

## ORIGINAL ARTICLE

## RELATIONSHIP BETWEEN CERVICAL CANCER AND THE LEVEL OF PREVENTIVE ONCOLOGICAL EXAMINATIONS

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**Vyacheslav M. Zhdan, Iryna A. Holovanova, Orest Ya. Vovk, Maksym V. Korosh**

POLTAVA STATE MEDICAL UNIVERSITY, POLTAVA, UKRAINE

### ABSTRACT

**The aim:** Of this study is to determine the relationship between the development of cervical cancer and the level of conducting of preventive oncological examinations. To identify risk factors of cervical cancer, we considered seven prognostic variables, that are associated with the development of cervical cancer.

**Materials and methods:** We conducted a survey of 120 women, among them 40 (33.3%) women had a confirmed diagnosis of cervical cancer, and 80 (66.7%) women were healthy.

**Results:** We find, that factors that increase risk of cervical cancer is age after 40 years increases the chances of cervical cancer by 14 times; untimely medical examinations increase by 5.4 times; the number of sexual partners, more than 4 - in 6 times.

**Conclusions:** A comprehensive medical and social study has established a reliable relationship between the development of cervical cancer and the level of preventive cancer examinations.

**KEY WORDS:** oncological pathology, cervical cancer, risk factors, diagnostic, prevention

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### INTRODUCTION

Oncological diseases is one of the leading causes of morbidity and mortality in whole world. There is about 14 million new cases and 8.2 million cancer-related deaths per year [1]. Cancer is one of the most serious diseases that changes the whole life schedule not only of the patient, but also of the whole family. This pathology requires close attention, significant physical and emotional efforts of the patient, economic costs on the part of the patient and his family, vigilance of health care workers and society as a whole [2, 3].

World Health Organisation (WHO) and the International Agency for Research on Cancer (IARC), the specialized cancer research agency of WHO, work with other United Nations agencies and partners to achieve a number of goals: strengthening of the political commitments in the field of cancer prevention and control; coordination and conduction of the research in the field of the causes of human cancer and the mechanisms of oncogenesis; cancer burden monitoring (as part of the work of the Global Cancer Initiative); developing of the scientific strategies for cancer prevention and control; accumulation of new and dissemination of existing knowledge that contributes to the application of evidence-based approaches in the fight against cancer; developing standards and tools to manage the planning and implementation of measures in the field of prevention, early detection, treatment and medical care; promotion of the development of extensive networks of partners and experts in the field of cancer at the global, regional and national levels; strengthening the health care

system at the national and local levels to provide treatment and care for cancer patients; providing of the technical assistance for the rapid and effective transfer of best practice measures to developing countries [4, 5, 6].

One of the important problems of oncological care is the significant level of neglect of a large number of cancer cases. This situation is due to the lack of vigilance of the population to the oncological diseases, neglect of preventive examinations, too late detection of the disease, as well as insufficient awareness of the possibilities of prevention and healthy living [7].

Cervical cancer is one of the most common forms of malignant neoplasms of the female genitalia. About 500,000 patients with cervical cancer are diagnosed worldwide annually, which is about 5% of all cases of oncological diseases. In Ukraine, according to the National Cancer Registry, the incidence of cervical cancer in 2015 was 21.4 and in 2016 - 20.0 per 100 thousand population.

In the structure of oncogynecological morbidity of the female population of Ukraine, cervical cancer ranks 2nd, and the highest rates are observed in the age groups 18–29 years (13.5%) and 30–54 years (12.9%), ie women of reproductive age. Mortality in result of cervical cancer in Ukraine is 8.8 per 100 thousand population. In women of reproductive age, it is the second most common cause of death from malignant neoplasms, reaching 14.5% in the age group of 18–29 years and 13.8% in the age group of 30–54 years [8], which defines cervical cancer not only as a medical but also as an important social problem [9].

**Table I.** Definitions and ranks of prognostic variables associated with cervical cancer

Prognostic variables	Definitions and ranks
Age (41 and older)	1 – Yes, 0 – No
Working conditions (difficult)	1 – Yes, 0 – No
Preventive examination (was not more than 5 years)	1 – Yes, 0 – No
Beginning of menarche (14-18 years)	1 – Yes, 0 – No
Beginning of sexual life (15-17 years)	1 – Yes, 0 – No
Number of sexual partners (4 and more)	1 – Yes, 0 – No
Place of residence (rural)	1 – Yes, 0 – No

Currently, cervical cancer remains one of the most pressing problems and one of the most common tumors of the female genitalia. According to world statistics, cervical cancer ranks 2-3rd in the structure of oncogynecological diseases in different countries, giving way only to breast cancer and uterine cancer. Significant variability in cervical cancer morbidity and mortality is due to the availability of national cervical screening programs in different countries and the size of their coverage of the female population. Thus, according to WHO recommendations, to ensure the effectiveness of any screening program, the coverage of the population should be at least 80%.

The main features of cervical cancer at present are:

- «Rejuvenation of the age of the disease», which is associated with an earlier onset of sexual activity;
- the proportion of adenocarcinoma in the structure of cervical cancer up to 20%;
- increasing in morbidity among women over 55 years.

## THE AIM

The purpose of this study is to determine the relationship between the development of cervical cancer and the level of conducting of preventive oncological examinations.

## MATERIALS AND METHODS

To achieve the goal of the study the results of the sociological survey were analyzed: special respondent's survey cards were taken into account. We conducted a survey of 120 women, among them 40 (33.3%) women had a confirmed diagnosis of cervical cancer, and 80 (66.7%) women were healthy. Determination of risk factors was performed by the odds ratio method.

To identify risk factors of cervical cancer, we considered seven prognostic variables, that are associated with the development of cervical cancer. (Table I).

At the same time, we calculated the odds ratio (OR), 95% confidence interval (95% CI) and the coefficient  $\beta$ , which describes the change in the risk of developing the disease when a certain risk factor changes by one.

## RESULTS

After compiling of the conjugation tables, it was found that under the age of 40 years there were 36 (30%) women

and in age over 40 years - 84 (70%) women. Regarding the distribution according to the presence of cervical cancer, it was determined that 2 (1.7%) women under the age of 40 suffered from cervical cancer, and 38 (31.7%) women were older than 40 years. Among those who did not undergo a preventive examination for 5 years or more, 31 (25.8%) cases of cervical cancer were detected, and among those who underwent it on time - 9 (7.5%) cases. According to the beginning of menarche it is established, that cervical cancer was present in 35 (29.2%) women in whom menarche began at the age of 10-13 years, and among those in whom the onset of menarche occurred at the age over 13 years, 5 (4.2%) cases of the disease were detected. Women who indicated that onset of sexual activity began at age 15-17 had 14 (11.7%) cases of cervical cancer, and those who began onset of sexual life at age 18 and older had 26 (21.7%) cases. Depending on the number of sexual partners, cervical cancer was found in 8 (6.7%) women who had no more than 3 sexual partners, and in those who had 4 or more partners - 32 (26.7%) cases. Depending on the place of residence, cervical cancer was observed in 15 (12.5%) women from the city and in 25 (20.8%) from rural areas. The full distribution of respondents and of risk factors by groups is given in table (Table II).

In determining the risk factors that affect the occurrence of cervical cancer, we used the method of odds ratio (Table III).

Predictors of cervical cancer, which were included in the study, were divided into the following groups:

- 1) medical and demographic: age, place of residence;
- 2) organizational and medical: preventive examination;
- 3) biological and medical: beginning of menarche;
- 4) social: working conditions;
- 5) behavioral: beginning of sexual life, number of sexual partners.

Among medical and demographic factors, age after 40 years increases the chances of cervical cancer by 14 times OR - 14,043 (95% CI 3,167 - 62,275) ( $p < 0.001$ ). Among the organizational and medical factors, untimely medical examinations increase the chances of cervical cancer by 5,4 times: OR - 5,44 (95% CI 2,286 - 12,967) ( $p < 0.001$ ). Among the behavioral risk factors, a significant factor was the number of sexual partners, of which there were more than 4. In this case, the risk of cervical cancer increases in 6 times: OR - 6,00 (95% CI 2,453 - 14,678) ( $p < 0.001$ ).

Thus, one of the important risk factors that affects the detection of cervical cancer is the timely completion of preventive medical examinations by women.

**Table II.** Distribution of women according to risk factors of cervical cancer

	Research group (n=40) n(33,3%)	Comparison group (n=80) n(66,7%)
Age (up to 40 years)	2 (1,7)	34 (28,3)
Age (41 and older)	38 (31,7)	46 (38,3)
Preventive examination (in time or less than 5 years ago)	9 (7,5)	49 (40,8)
Preventive examination (more than 5 years ago)	31 (25,8)	31 (25,8)
Beginning of menarche (10 – 13 years)	35(29,2)	73 (60,8)
Beginning of menarche (14-18 years)	5 (4,2)	7 (5,8)
Beginning of sexual life (at 15-17 years)	14 (11,7)	21 (17,5)
Beginning of sexual life (at 18 and older)	26 (21,7)	59 (49,2)
Number of sexual partners (3 or less)	8 (6,7)	48 (40,0)
Number of sexual partners (4 and more)	32 (26,7)	32 (26,7)
Place of residence (urban area)	15 (12,5)	26 (21,7)
Place of residence (rural area)	25 (20,8)	54 (45,0)

**Table III.** Risk factors associated with cervical cancer

Risk factors	Research group (n=40) n(33,3%)	Comparison group (n=80) n(66,7%)	OR (95%CI)	p
Age (41 and older)	38 (45,2)	46 (54,8)	14,043 (3,167-62,275)	<0.0001
working conditions (hard)	8 (38,1)	13 (61,9)	1,288 (0,485-3,420)	0,393
Preventive examination (more than 5 years ago)	31 (38,8)	31 (77,5)	5,44 (2,286-12,967)	<0.0001
Beginning of menarche (14-18 years)	5 (12,5)	7 (8,8)	1,490 (0,441-5,028)	0,364
Beginning of sexual life (at 18 and older)	14 (35,0)	21 (26,3)	0,661 (0,292-1,499)	0,216
Number of sexual partners (4 and more)	32 (80,0)	32 (33,3)	6,00 (2,453-14,678)	<0.0001
Place of residence (rural area)	25 (62,5)	54 (67,5)	0,802 (0,363-1,773)	0,365

## DISCUSSION

In Ukraine, according to the National Cancer Registry, in the structure of oncogynecological morbidity of the female population, cervical cancer ranks 2nd position, and the highest rates are observed in the age groups 18-29 years (13.5%) and 30-54 years (12.9%), ie women of reproductive age, which defines cervical cancer not only as a medical but also an important social problem. In 17.4% of patients, cervical cancer is detected in the III-IV stages, and more than 15% of patients do not live for a year from the moment of diagnosis. The level of mortality in cause of cervical cancer in Ukraine is 8.8 per 100 thousand population. In women of reproductive age, cervical cancer is the second most common cause of death among all malignant neoplasms, reaching 14.5% in the age group of 18-29 years and 13.8% - 30-54 years. [10, 11, 12]. About 40% of patients with cervical cancer die in the coming years after primary treatment, mainly due to the development of local recurrences and isolated

metastases [13]. Recurrences in a significant number of patients with cervical cancer occur within the first two years after treatment and are localized mainly in the pelvic area [15, 16].

First of all, in diagnostic of cervical cancer, used examination of the genital tract in mirrors, vaginal and rectovaginal bimanual examination, cytological examination [17, 18]. Colposcopy allows to identify the area of atypia and perform a targeted biopsy of the suspicious area, and if necessary, allows cervicoscopy and scraping of the mucous membrane of the cervical canal [19]. The diagnosis of cervical cancer is established by histological examination of cervical tissue obtained by biopsy, scraping of the cervical canal or conization. In 85-90% of cases, cervical cancer develops in the ectocervix and the transition zone, so it is available for visual and invasive diagnostic methods, but in 10-15% it is localized in the endocervix, resulting in inaccessibility during gynecological examination, which complicates its detection in the early stages. Determination

of tumor markers in cervical cancer has low sensitivity and specificity, and therefore is not included in the standard examination program [20].

The stage of cervical cancer is the most important factor that determines the tactics of treatment and prognosis. Underestimation of the spread of the tumor process inevitably leads to the wrong choice of treatment tactics and unsatisfactory treatment results. The stage of cervical cancer is determined according to the International Classification of Cancer (ICD-O C-53), the classifications of the International Federation of Gynecologists and Obstetricians (FIGO) and TNM. Cervical cancer is the only one of malignant diseases of the reproductive organs in women, which is staged only by clinical examination [21].

Speaking about the risk factors of cervical cancer, it is known that the relationship between the risk of cervical cancer and sexual behavior is in good agreement with epidemiological data obtained in independent studies using various methods of analysis. This relationship is determined by two critical factors: age of first sexual intercourse and the number of sexual partners during life, in addition, the number of sexual partners seems to have a greater impact on the risk of disease [22].

Long-term observations of K. Syrjanen et al. for women infected with human papillomavirus (HPV), allowed to conclude that the HPV infection is a sexually transmitted disease and can be considered a risk factor for cervical cancer. It has also been determined that virus-transformed cells of the cervical epithelium are more likely to cause cervical cancer if timely efforts are not made to treat precancerous conditions. Predictions of oncogenic transformation in virus infection probably depend on the type of virus and the physical state of its DNA (ie, whether or not the integration of the virus genome into the cellular genome). Tumor transformation is more likely to occur when HPV interacts with other carcinogens or infectious agents. According to the results of 4-year observations, papillomavirus infection in 15-20% of cases ends with one or another oncological pathology of the genital area [23].

Smoking is a separate risk factor for cervical cancer. Earlier, researchers found that the number of smokers among patients with cervical cancer was much higher than among control subjects. The independent role of smoking in the risk of cervical cancer has been found in studies that attempted to track the relationship between the age of first sexual intercourse and the number of sexual partners. Most studies have been conducted in developed countries, where the incidence of cervical cancer is either low or medium, and the prevalence of smoking among women is relatively high. Confirmation that smoking is an etiological cause of cervical cancer stems from the fact that, of the 33 epidemiological researches conducted to study this relationship, only seven have found no evidence to support this.

The role of oral contraceptives in the development of cervical cancer is also debatable, as early studies have shown an increased risk of cervical cancer among those who use this method of contraception. Relatively recent studies, however, have shown that the increased risk of

disease occurs mainly with long-term use of birth control pills. As a result of research, conducted in Latin American countries, it was found that the use of oral contraceptives leads mainly to an increased risk of adenocarcinoma [24].

## CONCLUSIONS

A comprehensive medical and social study has established a reliable relationship between the development of cervical cancer and the level of preventive cancer examinations.

As a result of the analysis of the data received at interrogation of women we have defined the risk factors associated with cervical cancer:

- medical and demographic factor: age after 40 years increases the chances of cervical cancer by 14 times ( $p < 0.001$ ).
- organizational and medical factor: untimely medical examinations increase the chances of cervical cancer by 5.4 times: OR - 5.44 (95% CI 2.286 - 12.967) ( $p < 0.001$ ).
- behavioral factor: significant factor was the number of sexual partners, of which there were more than 4 ( $p < 0.001$ ).

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#### ORCID and contributionship:

Vyacheslav M. Zhdan: 0000-0002-4633-5477<sup>E, F</sup>

Irina A. Holovanova: 0000-0002-8114-8319<sup>A, E</sup>

Orest Ya. Vovk: 0000-0003-4364-5493<sup>B, C, D</sup>

Maksym V. Korosh: 0000-0002-2083-1333<sup>C, D</sup>

#### Conflict of interest:

*The Author declare no conflict of interest.*

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#### CORRESPONDING AUTHOR

**Maksym V. Korosh**

Poltava State Medical University

23 Shevchenko st., 36024 Poltava, Ukraine

tel: +380965387040

e-mail: indarion0@gmail.com

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