ORIGINAL ARTICLE

INTELLECTUAL DISABILITIES IN PRESCHOOLERS: MENTAL HEALTH DETERMINANTS DURING THE PERINATAL PERIOD OF DEVELOPMENT

DOI: 10.36740/WLek202111115

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ABSTRACT

The aim: The aim of the study is to identify correlations between mental health indicators for preschoolers with intellectual disabilities and specifics of their prenatal, natal and postnatal development.

Materials and methods: Analysis of special medical, psychological and pedagogical literature; comparison and systematization of research material to determine mental health indicators for preschoolers with mild and moderate degrees of intellectual disability; mathematical methods of statistics.

Results: Empirical research, delineating formation of mental health indicators for senior preschoolers with intellectual disabilities, specified in low level of formation of both criteria, has been conducted. In general, we can conclude that the formation of mental health against the background of intellectual disability of preschool children is associated with low levels of self-awareness as a member of a social group; below age expectations' ability to perceive self and produce information about themselves, their preferences and meaningful adults; inability to adhere to social norms and values in behavior; high levels of anxiety; aggressive tendencies; lack of independence; helplessness concerning helping others; expectation of help from adults; content inappropriate emotional outbursts accompanied by frequent mood swings; and desire for solitude.

Conclusions: The obtained results confirm the conditionality of intellectual disability on negative factors in the perinatal period of development and strong correlation with mental disorders. It is important to correctly diagnose the existing manifestations of comorbid mental health disorders at preschool age and earlier, in order to implement appropriate measures for intervention and development.

KEY WORDS: mental health, preschool age, intellectual disability, neurodevelopmental disorders, comorbidity

Wiad Lek. 2021;74(11 p.I):2768-2773

INTRODUCTION

Mental health of children with neurodevelopmental disorders continues to present an acute problem. In modern publications, the interpretation of mental health of an individual is limited to successful performance of psychological functions resulting in productive activity, establishing relationships with other people, ability to adjust to changes and cope with adverse life circumstances [1]. The issues of mental health in toddlers and preschoolers with impaired development have been critical for a long time for both scientists and practitioners [2-4].

Research on the selected subject confirms and complements the data on conditional mental health of intellectually disabled children (IDC). Recent studies have concluded that there are three most common categories of mental disorders comorbid with intellectual developmental disorder (IDD): hyperkinesis (ADHD), anxiety disorders, and conduct and externalizing disorders [4].

According to the results of the systematic(psychological/pharmacological) review of mental health problems in children (and adults) with severe intellectual impairments, mental and behavioral disorders and their key symptoms were classified as follows: attention deficit disorders, tic disorders, mood disorders, anxiety disorders, somatoform disorders, dissociative disorders, eating disorders, adaptation disorders [5]. The authors emphasize that ways in which behavior and behavioral problems may be associated with mental disorders or indicate them are complex.

Coexistence of mental disorders with intellectual disability in children aged 3 to 18 years is described in literature [6]. Research on the integration of social, psychological, and genetic influences on children's intellectual disabilities and their impact on parental mental health [7] has proved that the indicators of parental physical health are an important predictor of mental health of children.

However, these studies were conducted on a different methodological basis, whereas the issue of preschoolers' mental health has been left out of consideration. Their psycho-neurophysiology is characterized primarily by deficits in higher cortical functions, inertia of mental processes, underdevelopment of higher-level cognition with pronounced persistent deficits in abstract thinking,

processes of generalization and distraction [8]. Extremely vulnerable in this aspect is the age category of preschoolers, as during this period development arrives to an important crossroads for personality and social skills development. Psychological well-being is one of primary objectives of developmental and educational work with children of the presented nosological group [9-12].

THE AIM

The aim of this study is to determine correlation between mental health indicators of preschoolers with intellectual disabilities and distinguishing features of the prenatal, natal and postnatal stages of their development.

MATERIALS AND METHODS

The following methods were used: analysis of special medical, psychological and pedagogical literature to reveal the essence of mental health determinants/indicators for older preschoolers with ID; comparison and systematization of research material to determine the mental health indicators represented by the category of children; diagnostic complex to identify variables of mental health indicators – "Methods for assessment of the level of social development" [13] allowed to determine the degree of social intelligence, knowledge about oneself and one's place in the world, ideas about social norms, rules, understanding of social reality, cooperation; projective testing technique: "House, tree, man" [14], method "Joint sorting" [15], Pearson's x^2 homogeneity criterion, calculation of Spearman's rank correlation coefficient.

Survey sample consisted of 448 preschoolers, whereof – 292 preschoolers had moderate ID and 156 – preschoolers had mild ID.

Check for homogenous distribution of preschoolers involved in the experimental study by the degree of ID using Pearson's x^2 homogeneity criterion showed: during the experimental study, parameters of the group of mild IDC were as follows: N=156; n_1= 22; n_2=24; n_3=26; n_4=48; n_5=36. Parameters of the group of children with moderate ID: M = 292; m_1= 54; m_2= 44; m_3= 68; m_4= 56; m_5= 70. For our case L = 5 (5 age categories of preschoolers were categorized: early, junior, middle, senior (2 groups), so $x^2 кр$= 9.49. Since critical area is right-handed, we can conclude from the inequality $x^2 сп < x^2 кр$, that null hypothesis is accepted. We can state that at the experimental stage of the study at a given level of significance, the distribution of pupils according to the degree of ID is homogeneous.

Spearman's rank correlation coefficient: *Ho* – no significant rank correlation, i.e. certain prenatal, natal and postnatal periods do not correlate with certain indicators of mental health; *Hi* – a significant rank correlation between indicators and periods. *R* exp was calculated for each child by the formula:

$$R\ exp. = 1 - \frac{6 Ч \sum_{i=34}^{n} d_i}{n(n^2-1)} = 1 - \frac{6 Ч (d1 + d2 + \ldots d_n)}{n Ч (n^2-1)}$$

To calculate T cr. there was used the formula: *Tcr.* =

$$Tcr. = t\ cr.\ Ч\ (L,К)\ Ч \sqrt{\frac{1 - R^2_{эксп.}}{n-2}}$$

where n – the sample size; t cr. (L, κ) – the critical point of the two-sided critical range, which is found in the Spearman's distribution table. By the level of significance L and κ = n -2 degrees of freedom. As a result, L = 0,05; n = 34; κ= 32; t cr. (0,05; 32); tcr. ≈2,04

Comparison of R exp. and T cr.: if the indicators R exp. are less than T cr., there is no reason to reject Ho, i.e., the correlation between the signs is insignificant; if the indicators R exp. are more than T cr. – Ho is rejected, so there is a significant correlation between qualitative characteristics.

RESULTS

The following results were obtained during the collection of medical history data: 17.5% had older siblings in their family, which were born from the first pregnancy; 45.7% of children were product of the second or third mother's pregnancy; 36.8% – from 4th and more, yet in most cases, they were firstborn.

As a result of medical records review, the following was identified as risk factors for ID:

1. Interruption of pregnancy associated with toxicosis was common to all children in this group: in most cases, toxicosis accompanied the entire period of pregnancy with varying intensity (the most threatening – in the first trimester).
2. Complications of childbirth associated with cesarean section were present in 42.2% of cases.
3. Diseases of mothers in the first trimester of pregnancy (both viral and infectious), which were accompanied by high fever – 28.5% of cases.
4. Maternal age for the first pregnancy which exceeded the threshold of forty years – 18.9%.
5. Concomitant complications of childbirth: intoxication (mostly medical) – 21.3%, fetal hypoxia – 15.6%, birth injuries 29.8%, fetal asphyxia – 48.9%, umbilical cord entanglement – 15.8%; and other complications, including chronic toxoplasmosis during pregnancy, maternal hepatitis B, neonatal jaundice, large fetus – 8%.

Based on the retrospective analysis of medical histories, clinical findings, additional medical (neurological) examinations, anamnestic data of preschoolers, we have found a number of systemic disorders of early development: all children had more or less severe psychomotor delay, especially – developmental delay of gross motor functions.

While processing medical-psychological-pedagogical documentation, the following has been established:

In the etiology of intellectual, speech and other related disorders, pathological course of pregnancy and its complications is determined to make significant impact on mental health of children. Distribution of children by cooccurring disorders is presented in the diagram (Fig. 1).

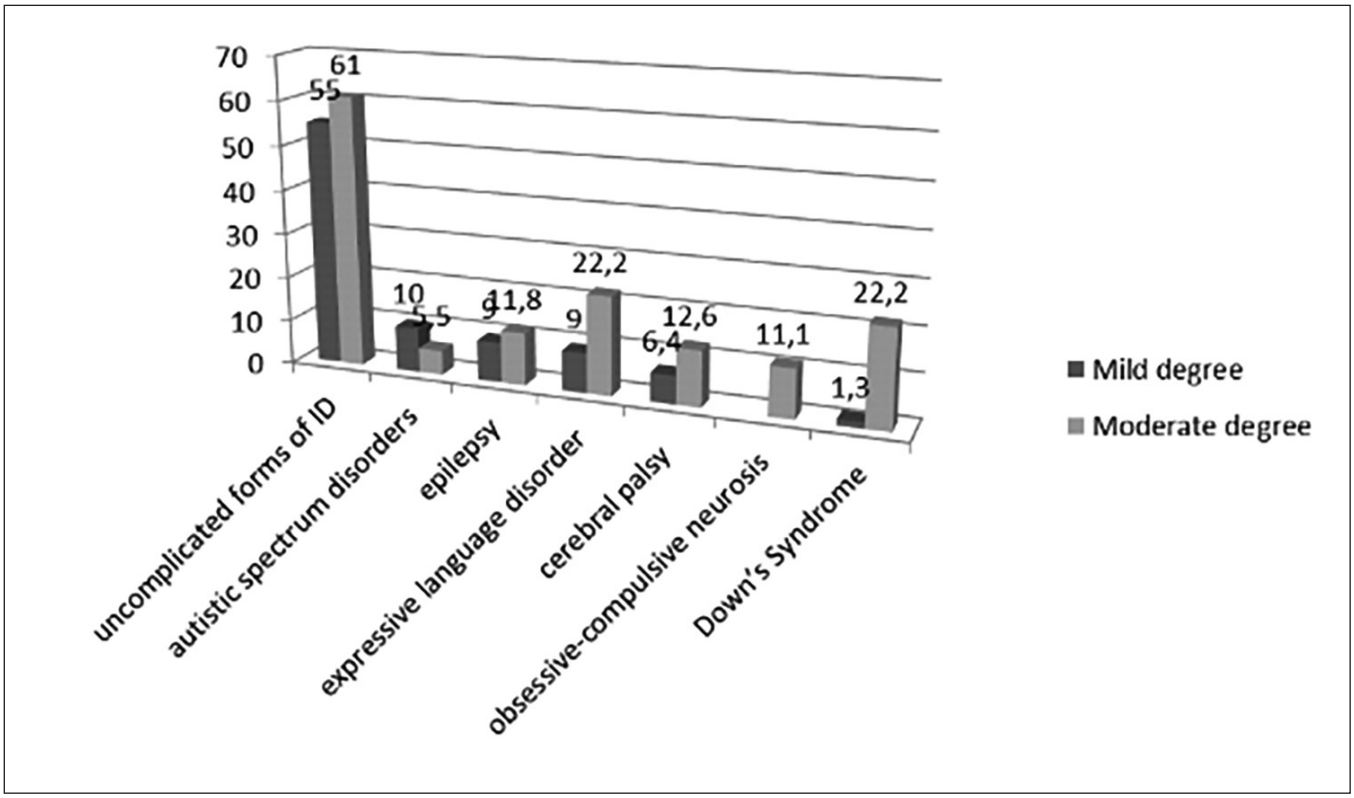

Fig. 1. The detection of cooccurring disorders in intellectually disabled preschoolers IDP (in %)

Since IDD is characterized by inertia of mental processes [8], the experimental research involved 210 children with ID of senior preschool age: 84 – with mild and 126 – with moderate degrees of ID. Under the aim of our study and taking into account unique features of the studied category of children, the mental health of ID preschoolers is interpreted as a formed ability to appropriately express their individual desires and interests according to age (Table I).

The first studied *criterion* was socio-interpersonal according to the "Methods for assessment of the level of social development" [14]. The results show that children of both groups with ID have a low level of formation of *socio-personal criteria (moderate* ID = 52.8 % vs *mild* ID= 26.8 %; χ2emp. = 9.492, which corresponds to $\rho \leq 0.01 = H_1$) due to low indicators of formation of: ideas of oneself (*moderate* =23.7 % against *mild* =51.2 %; χ2emp. = 9.376 at $\rho \leq 0.01 = H_1$), ideas of others (*moderate* =16.9 % against *mild* =56.1 %; χ2emp. = 16.58 at $\rho \leq 0.01 = H_1$), understanding of social activity based on cooperation (*moderate* =15.8 % against *mild* =39.1 %; χ2emp. = 9.058 at $\rho \leq 0.01 = H_1$) (Table II).

The next stage of the study revealed correlations between the mental health indicators of IDP and distinguishing features of prenatal, natal and postnatal development (Table III).

The second criterion of the study was emotional and behavioral, the indicators of which were studied by the projective technique "House, tree, man" [14] and the method of "Joint sorting" [15].

Low formation of emotional and behavioral criteria of mental health indicators (zero level in moderate = 52.8 % against mild = 20.7 %; χ2emp. = 13.16, which corresponds to $\rho \leq 0.01 = H_1$), as specified in low incidence of cooperation with others, presence of low self-esteem, increased anxiety and propensity to solitude (in moderate 64.1 % against mild = 38,4 %; χ2emp. = 5.952, which corresponds to $\rho \leq 0.05 = H_1$), inability to negotiate with others (in moderate 73.5 % against mild = 39.6%; χ2emp. = 9.57, which corresponds to $\rho \leq 0.05 = H_1$), high levels of aggression, negativism, lack of independence and helplessness when helping others, expectation of help from adults (in moderate 73.5 % against mild = 39.6%; χ2emp. = 9.57, which corresponds to $\rho \leq 0.05 = H_1$), inappropriate emotional outbursts, accompanied by frequent mood swings (in moderate 64.1% at $\rho \leq 0.01 = H_1$), manifestations of inappropriate behavior in unfamiliar conditions (in moderate 65% at $\rho \leq 0.01 = H_1$) have been established. Summary indicators of the study are given in the table (Table IV).

The next stage of the study revealed correlations between mental health indicators of IDP and distinguishing features of prenatal, natal and postnatal stages of their development (Table V).

These tables show that the events of, specifically, postnatal period have a significant impact on further emotional life of the child [16-18].

DISCUSSION

We can conclude that the formation of mental health against the background of intellectual disability of preschool children is associated with low levels of self-awareness as a

Table I. Criteria and indicators of mental health of ID preschoolers

Mental health indicators of IDP	
Criteria	
Social and interpersonal	**Emotional and behavioral**
Indicators	
• formation of ideas about oneself and one place in the world • formation of ideas about others • understanding of social reality, basics of cooperation.	• anxiety / proneness to conflict / aggression / negativism / low self-esteem • appropriate behavior in a familiar situation / unfamiliar situation • emotional attitude to joint activities

Table II. Results of the study of formation levels of social-personality criterion (in%)

Levels	Preschoolers with moderate ID	Preschoolers with mild ID
High	-	3.2
Average	24.5	53.6
Low	52.8	26.8
Null	22.7	26,4

Table III. Correlations between mental health indicators of IDP by socio-personal criteria and prenatal, natal and postnatal development

Pairs of development stages/ indicators of the social and inter -personal criteria	Value R exp.	Value Tcr.	Comparison results of R exp.and Tcr.	Comparison indicators of R exp. and T cr.
prenatal/natal development – formation of ideas about oneself	0.0993	0.03	R exp. > T cr	0.97
prenatal/natal development – formation of ideas about others	0.0993	0.03	R exp. > T cr	0.97
prenatal/natal development – formation of ideas about the surrounding reality, appropriate use of surrounding objects	0.0993	0.03	R exp. > T cr	0.97
prenatal/natal development – situation appropriate adjustment in unknown environment	0.0993	0.03	R exp. > T cr	0.97
postnatal development – formation of ideas about oneself	1.001	0.01	R exp. > T cr	1
postnatal development – formation of ideas about others	1.001	0.01	R exp. > T cr	1
postnatal development – formation of ideas about the surrounding reality, appropriate use of surrounding objects	1.001	0.01	R exp. > T cr	1
postnatal development – appropriate behavior in unknown environment	1.001	0.01	R exp. > T cr	1

Table IV. Formation levels of emotional and behavioral criteria (in %)

Levels	Preschoolers with moderate ID	Preschoolers with mild ID
High	-	-
Average	16.9	28.3
Low	30.3	61
Null	52.8	20.7

member of a social group; below age expectations' ability to perceive self and produce information about themselves and meaningful adults, and express preferences; inability to adhere to social norms and values in behavior; high levels of anxiety; aggressive tendencies; lack of independence; helplessness concerning helping others; expectation of help from adults; content-inappropriate emotional outbursts accompanied by frequent mood swings; and desire for solitude. We make assumption about the predominance of postnatal period as the leading impactful factor in development of preschooler's mental health. There is an intricate connection between children of the selected category and their parents at different stages of ontogenesis, that lays foundation to future patterns of social behavior. In this aspect, increase in maternal (caregivers') psychoeducation becomes urgent. Our study confirms and complements the data on the importance of parental education [19, 20].

This article does not reveal the entire scope of mental health indicators associated with ID, since it presents results of the study covering senior preschool age only, while school-age children were not considered. It is also worth noting that we did not take into account such important

Table V. Correlations between mental health indicators of IDP by emotional and behavioral criteria

Pairs of development stages/ indicators of emotional and behavioral criteria	Value R exp.	Value Tcr.	Comparison results of R exp.and Tcr.	Comparison indicators of R exp. and Tcr.
prenatal/natal development – anxiety	0.998	0.02	R exp. > Tcr	0.98
prenatal/natal development – proneness to conflict	0.999	0.02	R exp. > Tcr	0.98.
prenatal/natal development – aggression	0.996	0.03	R exp. > Tcr	0.97
prenatal/natal development – negativism	0.996	0.03	R exp. > Tcr	0.97
prenatal/natal development – low self-esteem	0.996	0.03	R exp. > Tcr	0.97
prenatal/natal development – appropriate behavior in a familiar situation / unfamiliar situation	0.996	0.03	R exp. > Tcr	0.97
prenatal/natal development – emotional attitude to cooperation with others	0.996	0.03	R exp. > Tcr	0.97
postnatal development – anxiety	1.001	0.01	R exp. > Tcr	1
postnatal development -proneness to conflict	1	0.11	R exp. > Tcr	0.89.
postnatal development – aggression	1	0.11	R exp. > Tcr	0.89
postnatal development – negativism	1	0.11	R exp. > Tcr	0.89
postnatal development – low self-esteem	0.996	0.03	R exp. > Tcr	0.96
postnatal development – appropriate behavior in a familiar situation / unfamiliar situation	1.001	0.01	R exp. > Tcr	1
postnatal development – emotional attitude to cooperation with others	1.001	0.01	R exp. > Tcr	1

predictor of child's mental health as maternal mental health and attitude towards the child with ID, as these can be a subject of the separate study.

CONCLUSIONS

Clinical manifestations of mental disorders are in part determined by negative factors at prenatal, natal and postnatal stages of development. The study revealed correlation between the mental health of IDP and distinguishing features of early development and found that children with ID are at risk for developing significant mental health problems. It's important to correctly diagnose the existing manifestations of mental health disorders exactly at the preschool age or earlier, in order to implement appropriate enrichment, therapy and development.

Further research should determine the relative contribution/interaction of ID, social/environmental, psychological and biological factors to the identified elevated indicators of mental health disorders. Based on the careful review and early monitoring of babies with history of adverse prenatal and natal events, it is necessary to introduce a comprehensive medical-psychological-pedagogical approach with experts from different disciplines and fields from as early as toddlerhood. Medical direction: monitoring general physical health of the toddler (pediatrician), increasing active participation in everyday life, development of motor and cognitive skills through sensorimotor integration (occupational therapist). Psychological-pedagogical direction: work with parents aimed at recognizing the need to understand child's emotional world, identifying strategies for effective reading of emotional signals and developing working alliance with specialists; for the child, formation of own motivation and initiative to interact on a systematic basis with specialists (pedagogical/medical workers); pedagogical direction (special teacher, occupational and speech therapists) – developmental interventions to maximize cognitive potential; psychological direction – improving self-image and self-esteem, enhancing interaction with peers and adults.

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Conflict of Interest:
The Authors declare no conflict of interest.

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Received: 04.06.2021
Accepted: 14.10.2021

A – Work concept and design, **B** – Data collection and analysis, **C** – Responsibility for statistical analysis, **D** – Writing the article, **E** – Critical review, **F** – Final approval of the article