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RISK FACTORS CAUSING PERSISTENT DELAY IN NEURO-PSYCHIC DEVELOPMENT IN INFANT CHILDREN DURING THEIR FIRST YEAR IN A FOSTER FAMILY

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Our research goal was to detect risk factors which cause delay in neuro-psychic development in infant children a year after they were adopted by a foster family. We examined health of 100 infant children at the moment they were adopted and after their first year spent in a foster family; we also examined health of their 100 hundred parents. Our research was focused on social and biological case histories, clinical examinations performed on children, and assessment of their mental development ("Chart for Infants' Neuro-Psychic Exam" technique), as well as psychological examination of foster parents: MINI-SPET (standardized personality examination technique) test, techniques developed by Yu.A. Alyoshina, L.Ya, Gozman, E.M. Dubovskaya and A.Ya. Varga, and V.V. Stolin. All the results were statistically processed with MA Excel XP and Statistica 6.0 software. Relative risks caused by various factors were calculated with Open Epi program; we applied Wald's sequential analysis to draw up an expectancy table. We revealed the following factors which could cause persistent delay in a child's mental development after a year spent in a foster family: a child already suffered from retarded mental development prior to being adopted; a child was adopted when he or she was older than 7 months; a child had had a psychological traumatic experience; a foster mother's attitude towards an infant also mattered a lot. Younger age of a child at the moment of adoption, psychological traumas minimization, and adequate educating techniques in a foster family make for better prevention of any delays in mental development. The obtained data prove it is necessary to provide long-term complex medical, psychological, and pedagogical support for an infant in a foster family under a psychiatrist's supervision.

Key words: *risk factors, prediction, delay in neuro-psychic development, infants, younger age, foster families, foster parents.*

It is well known that if children are deprived of mother's care during first years of their life it exerts negative effects on their further development [1–3]. Delay in neuro-psychic development (DNPD) is detected in most children from orphanages and it is determined by combined impacts exerted on their health by biological and psychosocial factors. A lot of authors note in their works that practically all orphans and children who are deprived of their parents' care, including those who are adopted by foster families (FF), have burdened obstetrician-gynecological case history, intra-

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uterine development disorders, and diseases during their neonatal period[1]. Researchers also mention that biological mothers of such children smoke, drink alcohol or take drugs during a pregnancy, their lifestyle is asocial, and they often suffer from psychoneurological diseases [4–6].

Psychic deprivation is another factor which can cause a delay in emotional and intellectual development of children kept in orphanages. Any period of time spent in an orphanage leads to a decrease in a child's overall and verbal intellect [4]. A lot of researchers give strong evidence that the earlier this deprivation factor[2], occurs, the more pathogenic and significant it is for a child's further development [7–9].

According to data given in multiple works [2, 3, 10, 11], 80–98% of children from orphanages have delays in their neuro-psychological development at least as per one parameter. Active speech, sensory development, actions with objects, drawing activities, thinking, attention, and memory are damaged most frequently. Mental development disorders rank first in mental deviations structure; 30.0% of orphans suffer from emotional disorders and behavioral disorders, as well as imbalance between parasympathetic and sympathetic sections in the vegetative nervous system with the latter being insufficient[3] [7, 9, 10].

Therefore, nowadays adoption of children from orphanages and disadvantaged families by foster families is one of a key social and demographic tasks in the RF [11]. Foster parents are most eager to adopt infants. Infants are most vulnerable to pathogenic factors but this age is the most favorable for correction[4]. The brain grows and develops intensively at this age, and its maximum flexibility determines high efficiency of educational conditions improvement. This improvement can not only stimulate functional responses in the mental sphere, but also lead to structural changes in actively forming cerebral systems [11–13]. Clinical picture at this age is mosaic and mental disorders here are tightly connected with neurological ones thus creating a unified psychoneurological complex of various symptoms [11, 14].

When a child is placed in favorable conditions ("family therapy"), when he or she receives adequate nutrition, is taken care of properly, and there are no disorders in his or her sleep and wake regime, normal growth rate and neuro-psychic development is recovered (development canalization law) [13, 15, 16]. M.J. Hayes et al. came to a conclusion that a family was a factor which could improve psychoemotional state and cognitive abilities of orphans and children deprived of their parents' care [8]. A foster family is able to compensate deprivation symptoms in orphans; qualitative changes occur in children's intellectual development when they are adopted, and their social adaptation grows, they master moral values and standards, and their emotional sphere also improves [16]. The earlier a child is adopted by a foster family, the less damaged his or her neuro-psychic and emotional development is.

Many authors have proved that children adopted by foster families have better health than those who remain under state custody in orphanages [1, 2, 17, 18], but still, as per many parameters, such children lag behind those who have been growing in their kin families since the very birth [2, 6]. According to foreign researchers, prevalence of mental disorders among children adopted by foster families is within 29-96% range and is higher than the average population level of mental deviations [19, 20].

When a child is adopted by a foster family, it usually has a positive effect on

his or her development; but still, some children suffer from DNPD [1, 7, 10, 13]. They usually have low initial potential of somatic and mental health caused by negative influence exerted by biological and social-psychological factors and it can result in poorer adaptation to a new family [9]. Adaptation to a new family is a most essential criterion for creating normal life conditions for orphans; it to a great extent depends on foster parents' motivation related to adopting a child, their psychological peculiarities, somatic and mental health they and their adopted child have, and gradually developing psychological relationships between a child and his or her new parents [21–25].

All the above mentioned calls for necessity to find new markers which can be applied as additional predictive criteria for delay in neuro-psychic development in children during a period of their adaptation to a foster family (the first year after adoption). These markers will help to work out scientifically grounded recommendations on how to optimize it.

Our research goal was to analyze a set of social, psychological and biological parameters and to reveal risk factors which could cause delays in neuro-psychic development of infants after they have spent a year in a foster family.

Data and methods. We examined health state of 100 children aged 1–3 at the moment they were adopted (average age being 18±7 months) and after a year spent in a foster family (FF) (average age being 33±9 months); we also examined health state of 100 foster parents. We studied their social and biological case history (taking data from medical documents and performing parents' questioning). We accomplished clinical examination of children, observed their behavior, analyzed their medical case histories, assessed their mental development quotients (applying "Chart for Infants' Neuro-Psychic Exam" technique developed by G.V. Kozlovskaya et al., 2007), and performed their foster parents' questioning with a structured clinical-statistical chart which we developed. The chart included features of psychopathologic symptom complexes which were described in the V(F) section of ICD-10.

All the examinations on children were performed in full conformity with the ethical principles stated in WMA Declaration of Helsinki (Ethical principles for medical research involving human subjects, 1975, with 1983 and 1989 additions). Parents (legal representatives) of all the examined patients gave their voluntary informative consent to medical interference and personal data processing.

We performed psychological examination of foster parents; MINI-SPET test was applied to reveal their personal traits; a technique developed by Yu.A. Alyoshina, L.Ya. Gozman, and E.M. Dubovskaya, to determine attitudes in a family; a technique developed by A.Ya. Varg and V.V. Stolin, to get an insight into relationships between parents and children. All the obtained data were statistically processed with MS Excel XP and Statistica 6.0 programs. Relative risk (RR) of various factors was calculated with OpenEpi program, with 95% confidence interval (CI) detection.

We applied Wald's sequential analysis to draw up an expectancy table. After verifying validity of discrepancy related to frequency of an examined factor occurrence among children with delays in neuro-psychic development and without them, we calculated predictive quotients (PQ) for each gradation of a factor. A predictive quotient was calculated as per the following formula: $PQ=10 \lg (P_1/P_2)$ if a factor occurred, $PQ=10 \lg (1-P_1/1-P_2)$ when a factor was absent, where P_1 and P_2 were frequen-

cies of a factor occurrence in compared groups. If an obtained value was positive, it meant the prediction was unfavorable.

Results. Mental and behavioral disorders were diagnosed in 72.31% of examined infants at the moment they were adopted by foster families. Mental deviations in children from the examined group were mostly delays in mental development (Disorders of psychological development, F80-89, 69.24% cases). As for specific nosologies, mixed specific developmental disorders (F83) accounted for 56.93%; expressive language disorders (F80.1), 9.23%; specific developmental disorders of motor function (F82), 3.08%.

We studied mental and behavioral disorders prevalence in adopted children after they had spent a year in a foster family and revealed that a number of children with mental (psychological) developmental disorders (F80–89) decreased considerably from 69.24% to 44.62 ($p<0.01$). Prevalence of mixed specific developmental disorders (F83) fell down from 56.93% to 33.85% ($p<0.01$), but that of specific language articulation disorders (F80.0) increased from 0% to 10.77%, $p<0.01$).

We detected the following significant biological factors which caused risks of delays in psychic development of children after a year spent in a foster family: already existing delay in mental development (RR 4.10; 95% CI 1.56-10.80); children belonging to IV-V group of neuro-psychic development (NPD) (RR 3.86; 95% CI 1.47–10.15); planovalgus deformity (M21.0) (RR 2.51; 95% CI 1.3–4.84); and small body length of a child when he or she was adopted by a foster family (RR 2.43; 95% CI 1.09-5.42). We detected a correlation between a lag in children's neuro-psychic development at the moment of adoption and after a year spent in a foster family ($R=0.624$, $p=0.000$) and children's body length and a lag in neuro-psychic development at the moment of adoption ($R=0.281$, $p=0.036$,) and after a year spent in a foster family ($R=0.272$, $p=0.031$). These data prove there is a strong correlation between infants' physical and mental development and that perinatal damages to the central nervous system are the basic reason for later lags in it.

We also detected the following social and psychological risk factors: a child was adopted by a foster family at an age older than 7 months (RR 6.86; 95% CI 1.01–47.01); a biological family lived in a room in a shared apartment (RR 3.73; 95% CI 1.62–8.59); a child was kept in an orphanage before being adopted (RR 3.02; 95% CI 1.01–9.09); a foster mother preferred her family to be a patriarchic one (RR 2.76; 95% CI 1.53–4.95); foster parents' attitude towards an adopted child was symbiotic (RR 2.52; 95% CI 1.38–4.61); an education style in a foster family was authoritarian (RR 2.52; 95% CI 1.38–4.61); a foster mother having an original personality (RR 2.33; 95% CI 1.26–4.34).

So, there are several risk factors which make the most significant contribution into possible persistence of an infant's delay in mental development after a year spent in a foster family. They are psychic disorders and small body length; biological family living in a shared apartment; a child being kept in an orphanage before adoption; a foster mother preferring her family to be a patriarchic one; symbiotic attitude towards a child or authoritarian education style; a foster mother's originality.

To predict whether a delay in mental development would persist in an infant after a year spent in a foster family, we created the following expectancy table.

To predict whether a delay in mental development will persist in a child, a psychologist at a support center for foster

The expectancy table for predicting wheter a delay in mental development would persist in an infant after a year spent in a foster family

Risk factors	PQ	IC
Children's health and age at the moment of adoption by a foster family		
III-V health groups		8,43
Yes	1,66	
No	–25,01	
Mixed specific developmental disorders (F83)		3,63
Yes	3,22	
No	–5,26	
IV-V groups of neuro-psychic development		3,24
Yes	2,95	
No	–5,08	
A child was under state custody		2,10
Yes	1,87	
No	–5,08	
A child was left without parents' care at an age younger than 1 year		2,09
Yes	1,56	
No	–6,05	
Small body length		1,80
Yes	2,44	
No	–3,32	
A child was adopted by a foster family at an age older than 7 months		1,79
Yes	1,40	
No	–5,75	
Disorders of psychological development (F80-89)		1,66
Yes	1,83	
No	–4,06	
Symptoms of para-autism		1,17
Yes	2,70	
No	–1,92	
Foster mother's personal traits and her attitude towards a child:		
Authoritarian education style (Varg test)		2,11
Yes	5,96	
No	–1,52	
Originality (MINI-SPET test)		1,46
Yes	6,87	
No	–0,90	
Symbiotic attitude towards a child (Varg test)		1,40
Yes	5,13	
No	–1,22	

Note: PQ is a predictive quotient, IC is a informativeness coefficient

families performs a psychological examination of a foster mother before a child is adopted; this examination is performed with MINI-SPET tests, and A.Ya. Varg and V.V. Stolin technique, and it helps to reveal psychological risk factors. A pediatrician at an orphanage takes data from a child's development history and uses the expectancy table to detect occurrence or absence of risk factors which can cause unreliable affection formation.

If the PQ sum is equal to +13 score or higher, experts predict unreliable affection formation. But if the PQ sum is equal to or lower than -13 scores, than reliable affection is expected. If the PQ sum is higher than -13 but lower than +13, than in this case we don't have sufficient information to make a judgment.

If a prediction is unfavorable, then a pediatrician prescribes differentiated prophylaxis measures for children from risk groups and in case of necessity recommends to visit a psychologist or a psychiatrist. He or she also works out and implements an individual support program for a foster family which is aimed at risk minimization.

Conclusions. When infant children were adopted by foster families, delays in mental development prevailed in them. When favorable micro-social conditions are created in a foster family, it can lead to elimination of such disorders or their significant decrease in most cases due to good compensatory capabilities of infants. However, we don't observe complete mental well-being in infant children who spent a year in a foster family due to persistent delays in mental development caused by a complex interaction between biological (residual organic cerebral insufficiency) and social factors.

A lag in mental development prior to adoption, a child being older than 7 months

at the moment of adoption, psychological traumas, and inadequate attitude of a foster mother to a child are basic risk factors which can cause persistent delays in a child's mental development after a year spent in a foster family. Earlier age at the moment of adoption, psychological traumas minimization, and adequate education styles in a foster family help to prevent further delays in mental development.

The obtained data call for a long-term complex medical, psychological, and educational support for an infant in a foster family under a psychiatrist's supervision.

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