,4 g/100 g of lipids), Ukraine – by 7% (22,8±1,6 g/100 g of lipids), versus the cheese with 20% fat content (24,9±1,8 g/100 g of lipids).

The level of essential polyunsaturated fatty acids (PUFAs) is also higher in the lipids of cheeses with 13% fat content and for cheese with a fat content of 13% (France) is $39,4\pm1,4$ g/100 g of lipids, at 13% (Ukraine) – $38,0\pm1,3$, in comparison with 20% fat ($26,6\pm1,9$).

In terms of biological value the ω -3/ ω -6 ratio offers more optimal rates for cheeses with 13% fat content.

The proportions among SFAs, MUFAs and PUFAs in cheese with 20% fat content showed representative results for fatty dairy products, namely 1:0.5:0.5.

The proportions among SFAs, MUFAs and PUFAs in goat cheeses with 13% fat content may be equal to ideal fat, namely 0.96 and 0.97.

Conclusions: 1. Goat cheeses contain high biological value protein. 2. Fats in goat cheeses with 13% fat content have higher biological value due to essential PUFAs content. 3. Goat cheese is a source of Ca, K, Mg, Fe and Zn, as well as D, A, E, C, B vitamins. 4. Goat cheeses (13%) have a particular composition of healthy microflora, high bioavailability of Ca due to low F content and high vitamin D content.

Therefore, soft goat cheeses (13%) may be recommended as a part of human nutrition; diversifying goat cheese range and improving the culture of its consumption may be considered as an area for development.

KEY WORDS: goat cheeses, biological value, fatty acid, essential PUFAs, healthy microflora.

HEALTHCARE SYSTEM AND APPROACHES TO ITS ANALYSIS

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Introduction: An ideal healthcare system, on the one hand, ensures a balance between efficiency and fairness and, on the other hand, it provides such an organization that ensures the optimal use of limited resources.

The aim: The most important precondition for the successful achievement of public policy goals in healthcare reform is *the development of human resources*. Upgrading the quality of human resources refers to the growth of labour market efficiency, improvement of education and training, poverty alleviation and creation of a better healthcare system. The state must play an important and comprehensive role in solving all of the mentioned problems.

Materials and methods: In recent decades, various alternative models have been used to analyze healthcare systems. One of the approaches, proposed by Romer and some other scientists, describes and compares the national healthcare systems in many countries worldwide. It determines healthcare systems through resource indicators, in particular the number of hospital beds, healthcare workers, and the specific features of government programs, along with some performance indicators (morbidity, mortality and average life expectancy).

The second approach to analyzing a healthcare system is focused on the sources of financial resources. In the early '90s, J. Hurst studied healthcare systems from the perspective of inflow of financial resources and methods of payment for medical services between communities and medical institutions. He considers the healthcare system as a closed system where the scope of medical services corresponds to financial inflows.

The market for medical services stimulates *the development of the market for sickness insurance* and creates incentives that manage production – from modern medical technologies to new medications and equipment. At the same time it is necessary to take into account the significant impact of supply on demand and behaviour of patients. **Results:** There is no unified set of strategies that would guarantee a successful implementation of healthcare reform because too many variables should be taken into account. However, there are a number of common strategies that are successfully applied in reforming healthcare in many countries.

Conclusions: Based on such understanding of a reform as a process, the approach to the reform in the healthcare sector includes the following important elements:

- the cycle of transformation policy and identification of key tasks that have to be solved at each stage of such process;
- a set of intermediate and final goals of the healthcare system, which can serve as criteria for assessing the activity of the system;
- a systematic approach to the methodology of studying healthcare system problems that can teach to work effectively and is based on the idea of working a contrario: from certain problems in the activities to their causes.

KEY WORDS: healthcare, market for sickness insurance, the development of human resources, through resource indicators, is focused on the sources of financial resources.

CARDIOVASCULAR DISEASES AS A MEDICAL AND SOCIAL PROBLEM

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Introduction: Diseases of the circulatory system in Ukraine occupy a leading place among the causes of death. The main diseases of the cardiovascular system are coronary heart disease, myocardial infarction and hypertension.

The aim: The purpose of our work is to analyze the dynamics of morbidity indicators of the population of Ukraine of cardiovascular diseases and their causes.

Materials and methods: Medico-statistical, systems approach and systems analysis.

Results: In recent years, the incidence of cardiovascular diseases in the population of Ukraine at a high level. Cardiovascular diseases are the main cause of mortality in Ukraine. The main causes of cardiovascular diseases include smoking, lack of physical activity, unhealthy diet and excessive alcohol consumption. To reduce the incidence of cardiovascular pathology, it is necessary first of all to strengthen the job of primary and secondary prophylaxis, to strengthen s the job for the systematic training of specialists. It is necessary to ensure sufficient funding for the purchase of modern medical equipment and medical products.

Conclusions: Cardiovascular diseases are a major medical and social problem, which requires government intervention at the level of central and local authorities. It is necessary to improve prevention, provide medical facilities with modern medical and diagnostic equipment.

KEY WORDS: cardiovascular diseases, medical assistance, morbidity.