

## Cognitive and Speech Development of Preschool Children, Conceived through Assisted Reproductive Technologies

**Karolina L. Surkova**

Mental Health Research Center

Moscow, Russia

ORCID: <https://orcid.org/0000-0001-7501-0535>, e-mail: [www1-11@yandex.ru](mailto:www1-11@yandex.ru)

**Objectives.** The mental health of children conceived using assisted reproductive technologies (ART) is a growing concern for parents and professionals. With a maximum compliance with the conditions for using reproductive technologies, the birth of a healthy child is expected. But some children conceived through artificial insemination have developmental problems, speech and/or cognitive problems. A pilot study was conducted on the cognitive and speech development of children from 3 to 8 years old with the aim of a comparative analysis of children from induced pregnancy with children conceived naturally, to determine the possible impact of ART methods on children's health.

**Methods.** The cognitive and speech functions of 115 children aged 3 to 8 years were studied: 54 children from induced pregnancy were included in the experimental groups (EG 1 and EG 2) and 61 children from natural conception were included in the control groups (CG 1 and CG 2). The method of neuropsychological diagnostics of children of L.S. Tsvetkova and methods of speech therapy examination (assessment of the state of facial and articulatory muscles, breathing, prosodic speech, general speech development) were used. The results were processed through the qualitative and quantitative assessment of the correspondence of the child's cognitive and speech development to normative ontogenesis.

**Results.** It has been determined that children conceived through ART have a high percentage of perinatal risk: 35% of children (n=54) conceived through ART have: mental disorders (autism, intellectual disability) and various speech disorders in 77% of cases, – which has a negative impact on the development of cognitive activity. In children conceived naturally (n=61), the percentage of disorders was lower: in 47% of cases, cognitive disorders were noted, and in 60% of children, speech disorders of mild to moderate severity were identified.

**Conclusions.** The hypothesis about the possible influence of the fertilization methods used, the characteristics of the procedure, the health status of the parents before conception, the course of the mother's pregnancy and other prenatal factors on the occurrence of developmental disorders in children conceived through ART is supported. An interdisciplinary approach to organizing research will allow a comprehensive study of the developmental features of children from induced pregnancy and the timely identification of possible dysontogenetic risk factors.

**Keywords:** in vitro fertilization (IVF); assisted reproductive technologies (ART); artificial insemination; cognitive and speech development of children; induced pregnancy

**Funding.** The study was financially supported by the Mental Health Research Center within the framework of scientific project No. 0393-2019-0009.

**Acknowledgment.** The author thanks the scientific director of the project, leading researcher, PhD in Psychology N.V. Zverev and leading researcher, PhD in Psychology A.A. Sergienko.

**For citation:** Surkova K.L. Cognitive and Speech Development of Preschool Children, Conceived through Assisted Reproductive Technologies. *Autizm i narusheniya razvitiya = Autism and Developmental Disorders*, 2024. Vol. 22, no. 1, pp. 38–44. DOI: <https://doi.org/10.17759/autdd.2024220105> (In Russian; abstract in English).

## Когнитивное и речевое развитие детей дошкольного возраста, зачатых путем вспомогательных репродуктивных технологий

Суркова К.Л.

Федеральное государственное бюджетное научное учреждение  
«Научный центр психического здоровья» (ФГБНУ НЦПЗ),  
г. Москва, Российская Федерация

ORCID: <https://orcid.org/0000-0001-7501-0535>, e-mail: [www1-11@yandex.ru](mailto:www1-11@yandex.ru)

**Актуальность и цель.** Психическое здоровье детей, зачатых с использованием вспомогательных репродуктивных технологий (ВРТ), вызывает все большее беспокойство родителей и специалистов. При максимальном соблюдении условий использования репродуктивных технологий ожидается рождение здорового ребенка. Но у некоторых детей, зачатых искусственным путем, наблюдаются проблемы в развитии, нарушения речевых и когнитивных функций. Проведено пилотное исследование когнитивного и речевого развития детей от 3-х до 8-ми лет с целью сравнительного анализа развития детей от индуцированной беременности и зачатых естественным путем для определения возможного влияния методов ВРТ на развитие.

**Методы и методики.** Исследованы когнитивные и речевые функции 115 детей в возрасте от 3-х до 8-ми лет: 54 ребенка от индуцированной беременности вошли в экспериментальные группы (ЭГ 1 и ЭГ 2) и 61 ребенок от естественного зачатия включены в контрольные группы (КГ 1 и КГ 2). Применялись методика нейропсихологической диагностики детей Л.С. Цветковой и методы логопедического обследования (оценка состояния мимической и артикуляционной мускулатуры, дыхания, просодического оформления речи, общего речевого развития). Результаты обрабатывались путем качественной и количественной оценки соответствия когнитивного и речевого развития ребенка нормативному онтогенезу.

**Результаты.** Определено, что дети, зачатые с помощью ВРТ, имеют высокий процент перинатального риска: у 35% детей (n=54), зачатых путем ВРТ, отмечаются нарушения развития (аутизм, задержка психического развития и др.) и в 77% случаев различные речевые нарушения, — что оказывает негативное влияние на развитие познавательной деятельности. У детей, зачатых естественным путем (n=61), процент нарушений ниже: в 47% случаев отмечались когнитивные расстройства, и у 60% детей выявлены речевые нарушения от легкой до средней степени выраженности.

**Выводы.** Подкрепляется гипотеза о возможном влиянии применяемых методов оплодотворения, особенностей проведения процедуры, состояния здоровья родителей до зачатия, течения беременности матери и других пренатальных факторов на возникновение нарушений развития у детей, зачатых путем ВРТ. Междисциплинарный подход в организации исследования позволит всесторонне изучить особенности развития детей от индуцированной беременности и своевременно выявить возможные факторы дизонтогенетического риска.

**Ключевые слова:** экстракорпоральное оплодотворение (ЭКО); вспомогательные репродуктивные технологии (ВРТ); искусственное оплодотворение; когнитивное и речевое развитие детей; индуцированная беременность

---

**Финансирование:** исследование выполнено при финансовой поддержке Федерального государственного бюджетного научного учреждения «Научный центр психического здоровья» (ФГБНУ НЦПЗ) в рамках научного проекта № 0393-2019-0009.

**Благодарности:** Автор благодарит за помощь в сборе данных для исследования специалистов отдела медицинской психологии Федерального государственного бюджетного научного учреждения «Научный центр психического здоровья» научного руководителя проекта, ведущего научного сотрудника, кандидата психологических наук Н.В. Звереву и ведущего научного сотрудника, кандидата психологических наук А.А. Сергиенко.

**Для цитаты:** Суркова К.Л. Когнитивное и речевое развитие детей дошкольного возраста, зачатых путем вспомогательных репродуктивных технологий // Аутизм и нарушения развития. 2024. Том 22. № 1. С. 38–44. DOI: <https://doi.org/10.17759/autdd.2024220105>

### Introduction

The infertility of men and women is an important modern medical and demographic problem. One of the ways to solve the problem is the use of assisted reproductive technologies (ART), among which in vitro fertiliza-

tion (IVF) and intracytoplasmic sperm injection (ICSI) are the most sought after. ART methods also include surrogacy, oocyte/sperm/embryo donation, preimplantation genetic testing, etc., all of which allow the family to utilize higher quality genetic material for a successful conception [3; 4; 5; 6; 7].

It may seem that favorable conditions have been created in which the percentage of healthy births in induced pregnancies will be significantly higher than in natural conception. But the presented studies in the field of studying the psychomotor development of a child from an induced pregnancy are very few and contradictory. Some authors claim that there are no significant differences in the development of children conceived with the help of ART and naturally conceived (NC) children [9; 10; 12; 15]. Other studies provide data on a higher incidence of developmental disorders among artificially inseminated children [1; 2; 11; 13; 14], which raises many questions about the possible impact of new technologies in human reproduction on further child development.

The presented study analyzes the obtained developmental history and data on the results of a neuropsychological and speech therapy examination of children conceived by ART, compared to children conceived in natural conditions. An integrated approach to the study of a child's cognitive and speech development will make it more likely to identify variants of dysontogenesis at an early stage and to begin timely correctional work. The analysis of the applied methods of ART, the number of performed embryo transfers before pregnancy, the anamnestic data on child development allows us to consider the influence of these factors on the further psycho-speech development of children. The cognitive and speech development of children aged 3 to 8 years old conceived by means of ART was analyzed.

## Materials and Methods

**Participants.** The study included 115 children aged 3 to 8 years old, 54 of whom were conceived by ART and were the experimental group, and 61 children were the control group of children conceived naturally.

**Research Methods.** In the diagnostic examination of children's cognitive and speech development, we used the methods of neuropsychological examination proposed by L.S. Tsvetkova [8] and standardized speech therapy diagnostics, including the assessment of the state of the mimic and articulatory muscles, breathing, vocalization, the features of sound pronunciation, syllabic structure, and the state of the general lexicogrammar structure of speech.

In accordance with the diagnostic methods used and for a more effective differentiated assessment of cognitive development, it was decided to divide the children involved in the study into two age groups: children

aged 3 years to 4 years 11 months old and children aged 5 years to 7 years 11 months old. The two experimental groups (EG 1 and EG 2) included 54 children conceived through ART. The two control groups (CG 1 and CG 2) included 61 children conceived in naturally and with no history of clinical disease. The two groups were composed of children aged 3 to 5 years old: 25 children (15 boys, 10 girls) were included in EG 1; 25 children (16 boys, and 9 girls) were included in CG 1. Children aged 5 to 8 years old were also divided into two groups: EG 2 had 29 children (16 boys, 13 girls) and CG 2 included 36 children (18 boys, 18 girls). This division into age groups was dictated by the features of the neuropsychological examination for each age period. In the group of the younger and middle preschool age of children, adapted neuropsychological tests were used to assess intellectual activity, selected with regard to the age and individual abilities of the child.

## Results and Discussion

In accordance with the purpose of the work, the data of the child's medical history, protocols for the management of the ART procedure and the comprehensive diagnostics of psycho-speech development were studied.

Detailed information about the applied methods of ART is given in Table 1. In the studied sample of 54 children conceived by ART: 28 children (53%) were conceived by the IVF procedure; 26 children (47%) were conceived by the ICSI procedure.

According to the medical records of the examined children conceived by ART, conditionally normal ontogenetic development was determined in 41% of cases in children from 3 to 8 years old. In 37% of the total number of children in the group, there were confirmed mental disorders, in 22% of cases there were neurological and genetic disorders.

According to the medical history, the examined children from the experimental groups had both normotypic development and different variants of deviant development. The data is presented in Table 2.

Intellectual disability was observed out of the whole sample of children aged 3–8 years old in 15% of cases. Autism spectrum disorders (ASD), as well as ADHD, were identified in 10% of children conceived by ART. Epilepsy was diagnosed in one child (2%).

In the comparison group: CG 1 and CG 2, no clinical illnesses were identified when analyzing medical history

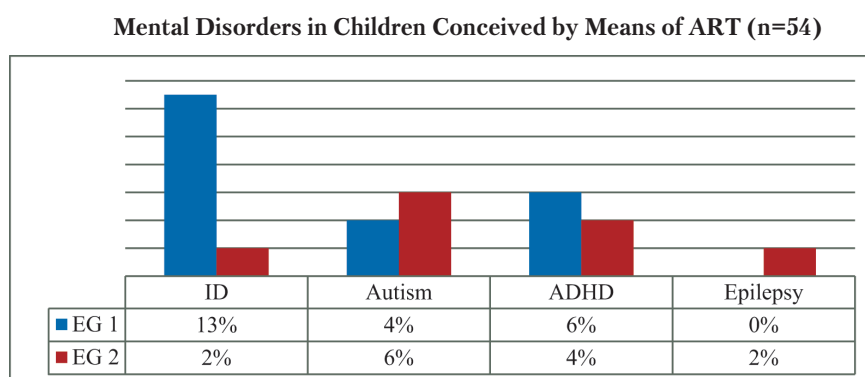
Table 1

**Distribution of Performed ART Procedures Among the Children of the Experimental Groups**

	Fertilization Method		Number of Embryo Transfers		
	IVF	ICSI	from 1 to 3	from 4 to 5	over 6
EG 1	28%	16%	36%	8%	0%
EG 2	32%	24%	38%	16%	2%

Note: n=54 respondents, corresponding to 100% of the sample.

Table 2



Note: ID – intellectual disability; autism – autism spectrum disorder; ADHD – attention deficit hyperactivity disorder.

data, and dysontogenetic developmental variants had not been diagnosed previously. All children in the control groups had mental and speech development within the age norm.

When analyzing the data obtained during the neuropsychological examination, it was decided to distinguish the following parameters for assessing the state of cognitive functions: 1. Cognitive development corresponds to the age: no cognitive disorders were detected in the child; 2. Functional insufficiency of the development of separate mental functions: partial disorders in the cognitive sphere, which are functional in nature and are likely to be compensated independently as the brain matures, are diagnosed in the child; 3. Borderline cognitive development: a high probability of the insufficiency of the development of separate cognitive functions of a predominantly organic etiology is diagnosed, with good compensatory capabilities. 4. Risk of dysontogenetic development: the child is diagnosed with severe cognitive function development disorders of various etiologies, which require targeted correctional psychological and pedagogical work.

Let us consider the results obtained within the framework of neuropsychological research.

The data obtained from the neuropsychological examination shows that conditionally normal cognitive development was more common in the control groups

of children born from natural conception than in the experimental groups. The high rates of risk of dysontogenetic development in the groups of children conceived with the help of ART are much higher than in the control groups, which can be explained by the inclusion and exclusion of the study participants. There were no significant differences between the experimental and control groups of children in terms of the degree of the insufficient development of individual cognitive functions. The revealed features of development were predominantly functional in nature.

During the course of neuropsychological examination, the immaturity of the arbitrary regulation of activity, expressed in negativism, stubbornness, and outbursts of aggression, was most clearly noted in the EG 1 group. The immaturity of inhibitory control was manifested by motor disinhibition and rapid exhaustion in some children or increased distractibility against the background of exhaustion in others. The development of other higher mental functions was secondarily affected by difficulties in arbitrary control. In the comparative group of CG 1 children had a less frequent insufficiency of arbitrary regulation, and it did not have a severe character of disorders of the emotional and/or behavioral sphere. In children from EG 1 and CG 1, an insufficiency of motor sphere development was noted with the same frequency. An error-free performance of tests on the kinesthetic and

Table 3

**Assessment of the Cognitive Development of Children Participating in the Study Using Neuropsychological Research Methods**

Indicators	EG 1	CG 1	EG 2	CG 2
n (% of each group)	25	25	29	36
Cognitive Development Corresponds to the Age	5 20%	14 56%	1 3,4%	8 22%
Functional Insufficiency of the Development of Separate Mental Functions	9 36%	8 32%	7 24,1%	11 30%
Borderline Cognitive Development	4 16%	3 12%	7 24,1%	7 19%
Risk of Dysontogenetic Development	7 28%	0 0%	14 48,2%	0 0%

dynamic praxis was not available to children up to 3.5–4 years old. The analysis of the formation of thinking operations showed that children from the groups EG 1 and CG 1 equally experienced difficulties in the tests for visual and figurative and verbal logical reasoning, which is quite expected for children of this age period.

Neuropsychological examination in the EG 2 group and in the CG 2 comparative group gave the following results: in the EG 2 group, the majority of children had a severe dissociation of the formation of a number of mental processes (voluntary attention, thinking, memory, perception, motor sphere), as compared to children from CG 2, who did not have any dissociation in cognitive development, and the insufficient formation of some mental functions was mainly functional in nature. The symptoms of underdevelopment of subcortical structures (diencephalic and stem structures), as well as of certain cortical structures, were observed in 35% of children from EG 2 and 23% of children from CG 2. Decreases in general neurodynamics were observed with approximately equal frequency in the two groups. In 15 % of children from EG 2 there were symptoms of the functional deficiency of the regulatory factor, which manifested themselves in the lack of assiduity, difficulties in retaining a given program, in a decrease in the motivational component of activity (rapid saturation of activity), in difficulties in concentrating on the task. In CG 2, 9% of children showed symptoms of the insufficient development of the regulatory factor, and the manifestations were functional and less pronounced than in the EG 2 group.

The development of thinking operations in EG 2 children, as compared to CG 2, was characterized by unevenness. In children with mental and speech developmental delays, the tasks of classification by a common characteristic, the method of Excluding objects (“4<sup>th</sup> is the odd one out”, “nonsense” exercises were available only when performed jointly with an adult, whereas in children with normal mental development, the success of the task completion depended on the conditions of domestic pedagogical training and the zone of actual development.

The speech therapy examination revealed different types of speech disorders (see Table 4).

Table 4 shows the percentage of speech disorders for each group of children in the study. Conditionally normal speech development was found in 39% of children (n=61) from the control group and in 22% of children (n=54) from the experimental group. Speech disorders of the dysarthria and alalia type were more common among children conceived by ART (78% of cases) and varied in severity: from a complete absence of speech to unexpressed, erased manifestations, as well as combined with general underdevelopment of speech from level 1 to 3. In the control groups, speech disorders were observed in 61% of children and manifested themselves in the form of minimal disorders of muscle tone in the organs of mimic muscles and articulation, the insufficiency of speech breathing and the prosodic design of speech, and the insufficiency of the phonetic and phonemic perception. General underdevelopment of speech in groups CG 1 and CG 2 was diagnosed less frequently and was within the 3rd level of development. Dyslalia was diagnosed in almost all groups of children with approximately the same percentage of occurrence.

According to the results of the study, it can be concluded that children conceived through assisted reproductive technologies represent a heterogeneous group in terms of cognitive and speech development parameters. According to the data of the study, the children from the experimental groups have a tendency towards a decrease in general neurodynamics, an insufficient regulation of emotions and behavior, and speech disorders of varying degrees of severity, which shows the need for early psychological and pedagogical support. Timely correctional work will allow to compensate the existing disorders most successfully by the beginning of educational activity.

The data obtained in the study of the medical, psychological and pedagogical examination of children of 3–8 years old conceived with the help of reproductive

Table 4

#### Speech Disorders in Children of the Experimental and Control Groups Identified During the Speech Therapy Examination

Groups	EG 1	CG 1	EG 2	CG 2
<b>Speech Disorders</b>				
<b>N</b>	<b>25</b>	<b>25</b>	<b>29</b>	<b>36</b>
No Speech Disorders	6 24%	8 32%	6 20%	16 44%
Dysarthria	4 16%	5 20%	15 51%	11 30%
Alalia	7 28%	1 4%	4 13%	2 5%
Dyslalia	7 28%	8 32%	4 13%	5 13%
Stuttering	1 4%	0 0%	0 0%	0 0%

technologies shows different variants of neurocognitive development, characterized by the peculiarity of formation of higher mental functions. Therefore, the study of the issue of the possible interrelation of the influence of the fertilization method on the ontogenetic development of the child is extremely relevant. In our study, different variants – from severe underdevelopment to a high normality – were revealed in the designated spheres of development.

### Conclusion

The frequently occurring psychiatric and neurological pathology in children conceived by ART requires

a closer study of different spheres of possible influence (health status of parents, pregnancy and labor period, etc.) on the further development of the child.

A qualitative and comprehensive study of the impact of ART on children's cognitive and speech development is possible only through an interdisciplinary approach towards the organization of the study. This will allow for a comprehensive and more detailed assessment of the impact of the chosen reproductive method on the child's further development. Combining specialists from different fields: fertility specialists, gynecologists, neonatologists, pediatricians, psychologists, and teachers will help to create a more comprehensive picture of the development of children conceived artificially. ■

### References

1. Belyaeva I.A., Namazova-Baranova L.S., Baranov A.A. et al. Otdalennoe razvitie i zdorov'e detei, zachatykh s pomoshch'yu vspomogatel'nykh reproduktivnykh tekhnologii [Long-Term Development and Health of Children Conceived by Assisted Reproductive Technologies]. *Voprosy sovremennoi pediatrii = Current Pediatrics*, 2022, vol. 21, no. 2, pp. 72–82. (In Russ., abstr. in Engl.) DOI:10.15690/pf.v19i2.2404
2. Dobryakov I.V., Leshchinskaya S.B., Stoyanova I.Ya. et al. Psikhicheskoe i somaticheskoe razvitie detei, zachatykh s pomoshch'yu ekstrakorporal'nogo oplodotvoreniya [Psychological Factors of Health and Development of Children Conceived Through In Vitro Fertilization During the Periods of Early Childhood]. *Voprosy psikhicheskogo zdorov'ya detei i podrostkov = Mental Health of Children and Adolescent*, 2019, vol. 19, no. 4, pp. 122–132. (In Russ., abstr. in Engl.)
3. Zvereva N.V., Sergienko A.A., Strogova S.E. et al. Multidistsiplinarnyi podkhod k otsenke kognitivnogo razvitiya detei 3-15 let, zachatykh s pomoshch'yu EKO (pilotnoe issledovanie) [Multidisciplinary approach to assessing the cognitive development of children 3-15 years old conceived with IVF (pilot study)]. In XVII S"ezd psikhiatrov Rossii [...] "Interdistsiplinarnyi podkhod k komorbidnosti psikhicheskikh rasstroistv na puti k integrativnomu lecheniyu" (15–18 maya 2021 goda) [...] tezisy [17th Congress of psychiatrists of Russia [...] "Interdisciplinary approach to comorbidity in mental disorders on the path to integrative medicine" (15–18 May 2021) [...] theses]. Saint Petersburg: Publ. Bekhterev Psychoneurological Research Institute, 2021. Pp. 464–466. ISBN 978-5-94651-088-2. (In Russ.)
4. Zvereva N.V., Sergienko A.A., Strogova S.E. et al. Sovremennyye podkhody k otsenke kognitivnogo razvitiya detei i podrostkov, rodivshikhsya s primeneniem EKO [Modern Approaches to Evaluating the Cognitive Development of Children and Adolescents Born with the Use of IVF]. *Voprosy psikhicheskogo zdorov'ya detei i podrostkov = Mental Health of Children and Adolescent*, 2019, vol. 19, no. 4, pp. 133–143. (In Russ.)
5. Zvereva N.V., Surkova K.L., Sergienko A.A. et al. Osobennosti psikhorechevogo razvitiya detei, zachatykh s pomoshch'yu EKO i rodivshikhsya v mnogoplodnoi beremennosti [Psychological and speech development in children conceived with the use of IVF and born in multiple pregnancy]. *Forcipe*, 2022, vol. 5, special issue 2 (Materialy VI Natsional'nogo kongressa s mezhdunarodnym uchastiem "Zdorovye deti – budushchee strany" [Proceedings of the 6th National congress with international participation "Healthy children – the country's future"]), pp. 217–218. (In Russ.)
6. Sergienko A.A., Zvereva N.V., Surkova K.L. et al. O znachenii korrektsionno-razvivayushchei i reabilitatsionnoi raboty s det'mi s dizontogenezom (na primere detei, rozhdennykh s pomoshch'yu EKO) [On the impact of correctional, developmental and rehabilitational support for children with disontogenesis (on the example of children born with the use of IVF)]. In Obshchestvenno-orientirovannaya psikhiatriya: nauchno-prakticheskie aspekty i vektory razvitiya: Materialy Vserossiiskoi nauchno-prakticheskoi konferentsii s mezhdunarodnym uchastiem, posvyashchennoi 20-letiyu sozdaniya obshchestvennoi organizatsii "Sem'ya i psikhicheskoe zdorov'e" (9 iyunya 2022 g.) [Socially-oriented psychiatry: research and practice aspects and vectors for development: Proceedings of the National research-to-practice conference with international participation dedicated to the 20 year anniversary of the community organization "Family and mental health" (9 June 2022)]. Moscow: Publ. MAKS Press, 2022. Pp. 130–133. ISBN 978-5-317-06796-0. (In Russ.) DOI:10.29003/m3017.978-5-317-06796-0
7. Surkova K.L., Zvereva N.V. Nervno-psikhicheskoe razvitie detei, zachatykh putem vspomogatel'nykh reproduktivnykh tekhnologii (EKO, ICSI i dr.) [Neurodevelopment of Children Conceived with the Help of Assisted Reproductive Technologies (IVF, ICSI, etc.)]. *Voprosy psikhicheskogo zdorov'ya detei i podrostkov = Mental Health of Children and Adolescent*, 2022, vol. 22, no. 1, pp. 105–114. (In Russ., abstr. in Engl.)
8. Tsvetkova L.S. Metodika neiropsikhologicheskoi diagnostiki detei [Methodic for neuropsychological diagnostic for children]. 4th ed., corrected and appended. Moscow: Publ. Pedagogic Society of Russia, 2002. 96 p. ISBN 5-93134-179-X.
9. Berntsen S., Söderström-Anttila V., Wennerholm U.-B. et al. The health of children conceived by ART: 'the chicken or the egg?' *Human Reproduction Update*, 2019, vol. 25, no. 2, pp. 137–158. DOI:10.1093/humupd/dmz001
10. Farhi A., Gabis L.V., Frank S. et al. Cognitive achievements in school-age children born following assisted reproductive technology treatments: A prospective study. *Early Human Development*, 2021, vol. 155, article no. 105327. 6 p. DOI:10.1016/j.earlhumdev.2021.105327
11. Sandin S., Nygren K.G., Iliadou A. Autism and mental retardation among offspring born after in vitro fertilization. *JAMA*, 2013, vol. 310, no. 1, pp. 75–84. DOI:10.1001/jama.2013.7222

12. Strömberg B., Dahlquist G., Ericson A. et al. Neurological sequelae in children born after in-vitro fertilisation: a population-based study. *Lancet*. 2002, vol. 359, no. 9305, pp. 461–465. DOI:10.1016/S0140-6736(02)07674-2
13. Luke B., Brown M.B., Spector L.G. Validation of infertility treatment and assisted reproductive technology use on the birth certificate in eight states. *American Journal of Obstetrics & Gynecology*, 2016, vol. 215, no. 1, pp. 126–127. DOI:10.1016/j.ajog.2016.02.052
14. Luke B., Brown M.B., Wantman E. et al. The risk of birth defects with conception by ART. *Human Reproduction*, 2021, vol. 36, no. 1, pp. 116–129. DOI:10.1093/humrep/deaa272
15. Wessel J.A., Mol F., Danhof N.A. et al. Birthweight and other perinatal outcomes of singletons conceived after assisted reproduction compared to natural conceived singletons in couples with unexplained subfertility: follow-up of two randomized clinical trials. *Human Reproduction*, 2021, vol. 36, no. 3, pp. 817–825. DOI:10.1093/humrep/deaa298

### Литература

1. Беляева И.А., Намазова-Баранова Л.С., Баранов А.А. и др. Отдаленное развитие и здоровье детей, зачатых с помощью вспомогательных репродуктивных технологий // Вопросы современной педиатрии. 2022. Т. 21. № 2. С. 72–82. DOI:10.15690/pf.v19i2.2404
2. Добряков И.В., Леущинская С.Б., Стоянова И.Я. и др. Психическое и соматическое развитие детей, зачатых с помощью экстракорпорального оплодотворения // Вопросы психического здоровья детей и подростков. 2019. Т. 19. № 4. С. 122–132.
3. Зверева Н.В., Сергиенко А.А., Строгова С.Е. и др. Мультидисциплинарный подход к оценке когнитивного развития детей 3–15 лет, зачатых с помощью ЭКО (пилотное исследование) // XVII Съезд психиатров России [...] «Интердисциплинарный подход к коморбидности психических расстройств на пути к интегративному лечению» (15–18 мая 2021 года) [...]: тезисы. Санкт-Петербург: НМИЦ ПН им. В.М. Бехтерева, 2021. С. 464–466. ISBN 978-5-94651-088-2.
4. Зверева Н.В., Сергиенко А.А., Строгова С.Е. и др. Современные подходы к оценке когнитивного развития детей и подростков, родившихся с применением ЭКО // Вопросы психического здоровья детей и подростков. 2019. Т. 19. № 4. С. 133–143.
5. Зверева Н.В., Суркова К.Л., Сергиенко А.А. и др. Особенности психоречевого развития детей, зачатых с помощью ЭКО и родившихся в многоплодной беременности // Forcipe. 2022. Т. 5. Спецвыпуск 2: Материалы VI Национального конгресса с международным участием «Здоровые дети — будущее страны». С. 217–218.
6. Сергиенко А.А., Зверева Н.В., Суркова К.Л. и др. О значении коррекционно-развивающей и реабилитационной работы с детьми с дизонтогенезом (на примере детей, рожденных с помощью ЭКО) // Общественно-ориентированная психиатрия: научно-практические аспекты и векторы развития: Материалы Всероссийской научно-практической конференции с международным участием, посвященной 20-летию создания общественной организации «Семья и психическое здоровье» (9 июня 2022 г.). Москва: МАКС Пресс, 2022. С. 130–133. ISBN 978-5-317-06796-0. DOI:10.29003/m3017.978-5-317-06796-0
7. Суркова К.Л., Зверева Н.В. Нервно-психическое развитие детей, зачатых путем вспомогательных репродуктивных технологий (ЭКО, ИКСИ и др.) // Вопросы психического здоровья детей и подростков. 2022. Т. 22. № 1. С. 105–114.
8. Цветкова Л.С. Методика нейропсихологической диагностики детей. Изд. 4-е, испр. и доп. Москва: Педагогическое общество России, 2002. 96 с. ISBN 5-93134-179-X.
9. Berntsen S., Söderström-Anttila V., Wennerholm U.-B. et al. The health of children conceived by ART: ‘the chicken or the egg?’ // Human Reproduction Update. 2019. Vol. 25. № 2. Pp. 137–158. DOI:10.1093/humupd/dmz001
10. Farhi A., Gabis L.V., Frank S. et al. Cognitive achievements in school-age children born following assisted reproductive technology treatments: A prospective study // Early Human Development. 2021. Vol. 155. Article № 105327. 6 p. DOI:10.1016/j.earlhumdev.2021.105327
11. Sandin S., Nygren K.G., Iliadou A. Autism and mental retardation among offspring born after in vitro fertilization // JAMA. 2013. Vol. 310. № 1. Pp. 75–84. DOI:10.1001/jama.2013.7222
12. Strömberg B., Dahlquist G., Ericson A. et al. Neurological sequelae in children born after in-vitro fertilisation: a population-based study // Lancet. 2002. Vol. 359. № 9305. Pp. 461–465. DOI:10.1016/S0140-6736(02)07674-2
13. Luke B., Brown M.B., Spector L.G. Validation of infertility treatment and assisted reproductive technology use on the birth certificate in eight states // American Journal of Obstetrics & Gynecology. 2016. Vol. 215. № 1. Pp. 126–127. DOI:10.1016/j.ajog.2016.02.052
14. Luke B., Brown M.B., Wantman E. et al. The risk of birth defects with conception by ART // Human Reproduction. 2021. Vol. 36. № 1. Pp. 116–129. DOI:10.1093/humrep/deaa272
15. Wessel J.A., Mol F., Danhof N.A. et al. Birthweight and other perinatal outcomes of singletons conceived after assisted reproduction compared to natural conceived singletons in couples with unexplained subfertility: follow-up of two randomized clinical trials // Human Reproduction. 2021. Vol. 36. № 3. Pp. 817–825. DOI:10.1093/humrep/deaa298

### Information about the authors

Karolina L. Surkova, Researcher, Mental Health Research Center, Moscow, Russia, ORCID: <https://orcid.org/0000-0001-7501-0535>, e-mail: [www1-11@yandex.ru](mailto:www1-11@yandex.ru)

### Информация об авторах

Суркова Каролина Леонидовна, научный сотрудник, Федеральное государственное бюджетное научное учреждение «Научный центр психического здоровья» (ФГБНУ НЦПЗ), г. Москва, Российская Федерация, ORCID: <https://orcid.org/0000-0001-7501-0535>, e-mail: [www1-11@yandex.ru](mailto:www1-11@yandex.ru)

Получена 31.01.2024

Принята в печать 27.03.2024

Received 31.01.2024

Accepted 27.03.2024

## Neurotic States of Women and the Features of the Attitude Towards the Newborn in the Situation of “Burdened” Motherhood

Irina A. Zolotova

Yaroslavl State Medical University,  
Yaroslavl, Russia

ORCID: <https://orcid.org/0009-0007-5041-0082>, e-mail: [iazolotova@mail.ru](mailto:iazolotova@mail.ru)

**Objectives.** The growing number of children with mental health needs leads to an increase in the need for research on this issue. The subjective phenomenon of “burdened” motherhood is considered as an environmental risk factor for child mental health disorders. The article presents the results that allow us to consider the attitude to the newborn and the pronounced neurotic states of the mother among the unfavorable factors in the formation of the “mother-child” dyad.

**Methods.** A total of 228 women participated in the study. Comparison groups of 173 respondents were formed. The unifying criterion of the groups is the special conditions for the formation of the “mother-child” system in the situation of “burdened” motherhood. 55 women with preserved reproductive function, whose pregnancy ended with the birth of a healthy child, are classified as “conditional norm”. The Pregnant Woman’s Attitude Test by I.V. Dobryakov, the Clinical Questionnaire of Neurotic States by K.K. Yakhin and D.M. Mendelevich, the method of semi-structured interview, the methods of statistical processing of empirical data Mann-Whitney U-test and Spearman’s rank correlation coefficient were used.

**Results.** Women in a situation of “burdened” motherhood are more likely to transmit an anxious attitude towards the newborn ( $U = 210.0$ ;  $p = 0.004235$ ). Positive correlations between anxious and depressive attitudes towards the newborn and indicators on the asthenia scale of the Neurotic States Questionnaire ( $r = 0.39$ ;  $<0.05$ ) are described. Empirical data have confirmed the presence of pronounced neurotic states in women in the situation of “burdened” motherhood on the following scales: “anxiety”, “hysterical type of reaction”, “obsessive-phobic disorders” and “vegetative disorders”.

**Conclusions.** The obtained data indicate that the features of the attitude towards the newborn and the level of severity of neurotic states in women in the situation of “burdened” motherhood, can be considered among the risk factors for mental health disorders in infancy and young age.

**Keywords:** “burdened” motherhood; “mother-child” system; attitude towards the newborn; neurotic states; risk factors; anxiety; asthenia; neurotic depression

**For citation:** Zolotova I.A. Neurotic States of Women and the Features of the Attitude Towards the Newborn in the Situation of “Burdened” Motherhood. *Autizm i narusheniya razvitiya = Autism and Developmental Disorders*, 2024. Vol. 22, no. 1, pp. 45–51. DOI: <https://doi.org/10.17759/autdd.2024220106> (In Russian; abstract in English).