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# The Interrelation of the Mother's Health Status with the State of Health of First- and Second-Year-Old Children

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## Abstract

We evaluated the state of health of the mother and child at birth, and the probability of the diagnosis of cancelation in the child at the end of the second year of life. The sample consisted of 100 mother-child dyads. The complex assessment of the children's health status was based on the individual medical records. Mothers filled the questionnaire evaluating the mother's relation to her child during the first 2 years of life, and the questionnaire aimed at assessing the emotional intelligence level. Almost all the children at birth have one or the other diagnosis. There is a positive connection between the number of the diagnoses in the first- and second-year-old children during their stay in the maternity ward and perinatal pathology factors of the mother. But by the end of the second year of life in 60% of the children, these diagnoses were canceled. The healthier the mother, the more positive the prognosis with regard to the child's health within the first 2 years of living is. Positive prognosis with regard to the first-year-old children's health depends upon the acceptance of the child by the mother: the higher the value on the scale of acceptance-nonacceptance is, the better the child's health is.

**Keywords:** dyad mother-child, health, emotional intelligence, attachment, perinatal pathology, encephalopathy, Russia

## 1. Introduction

Man's health is an essential condition of his/her wellbeing, self-fulfillment and an active creation [1, 2]. However, throughout the world, there is a great number of people suffering from different diseases. A part of them is connected with the process of gestating and bearing a child, many of them are a result of poverty, and some others are a consequence of aging [3]. Nowadays, many scientists define the reason for hereditary disease growth as a result of that mankind has gone out of control of natural selection. For instance, at the end of the nineteenth century in Russia, 85% of infants who were born in summer died [4]. The reason for most children's death was intestinal infections and mothers' employment in agricultural works that decreased their care for the child. At present, infant mortality has fallen, but a lot of diseases have emerged. They may be an effect during pregnancy, some chronic diseases have exacerbated in the mother, or she has had infectious diseases, experienced the acute stress, etc. The mother for the child is a natural environment

in the course of development, and her health, of course, determines his/her health. Maternal organism provides everything the child needs in and develops in [5].

### **1.1 The mother's diseases during the pregnancy and the child's health**

The extragenital and chronic genital pathology exerts a significant influence upon pregnancy outcome for the fetus [6]. Among the factors of adverse effect on the fetus, researchers point out chronic hypoxia due to the disturbance of utero-placental blood circulation, the sympathetic-adrenal system insufficiency, fetal growth retardation, immaturity, the disturbance of function of cardiovascular and respiratory systems. Consequently, there appears a risk of the premature termination of pregnancy and birth of a premature baby [7]. Fetoplacental insufficiency is a complex of disturbances of placenta functions (transport, trophic, endocrine and metabolic) caused by morphofunctional changes in it and utero-placental blood circulation disturbance [8]. Placental insufficiency is a cause of the development disturbance and intrauterine hypoxia of the fetus and pathological statuses and diseases of a newborn baby.

At present, fetal hypoxia occupies a leading place in the structure of the reasons for perinatal mortality (from 40 to 70%) as well as central nervous system impairments in the fetus or a newborn (from 30 to 80%), which in turn lead to different disturbances of the somatic and neuromental development of children. At that, the degree of the severity of these pathological deviations depends upon the duration and severity of intrauterine hypoxia [9]. The chronic fetal hypoxia, fetal infection and birth trauma are main reasons for the perinatal lesion of central nervous system and the strongest stress factor [10, 11]. Fetoplacental insufficiency may arise throughout pregnancy but complications for the fetus manifest mainly during the third trimester. At delivery, fetal asphyxia progresses often in mothers with chronic fetoplacental insufficiency. The reason for that is an acute and chronic hypoxia of the fetus [12]. Newborn children have the central nervous system disturbances, changes in reflex excitability, cyanosis, bradycardia and so on [13]. The newborn children, whose mothers suffer from fetoplacental insufficiency, are born in the state of severe asphyxia in 10% of cases, and 81% experience a pathological course of an early neonatal period [14, 15].

In Russia, maternal toxemia during the first half of pregnancy occurs in 50% of women, late toxicosis in 2–30% of pregnant and parturient women [16]. Late gestosis represent a symptom complex of multiorgan and multisystem insufficiency, which manifest clinically more often from the 20th week of pregnancy and end immediately at birth or later after delivery [15]. The disturbances of mental, emotional and physical development are found in 20% of newborns from mothers with late gestosis; child morbidity rises considerably [17].

A number of investigations have shown that children born after pregnancy with gestosis have perinatal brain lesion, neurological complications, dysontogenesis, physical and neuromental development retardation, minimal brain dysfunction and immature indices of electroencephalogram [18]. Premature discharge of amniotic fluid is considered as an amniotic fluid release due to the rupture of membranes before the beginning of childbirth regardless of duration of gestation [19]. About 35% of premature labor is accompanied by premature discharge of amniotic fluid [20].

Among risk factors of premature discharge of amniotic fluid, there are abortions in an anamnesis (48%), inflammatory processes of genitals (33%), extragenital infectious diseases (12%), anomalies of the bone pelvis (8.5%) and hydramnion (3.4%). In case of premature discharge of amniotic fluid, complications during the childbirth and postpartum period increase considerably: birth abnormalities

(16%), bleeding during the postpartum and early postpartum periods (12.5%) and so on [21, 22].

The growth of the incidence of dystocia is explained by the increase of a number of reasons leading to the development of that pathology. Central nervous system dysfunction underlies dystocia, namely: disturbance of equilibrium of the sympathetic and parasympathetic divisions, somatic and genital diseases, endocrine disorders, flat fetal bladder and discrepancy between the fetus size and the mother's pelvis. Quite often, the reason for that anomaly is an undue and untimely prescription of stimulating-delivery remedies [23].

Among the peculiarities of neonatal period in children from mothers with weakness of labor activity, there is a decrease of a favorable outcome of early adaption by newborns alongside with the prevalence of the perinatal lesion of central nervous system [24]. In many works, one points out a considerable influence of risk factors during the pre- and perinatal periods on the development of the cerebrum on the whole and higher cortical functions, which enhance the heterochrony of functional systems maturation [25]. The influence of the health of pregnant women on the somatic and mental health of infants is out of doubt. However, it is noteworthy that the totality of data evidence that in the long run, the mother's diseases lead to an inadequate nutrition of a baby in the course of gestation and oxygen anoxemia. During the antenatal and, particularly, postnatal periods, again, the influence of the mental health of the mother on the mental health of children is less obvious and mediated, as it involves both genetic and environmental factors.

## **1.2 The mother-child dyad after birth**

After birth, the child is connected with the mother physiologically and psychologically. During the first two living years, the mother's influence on his or her development almost overlaps all the other factors [26]. Even if the child gets any diagnosis at birth, in many cases there may come recovery under the adequate care of him or her [27]. The child's brain is extremely flexible during the first year of life that is why even traumas can be jugulated under quality care of him or her [28]. According to the modern concepts, the emotional connection between the child beginning from the first years of life and the mother is a major factor of his/her healthy development [29]. One should accept that it is the mother who is a main source of signs forming the emotional-informative environment of the child at early stages of his life [30].

According to Bowlby [31], a close relationship forms between the child and an adult caring during the first 2 years. They are built on the basis of the mutual direction to each other: the child seeks the contact, and the mother responds to it. That kind of behavior is determined biologically and is reasonable evolutionally, since in early days after birth, the child has to find the one who will defend and guard him [32]. According to the theory of attachment, the quality of the formed attachment depends directly on the child's parent who may take care of him in a different way. Ainsworth with co-authors [33] observed the communication of 26 mothers and their children aged one and a half years old during 1 year. As an indicator of attachment, they evaluated the child's behavior at the moment of the mother's arrival and departure.

Based on the observations, three types of children's reactions are described, which correspond to three types of attachment of the child to the mother. Ainsworth calls them anxious-avoidant (A), secure (B) and anxious-resistant or ambivalent (C) types.

The important thing is that children with secure attachment grow into adults who will care for their health and take the responsibility for that. On the contrary, children brought up under the circumstances of insecure attachment often grow into people depending on pernicious habits [34]. The emotional behavior of the



mother is predetermined considerably by her emotional intelligence [35–38]. The ability to realize and ponder over one's own and others' emotions, of course, implies numerous consequences, first of all, in a person's behavior. Due to that, the interrelation between emotional intelligence and attachment degree is of absolute interest [29, 33, 39, 40]. This is especially significant, since attachment involves the phenomena, which in the real life a person verbalizes seldom. It is difficult to imagine the mother who says by herself: "I accept my child", or "I support and I do not ignore my child". Attachment to the child is an intimate feeling being close to the instinct [31], and a person does not speak to himself or herself about its details.

We assume that one of the most important parameters influencing the child's health is a level of the emotional maturity of the mother. It manifests in the high emotional intelligence and emotional attachment to the child. We set the task to evaluate the state of health of the mother and child at birth, and the probability of the diagnosis cancelation in the child at the end of the second year of life. It depends upon two characteristics of the mother: emotional intelligence and the degree of attachment to the child.

In Russia, quality examination of the child is fulfilled after birth in the maternity hospital, and a major part of children gets one or the other diagnosis. Another attending doctor may cancel the diagnosis of the child, if the child's status has been normalized. At that, by the end of the first and, quite often, second year of life, medical specialists cancel children's diagnoses made earlier [27]. To a considerable extent, the child's status change is determined by efficient actions of caring persons, mainly, the mother [41]. It is the mother who in the majority of families takes the child to a doctor and carries out all the necessary directions for the rehabilitation. In that situation, her involvement in the process of the child's health recovery impacts substantially on the positive prediction of his/her recovery provided that the disease is not genetic but determined by the peculiarities of intrauterine development and birth.

## **2. Materials and methods**

### **2.1 Sample**

The sample consisted of 100 mother-child dyads. There were 48 girls, 52 boys and 100 mothers. Among children, there were 50 children aged under 1-year-old (27 boys and 23 girls) and 50 children at the age of 1–2 years old (25 boys and 25 girls).

The experimental sample was selected by means of randomization, that is, by the random selection strategy or subjects distribution when all the subjects had an equal chance to enter the group. It provided internal validity and controlled the blending effect. The present study was carried out in an urban polyclinic for children in a little town of the European part of Russia.

### **2.2 Measures**

The complex assessment of the children's health status was based on the individual medical records. The mothers filled the questionnaire evaluating the mother's relation to her child during the first 2 years of life [42] and the questionnaire aimed at assessing the emotional intelligence level [43]. The questionnaire evaluating the mother's relation to her child includes four scales: sensitivity-insensitivity; attachment-rejection; support-ignoring and efficiency-intervention. The questionnaire assessing emotional intelligence level includes three scales: interpersonal emotional intelligence (EI), intrapersonal EI, emotions understanding, emotion management, some

subscales and aggregate indicator of EI. It was showed earlier that both questionnaires were valid and reliable [42, 43].

The complex assessment of the children's state of health was based on six main indicators (criteria) of health [16]. These indicators are used by all doctors in the state clinics in Russia for child health assessment. We used the results of the doctor's assessments from the individual records of the children. The first criterion: peculiarities of ontogeny (individual development) described according to the genealogical, biological and social anamnesis. The second criterion: a degree of physical development and its harmoniousness. The physical development of the child was assessed by means of the comparison of individual indicators (body length and weight, chest circumference, etc.) and age standards. At that, body length was the most informative and leading feature in the evaluation of physical development. It was important not only to solve the question of correspondence of the physical development indicators of the child to his/her age but also to assess the harmoniousness of his/her development.

The third criterion: a level of nervous and mental development of the child depends upon both central nervous system state of the child, musculoskeletal system and the environment effect.

The fourth criterion: a level of organism resistance assessed by the quantity of acute diseases during the year preceding the examination. According to this criterion, the children were divided into two groups: with good resistance of organism (having had no diseases during a year, or having had diseases from one to three times); with a lower resistance of organism (having had diseases more than four times a year). The fifth criterion: a level of the functional state of organism based on the aggregate of results of laboratory and instrumental examinations of the child (pulse rate, breath, hemoglobin content in the blood and so on), analysis of his or her behavior and adaptive capabilities. The mother accumulated knowledge about the child's behavior during everyday contact with him or her. The following parameters were assessed during the observation of the child: emotional state, mood, sleep, wake, appetite and the nature of relationships with children and adults, at an older age—the ability to concentrate, attention and fatigability. It was important to take into account individual peculiarities of behavior.

The sixth criterion: the presence or absence of chronic diseases or congenital malformation.

Based on the complex assessment of the above-mentioned criteria, five groups of health were distinguished:

Group I: healthy children having no abnormalities according to all the six criteria.

Group II-A: children having abnormalities according to the first criterion only (ontogeny peculiarities).

Group II-B: children having some functional disorders (including behavior), physical and/or nervous and mental developmental disturbances (or without any of them) and frequent illnesses.

Group III: children having chronic diseases at the stage of compensation, that is, without any disorders of health.

Group IV: children having chronic diseases exacerbating 2–4 times per year, at the stage of subcompensation.

Group V: children having chronic diseases at the stage of decompensation.

### **2.3 Research techniques**

We received permits from the children's parents to use the information from their individual medical records. Mothers with children went to the doctor

(in Russia mothers of the first-year-old children show their children to the doctors each month) and filled in the questionnaires when the doctor analyzed the health of the child. Then they showed the doctor's records for the researchers. They received the psychological consultations if they participate in the investigation.

For the statistical analysis, the program SPSS-22 was used.

### 3. Results and discussion

The analysis of the data about the pregnancy of the mothers having first- and second-year-old children showed the following results. About 62% of the mothers of first-year-old children and 66% of the mothers of second-year-old children had a first pregnancy. About 26% of the women had a second one. A total of 6% of the mothers of children aged under one-year-old and 2% of the mothers of children at the age of 1–2 years old had a third pregnancy; 4 and 2% correspondingly—a fourth and fifth one, and as little as 1% of the mothers of second-year-old children had a sixth pregnancy.

Interpreting the data about planned and unintended pregnancy, it was noteworthy that the child was “planned and desired” for 72% of the mothers of first-year-old children and 62% of the mothers of second-year-old children. The baby was “unexpected but desired” for 28 and 38% of the women correspondingly. At that, the majority of the mothers (72%), having children aged less than 2 years old, experienced joy, having learned about their pregnancy. Thus, the total sample consisted of 200 subjects under test; there were 50 dyads of “the mother-the first-year-old child” (mean age of the mothers is  $24.5 \pm 5.6$  years old) and 50 dyads of “the mother-the second-year-old child” (mean age of the mothers is  $25.5 \pm 4.9$  years old).

#### 3.1 Description of health peculiarities in the children during the first 2 years of life

Based on **Table 1**, in the maternity hospital, the first-year-old children at the moment of examination get approximately the same number of diagnoses: two ones per child on the average. During the first year of living, the number of diagnoses diminishes; and there is one diagnosis per two second-year-old children. That fall of incidence is statistically significant. There are no significant differences in these parameters for the boys and girls.

In spite of the incidence fall, valid differences in the number of the children in the different groups of health at the first and second years of life are not found. This is accounted for that many second-year-old children are identified as group 2A. It includes the children who have no diseases and are almost healthy except these or other peculiarities of the anamnesis at the present moment. As described further, almost all of them have abnormalities owing exactly to the biological anamnesis of the mother.

The obtained results required a more in-depth consideration of morbidity (**Table 2**). The data (in %), obtained and presented in **Table 2**, show that the most widespread diseases are intrauterine hypoxia and physiological jaundice diagnosed in the children during their stay in the maternity ward. Almost all the children have one or the other disease at birth (90% of the first-year-old children, 96% of the second-year-old children). By the end of the first year of life, the diagnoses are canceled in 40% of the children, and in 60% of the children during the second year of life.

Parameters	The number of diagnosis					
	The first-year-old children			The second-year-old children		
	All children	Girls	Boys	All children	Girls	Boys
The number of diagnoses made in the maternity hospital	2.0 ± 1.1	2.0 ± 1.1	2.2 ± 1.0	2.4 ± 1.5	2.6 ± 1.7	2.2 ± 1.3
The number of diagnosis made by a local doctor	1.2 ± 1.1	1.2 ± 1.1	1.2 ± 1.2	0.6 ± 0.9**	0.8 ± 0.9	0.7 ± 1.0
*Differences between of the first and second old children p = 0.95. **p = 0.99 (there and late T-criterion).						

**Table 1.**  
*The number of diagnosis of the children made in the maternity hospital and by local doctors.*

The data, obtained and presented in **Table 2**, show that the most widespread diseases are intrauterine hypoxia and physiological jaundice diagnosed in the children during their stay in the maternity ward. Almost all the children have one or the other disease at birth (90% of the first-year-old children, 96% of the second-year-old children). By the end of the first year of life, the diagnoses are canceled in 40% of the children, and in 60% of the children during the second year of life. These disorders are the typical one during pregnancy in many countries [3, 15, 21, 24, 44, 45]. This is a typical distribution of neonatal morbidity in Russia [12, 41].

In **Table 3**, there are data about the number of canceled and non-canceled diagnoses for each of the diseases made by a local doctor earlier during the first 2 years. It is evident that during the second year of life already, a major part of the children come to the healthy group (retaining health group II-A because of the burdened anamnesis). There are no differences in this parameter between the boys and girls.

Thus, after the analysis of the medical histories of the children, one can say that the percentage of the healthy children at birth is very small. But the situation changes substantially during the first 2 years of living: a major part of the children's diagnoses are canceled by a local doctor. That is why it is highly important to explore the reasons, which enhance the probability of recovery during the most flexible period of the child's life.

**3.2 The interrelation of the biological anamnesis of the mother with the health of the first- and second-year-old children**

By the end of the first 2 years of life, a major part of the children passes to the group of healthy children. There appears a question of particular peculiarities of the psychological state of the mother that might be predictors of positive changes in the child's health at that time. Since morbidity at birth is often accounted for anomalies during gestation and childbirth, then the comparison of biological anamnesis of the mother and peculiarities of the child's health during the first years of living is of interest. Of course, not only the mother's health and diseases predetermine that change but they make their contribution to it. According to our



The name of the diagnosis of the child made in the maternity ward	The first-year-old children	The second-year-old children
1. Intrauterine hypoxia	64	52
2. Physiological jaundice	42	60
3. Conjugation jaundice	4	6
4. Risk group due to perinatal encephalopathy	15	8
5. Perinatal damage of central nervous system (CNS)	4	6
6. Excitation syndrome	2	2
7. Toxic erythema	12	6
8. Hemorrhage in the skin	12	20
9. Prematurity	0	2
10. Morphofunctional immaturity	2	2
11. Edema syndrome	2	2
12. Low birth weight	2	6
13. Large child	8	6
14. Asphyxia of low level	4	4
15. Asphyxia of mean level	4	0
16. Asphyxia of high level	2	0
17. Intrauterine growth restriction by hypotrophic type	4	2
18. Cardiopathy	4	2
19. Pathological loss of body weight	2	8
20. Umbilical hernia	0	2
21. Chin tremor	0	2
22. Low muscle tones	0	2
23. Muscle hypertonus	0	2
24. Respiratory distress syndrome of type 1	0	2
25. Hypoxic damage of CNS	0	2
26. The syndrome of CNS depression	0	2
27. Oxygen-dependent child	0	2
28. Depressed reflexes	0	2
29. Mammary glands engorgement	0	4
30. Right parietal cephalohematoma	0	4
31. Perinatal contact with chronic hepatitis C virus	2	2
32. Umbilical cord entanglement around the neck	2	2
33. Nappy rash	0	2
34. Hyperbilirubinemia	0	2
35. The right-side dacryocystitis	0	2
36. The left-side dacryocystitis	0	2
37. The left-side flat valgus foot	2	2
38. Reduced film of the tear duct	0	4
39. Papilloma of the left areola	2	0
40. Urinary tract infection	2	0

The name of the diagnosis of the child made in the maternity ward	The first-year-old children	The second-year-old children
41. Ankyloglossia	2	0
42. The right clavicle fracture	2	0
43. Polycythemia	2	0
44. Intrauterine hypotrophy	2	0

**Table 2.**  
*The children's diagnoses made in the maternity hospital (%).*

The name of the diagnosis of the child made by local doctor	The ratio of the canceled and non-canceled diagnoses of children					
	The first-year-old			The second-year-old		
	Number of diagnoses	Canceled	Non-canceled	Number of diagnoses	Cancelled	Non-canceled
Perinatal encephalopathy	86	24	62	80	64	16
Moving disorders	54	20	34	48	36	12
Excitation syndrome	6	2	4	8	4	4
Anemia	2	0	2	4	0	4
Atopic dermatitis	4	2	2	4	0	4
Flat valgus foot	2	0	2	0	0	0
Pyelectasis	2	0	2	0	0	0
Dysplasia of the hip joints	2	0	2	0	0	0
Hypotrophy of the 1,2,3 degrees	0	0	0	6	6	0
Inguinal hernia	0	0	0	4	0	4
Paratrophy	2	2	0	2	0	2
Cardiopathy	2	0	2	0	0	0
Little anomaly of heart development	0	0	0	2	0	2

**Table 3.**  
*The ratio of the canceled and non-canceled diagnoses for each of the diseases made by a local doctor.*

data, the mothers of the first- and second-year-old children do not differ between one another in the parameters of biological anamnesis.

Further, we have fulfilled correlation analysis (the Spearman's coefficient) aiming to identify relations between the children's health parameters and parameters of biological anamnesis of the mothers. There is a positive connection between the number of the diagnoses in the first- and second-year-old children during their stay in the maternity ward and perinatal pathology factors of the mother ( $r = 0.336$ ,  $p \leq 0.001$  for the first-year-old children;  $r = 0.226$ ,  $p \leq 0.05$  for the second-year-old children). Besides, the interrelation between the number of perinatal pathology

factors and health group of the first- and second-year-old children is observed ( $r = 0.243$ ,  $p \leq 0.02$  for the first-year-old children;  $r = 0.281$ ,  $p \leq 0.01$  for the second-year-old children). There is no significant interrelation between the number of the diagnoses in the second-year-old children and perinatal pathology factors of their mothers. That is connected with that a part of diagnoses has been canceled by the moment of the examination of the child. However, the number of the diagnoses in the first-year-old children made by a local doctor is validly connected ( $r = 0.478$ ,  $p \leq 0.001$ ) with the quantity of perinatal pathology factors identified during their mothers' pregnancy.

There is a positive interrelation between the health group type of the second-year-old children and the presence of abortions made before by their mothers ( $r = 0.213$ ,  $p \leq 0.05$ ). One should point out that no similar relation is found in the first-year-old children. The obtained data evidence a negative effect of abortions on the children's health. It manifests and is detected after some time only. The results obtained in correlation analysis correspond to the results of single-factor analysis of variance. It has shown that exactly the number of the perinatal pathology factors of the mother influences the number of the children's diagnoses made in the maternity hospital (where  $F = 9.565$ ,  $p = 0.003$  for the first-year-old children;  $F = 5.014$ ,  $p = 0.030$  for the second-year-old children).

We have analyzed 28 parameters indicating the presence of pathology in the mother. Based on them, the control of the state of health and prevention of abnormalities are performed in the children who have risks of getting central nervous system disorders at the maternity house. The analysis reveals that only 8% of the mothers of first-year-old children and 14% of the second-year-old children are almost healthy. About 74 and 62% of the mothers have different extragenital diseases. The obstetric anamneses of 24% of the mothers, having first-year-old children, are burdened with abortions, 22% of the mothers—having second-year-old children. The anamneses of 8 and 10% of the women correspondingly are burden with miscarriage. The current pregnancy of 34% of the mothers of first-year-old children and 22% of the mothers of second-year-old children is complicated by the threat of abortion. In 18 and 10% of the mothers of children aged under 2 years old, it is accompanied by placental insufficiency. In 14% of the women, there is an immunological incompatibility of blood of the mother and the fetus. Besides, 6% of the women having first-year-old children and 2% of the women having second-year-old children have got the symptoms of fetal hypoxia. About 14% of the mothers of first-year-old children and 10% of the mothers of second-year-old children are characterized by weakness of labor. The dominant factors in the structure of extragenital anomalies of the mothers of first- and second-year-old children (as in some other investigations) are iron deficiency anemia (26%), kidney diseases (28 and 30%) and vegetovascular dystonia (24 and 20%).

In our further analysis, all the factors are divided into three groups according to the period of impact:

1. Detrimental factors during the progenesis.
2. Adverse factors during the antenatal period.
3. Adverse factors during the birth period (the intranatal period).

We cannot detect any role of factors in progenesis, since we have observed the women regarding the gestation responsibly and regularly consulting with a gynecologist during their pregnancy. Only 4% of the mothers of first-year-old children smoke; and among the mothers of second-year-old children, there are no women

with bad habits. About 4% of the mothers of children aged under one-year-old and 12% of the mothers of second-year-old children have gynecological diseases in the anamnesis.

But we have been able to show the influence of the factors of perinatal pathology in the mother during the antenatal period on the future health of the child. The most significant factors of risk of the child's morbidity are the following: the threat of abortion (34% of the first-year-old children's mothers and 22% of the second-year-old children's mothers), anemia (26%), vegetovascular dystonia (24 and 20%), kidney diseases (28 and 30%) and chronic fetoplacental insufficiency (18 and 10%). During the intranatal period, the significant risk factors of perinatal pathology of the mothers, exerting influence upon the health of the first- and second-year-old children, are episiotomy (20 and 26%), cesarean (26 and 16%), premature rupture of membranes (20 and 18%) and weakness of labor activity (14 and 10%). We have not found any substantial differences in the pathology of the mothers of two groups. But this distribution shows the typical situation for pregnant women in Russia [25].

Correlation analysis of the results about the interrelation of the number of diagnoses in the first-year-old children, made by a local doctor, with perinatal anomaly factors during the antenatal period is in **Table 4**. We have found the significant relation of the children's morbidity with fetoplacental insufficiency during pregnancy ( $r = 0.444$ ,  $p < 0.001$ ) as well as with threat of abortion ( $r = 0.379$ ,  $p < 0.01$ ) and gestosis in the mother during pregnancy ( $r = 0.353$ ,  $p < 0.01$ ). We have revealed the close positive relation between the first-year-old children's health deterioration and iron deficiency anemia ( $r = 0.330$ ,  $p < 0.02$ ) and kidney diseases ( $r = 0.276$ ,  $p < 0.05$ ) through the mother. That is, the more diseases the mother has, the higher number of diseases the first-year-old children have.

There is no significant correlation relationship between the number of diseases of the second-year-old children and perinatal pathology factors of the mother during the antenatal period. However, significant interconnection is found between the number of diseases of the second-year-old children and iron efficiency anemia ( $r = 0.382$ ,  $p < 0.01$ ), varicosity ( $r = 0.332$ ,  $p < 0.02$ ), and the mother's kidney diseases ( $r = 0.281$ ,  $p < 0.05$ ). The analysis of the results about the interrelation of the number of diagnoses in the first-year-old children (by a local doctor) with the perinatal pathology factors of the mother during the intranatal period is in **Table 5**. It has revealed the significance of that dependence with weakness of birth activity ( $r = 0.354$ ,  $p < 0.001$ ). There is no similar association in the second-year-old children.

Mother's perinatal pathology	The number of diagnoses, made by a local doctor	
	The first-year-old children	The second-year-old children
Fetoplacental insufficiency	$r = 0.444$ , $p < 0.001$	$p > 0.05$
Threat of abortion	$r = 0.379$ , $p < 0.01$	$p > 0.05$
Gestosis	$r = 0.353$ , $p < 0.01$	$p > 0.05$
Iron efficiency anemia	$r = 0.330$ , $p < 0.02$	$r = 0.382$ , $p < 0.01$
Kidney diseases	$r = 0.276$ , $p < 0.05$	$r = 0.281$ , $p < 0.05$
Varicosity	$p > 0.05$	$r = 0.322$ , $p < 0.02$

**Table 4.**  
*Correlations between the number of diagnosis and factors of the mother's perinatal pathology.*



We have revealed (**Table 5**) close interrelation between the number of diagnoses, made by a local doctor, and premature childbirth of the mother ( $r = 0.663$ ,  $p < 0.001$ ) for the second-year-old children.

One might suppose that the degree of influence of those factors upon children of different sex would be different (**Table 6**). We have found close positive interconnection between the number of the first-year-old girls' diagnoses and their mothers' diseases of the cardiovascular system ( $r = 0.581$ ,  $p < 0.01$ ), iron deficiency anemia and kidney diseases ( $r = 0.529$ ,  $p < 0.02$ ;  $r = 0.463$ ,  $p < 0.05$ ) as well as fetoplacental insufficiency ( $r = 0.489$ ,  $p < 0.05$ ). As for the boys, there is a positive relationship between the number of diagnoses and gestosis in the mother during pregnancy ( $r = 0.400$ ,  $p < 0.001$ ), the threat of premature childbirth ( $r = 0.374$ ,  $p < 0.05$ ), immunological incompatibility of blood of the mother and the fetus ( $r = 0.457$ ,  $p < 0.01$ ) and kidney diseases ( $r = 0.391$ ,  $p < 0.01$ ).

The analysis of the results about the relationship of the number of diagnoses in the second-year-old girls with the perinatal pathology factors during the antenatal period reveals significant dependence between the child's morbidity and iron deficiency anemia and edema in the mother during pregnancy ( $r = 0.509$ ,  $p < 0.02$ ;  $r = 0.780$ ,  $p < 0.001$  correspondingly). It is noteworthy that close relationship is found between the number of diseases in the second-year-old boys and kidney diseases in the mother ( $r = 0.484$ ,  $p < 0.01$ ). Besides, significant positive relation is identified between the number of diseases in the second-year-old boys and negative Rh factor of the mother ( $r = 0.508$ ,  $p < 0.001$ ), and iron deficiency anemia ( $r = 0.494$ ,  $p < 0.01$ ).

The result of correlation analysis between the antenatal pathology factors of the mother and the number of diagnoses, made by a local doctor separately for the boys and girls, are in **Table 6**.

Further, we carry out correlation analysis aimed at identifying the interrelation of the number of diagnoses in the boys and girls, made by a local doctor, with the perinatal anomaly factors during the intranatal period (**Table 7**).

Close positive connection reveals between the number of diagnoses in the first-year-old girls, made by a local doctor, and episiotomy ( $r = 0.552$ ,  $p < 0.01$ ), and premature rupture of membranes in the mother ( $r = 0.586$ ,  $p < 0.01$ ). There is association between the number of diagnoses of the first-year-old boys and weakness of labor activity of the mother ( $r = 0.457$ ,  $p < 0.01$ ).

The analysis of the results about the interconnection between the number of diagnoses in the second-year-old girls and the perinatal pathology factors during delivery reveals significant dependence, the defect of the placenta ( $r = 0.780$ ,  $p < 0.001$ ) and manual control of the uterine cavity at childbirth ( $r = 0.453$ ,  $p < 0.05$ ). There is no significance of the same associations in the second-year-old boys. Subsequently, the health of children aged under 2 years old changes significantly during the first 2 years of life. The less factors of perinatal anomalies the

Pathology factors of the mother during the intranatal period	The number of diagnoses of children	
	The first-year-old children	The second-year-old children
weakness of birth activity	$r = 0.354$ , $p < 0.01$	$p > 0.05$
premature childbirth	$p > 0.05$	$r = 0.633$ , $p < 0.001$

**Table 5.**  
*The interrelation of the number of diagnoses of children (by a local doctor) with the perinatal pathology factors of the mother during the intranatal period.*

The antenatal pathology factors of the mother	The number of diagnoses made by a local doctor			
	The first-year-old children		The second-year-old children	
	Girls	Boys	Girls	Boys
Number of diagnoses of boys and girls (by a local doctor)				
Fetoplacental insufficiency	$r = 0.489,$ $p < 0.05$	$p > 0.05$	$p > 0.05$	$p > 0.05$
Gestosis	$p > 0.05$	$r = 0.400,$ $p < 0.001$	$p > 0.05$	$p > 0.05$
The threat of premature childbirth	$p > 0.05$	$r = 0.374,$ $p < 0.05$	$p > 0.05$	$p > 0.05$
Diseases of the cardiovascular system	$r = 0.581,$ $p < 0.01$	$p > 0.05$	$p > 0.05$	$p > 0.05$
Iron deficiency anemia	$r = 0.529,$ $p < 0.02$	$p > 0.05$	$r = 0.509,$ $p < 0.02$	$r = 0.494,$ $p < 0.01$
Kidney diseases	$r = 0.463,$ $p < 0.05$	$r = 0.391,$ $p < 0.01$	$p > 0.05$	$r = 0.484,$ $p < 0.01$
Immunological incompatibility of blood	$p > 0.05$	$r = 0.457,$ $p < 0.01$	$p > 0.05$	$r = 0.508,$ $p < 0.001$
Edema	$p > 0.05$	$p > 0.05$	$r = 0.780,$ $p < 0.001$	$p > 0.05$

**Table 6.**  
*The interrelation of the number of diagnoses of boys and girls (by a local doctor) with the perinatal pathology factors of the mother during the antenatal period.*

The intranatal pathology factors of the mother	Of the number of diagnoses made by a local doctor			
	The first-year-old children		The second-year-old children	
	Girls	Boys	Girls	Boys
Episiotomy	$r = 0.552,$ $p < 0.01$	$p > 0.05$	$p > 0.05$	$p > 0.05$
premature rupture of membranes	$r = 0.586,$ $p < 0.01$	$p > 0.05$	$p > 0.05$	$p > 0.05$
weakness of labor activity	$p > 0.05$	$r = 0.457,$ $p < 0.01$	$p > 0.05$	$p > 0.05$
the defect of the placenta	$p > 0.05$	$p > 0.05$	$r = 0.780,$ $<0.001$	$p > 0.05$
manual control of the uterine cavity	$p > 0.05$	$p > 0.05$	$r = 0.453,$ $p < 0.05$	$p > 0.05$

**Table 7.**  
*The interrelation of the number of diagnoses of boys and girls (by a local doctor) with the perinatal pathology factors of the mother during the intranatal period.*

mother has got, the more positive prognosis with regard to the child's health is. The most widespread diagnoses of the child at birth are encephalopathy and syndrome of motor disorders. The leading groups of the factors of perinatal pathology of the mother are extragenital diseases and birth activity complications. The change of the relationship between the number of diagnoses of the children at the age of the first 2 years old and the perinatal pathology factors of the mother is different in the boys and girls.

Maternal pathology leads to low level of oxygen during pregnancy and followed the different child disorders [46].

### **3.3 The influence of psychological features of the mother on the child's health**

It is obvious that not only perinatal pathology contributes to the health of the child at an early age [46]. Moreover, the success of child care during the first years of life is determined by psychological features of the mother. And that is why we will address the assessment of the influence of emotional reaction of the mother to the child's health status. Univariate analysis of variance is carried out to evaluate the influence of independent variable "the degree of the mother's attachment to the child" [47, 48] on the future possible cancelation of the child's diagnosis by a local doctor. The significant influence is obtained for one scale of the questionnaire only. Based on the results of the research, the degree of acceptance of the child (the acceptance-rejection scale) by the mothers of first-year-old children exerts influence on the probability of cancelation of the child's diagnosis made by a local pediatrician ( $F = 6.829$ ,  $p < 0.003$ ) during the first 2 years.

There are no differences between the mothers of first- and second-year-old children according to the degrees of attachment. About 54% of the mothers of each group are characterized by low degree of attachment; 44 and 42% correspondingly are characterized by mean degree. Only 2 and 4% of the mothers of first- and second-year-old children have high degree of attachment. No mothers with maternal deprivation are identified. Positive prognosis in terms of health of the first-year-old children depends upon the degree of acceptance of the child by the mother: the higher the value on the acceptance-rejection scale is, the better the child's health is. Our data point to the absence of differences in the features of emotional intelligence of the mothers of the first- and second-year-old children. The similarity of emotional intelligence of the mothers is explained by that they represent the same social environment.

The research results show that the majority of the mothers are characterized by low level of the capability to understand and control their own and other emotions as well as of interpersonal, intrapersonal and general emotional intelligence. There are no mothers with high level of emotional intelligence. Probably, that is why we do not find any association between emotional intelligence of the mother and the probability of cancelation of the child's diagnosis either in variance or correlation analysis. At the same time, in a sample of the mothers of second-year-old children, univariate analysis of variance reveals the influence of independent variables "understanding of other emotions" and "general emotional intelligence" on dependent variable "degree of attachment" ( $F = 2.115$ ,  $p = 0.051$ ;  $F = 2.618$ ,  $p = 0.029$ ). The better the understanding of other emotions and general emotional intelligence are, the higher the degree of attachment is. We have detected the influence of independent variables "understanding of other emotions", "control of expression" and "control of one's own and other emotions" on dependent variable "sensitivity-insensitivity" (correspondingly,  $F = 3.741$ ,  $p = 0.002$ ;  $F = 3.714$ ,  $p = 0.003$ ;  $F = 2.747$ ,  $p = 0.015$ ). The higher the values of the structural components of emotional intelligence are, the more efficient the mother is. That is, she respects for the child's independency to a greater extent.

Our data refer only to those women who led predominantly healthy lives before pregnancy and actively cared for the child immediately after his (her) birth. It is consistent with a large number of studies showing the dependence of the health level of the child at birth on both the mother's health before pregnancy and her pathology that arose during pregnancy and during childbirth [1, 7, 18, 19]. Our data show that the acceptance of the child is the main psychological factor that

contributes to the recovery of the child by the end of the second year his (her) life. At the same time, there are no significant effects between the parameters of emotional intelligence and the child's recovery. Although the parameters of emotional intelligence affect the sensitivity of the mother to the child needs. Perhaps in another sample, in which mothers with high level of the emotional intelligence would participate, such connections will be found.

#### **4. Conclusions**

Almost all the children at birth have one or the other diagnosis (96% of the first- and second-year-old children). But by the end of the first year of life, diagnoses are canceled in 40% of the children by a local doctor, and during the second year of life—in 60% of the children. The most widespread diagnose of the child at birth is perinatal encephalopathy and syndrome of motor disorders.

Only 8% of the first-year-old children's mothers and 14% of the second-year-old children's mothers are almost healthy. The less factors of perinatal pathology there are in the mother, the more positive the prognosis with regard to the child's health within the first 2 years of living is. The association of morbidity of the children with the factors of perinatal pathology of the mother is the most pronounced during the first year of living. During the second year of life, the boys' health is less dependent on those factors than that of the girls.

There are differences between the mothers of first- and second-year-old children according to the degrees of attachment. About 54% of the mothers of each group are characterized by low degree of attachment; 44 and 42% correspondingly are characterized by mean degree. Only 2 and 4% of the mothers of the first- and second-year-old children are characterized by high degree of attachment. No mothers with maternal deprivation have been identified. Positive prognosis with regard to the first-year-old children's health depends upon the acceptance of the child by the mother: the higher the value on the scale of acceptance-nonacceptance is, the better the child's health is.

The degree of emotional intelligence of the mother is not associated with the probability of cancelation of the child's diagnosis.

#### **Acknowledgements**

The work was supported by the grant of the Russian Fund of the Fundamental Researches# 18-413-480007.

#### **Conflict of interest**

We have no any conflict of interest.



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