

Comprehensive Integrated Assessment of Health, Lifestyle and Medical Services for Children at the Age of their First Year

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Abstract

Introduction: Children are the main value of any society, which plays a huge role in its development and prosperity. Meanwhile, they are the most vulnerable sector that have to be protected from negative physical and mental factors as well as diseases. A wide range of factors can affect the health of children, especially in their first year of life. Deep knowledge on those triggers may help to reduce the risk of developing different pathological conditions among them.

Materials and Method: An integrated analysis and risk assessment of different pathologies in 767 outpatient children under 1 year were conducted. A survey of the parents of those children was also conducted. The objectivity of the information obtained is guaranteed by the directed application of the method and techniques used in public health and healthcare, namely, medical-statistical analysis, sociological, psychological and expert analysis.

Results: Many children had a low risk of developing chronic diseases, including those with a hereditary predisposition and had a IIB health group, these are children with background of conditions and risk factors that can cause the formation of a chronic pathology. The third group of healthy children was represented by children with chronic pathology in the stage of compensation, the number of such babies was small ($5.9\pm 0.85\%$), as well as healthy babies with I ($6.0\pm 0.86\%$) and II A ($4.2\pm 0.72\%$) by health groups. Furthermore, more than half of the children of the first year of life had a normal functional state of the body. However, in 43% of cases, the functional state was impaired, which is manifested by the presence of various pathological conditions.

Conclusion: Comprehensive integrated approach and using evidence-based medicine principles for studying the medical conditions in children under 1 year-old can be valuable and help us to obtain reliable data on the health conditions and affecting risk factors.

Keywords: *Children of the first year of life, functional state, health group, medical care, evidence-based medicine.*

Introduction

Maintaining the health of a child is an essential part of the task of ensuring the health of a nation, which reduces the creation of necessary set of conditions and an overall improvement in the quality of life, politically and legally constituting one of the foundations of national security (De Jong et al, 2017)⁸. In general, we are talking about a set of special measures that protect the health of children, their development, starting from birth. Children are the main value of society, contributing to its development

and prosperity, but at the same time they are the most vulnerable part, which needs protection from diseases, physical and mental factors.

Recent decades have determined the need for a transition to more modern, cost-effective and effective preventive technologies for maintaining and optimizing the health of the child population, especially children from birth to 1 year. Among all age groups, special attention should be paid to young children, since it is during this period that risk factors can be realized and

various chronic pathologies can form (Da Cunha et al, 2016)⁷. A variety of factors can influence the health of a child in its first year of life, the knowing those triggers may help to reduce the risk of developing different pathological conditions.

During the last few years, many studies have been published in the literature that reflect this topic of issues. Perinatal damage to the central nervous system (CNS) is the most frequently detected pathology in children of the first year of their life (Sovetkhan et al, 2019)³. There is evidence of a relationship between central nervous system prenatal damage and somatic pathologies, as well as the negative impact of prenatal injuries of central nervous system on neuropsychic development and mental health of children (Dvorkina et al, 2015)².

Rickets is the most common background disease in young children (TT C, 2016)⁶. However, due to several reasons, the diagnosis of rickets is not always established by local pediatricians. Yerenkov et al. (2016) suggests using ultrasonic densitometry in order to increase the efficiency of diagnosis of rickets in young children.

Another common background disease is iron deficiency anemia (IDA) among children (Dvorkina et al, 2015)². Ivanova et al. proved that there was a link of between iron deficiency anemia with a slowdown of psychomotor development in children of the first year of life. It has been proven that anemia with its untimely and inadequate treatment can irreversibly affect cognitive functions (Peterkova et al, 2016).

An electrocardiographic study is widely implemented in diagnostic algorithms for assessing the health status of young children. When studying the state of the cardiovascular system in children of the first year of life, Kharlamova et al. detected posthypoxic cardiopathy in 76.4% of children, however, in half of them, it's the symptoms extinguished by the age of one month (Bezler & Galitsa, 2015)¹. Congenital heart defects are also diagnosed frequently in the early neonatal period (Peterkova et al, 2016)³. An echocardiographic examination of 1012 children in the first half of life indicates a high incidence of minor cardiac abnormalities, in particular, additional trabeculae in the cavity of the left ventricle. In the study of Kuleshova et al (2014), a high frequency of functional disorders of the digestive tract, especially in children in the first half of life was proved. The health of children in their first year of life largely depends on the type of feeding. Kashin et al.

(2005), analyzing the physical development of children of the first year of life depending on the type of feeding, showed that children who were on early artificial feeding had higher weight growth rates by the end of the first year of life. However, in the group of babies who were breast-fed for a long time, a mesosomatic body type (85.3%) with harmonious development (84.1%) was more often observed. Similar data was presented by other authors (Puzankova et al, 2015; Savchenko et al, 2015). (De Jong M CATJvWM. 2017; Atyasova et al 2005)⁸ showed that infants who were breast-fed are 1.8 times more likely to be diagnosed with dystrophy, 2 times more likely to have deficiency anemia, and 1.7 times more purulent-septic diseases compared to breastfed babies¹.

Legonkova et al. (2011)¹⁰ conducted a multicenter open comparative prospective study, which aimed to study the health status of children who were on different types of feeding. As a result of long-term observation, it was shown that children receiving breast milk had higher rates of physical and neuropsychic development, a lower incidence of acute respiratory diseases and atopic dermatitis.

Clinical examination is a dynamic monitoring of the level of development and the state of health (of children) with the aim of early diagnosis of initial deviations, timely correction as well as providing the conditions necessary for an optimal state of health and development (Bezler & Galitsa, 2015)¹.

The main methodological principles of dispensary observation in the first year of life are as follows: 1) continuous coverage of children living in the polyclinic service area, the unity of the preventive and medical work of the district doctor; 2) differentiated monitoring of children and preventive, improving, curative measures, depending on the individual characteristics of the child; 3) the leading role of the district children's clinic (or district central hospitals) in the follow-up with the wide involvement of advisory centers; continuity between institutions of various profiles in the examination and management of children; 4) a prognostic approach in assessing the capabilities of the immediate and distant level of health and development of the child; 5) the introduction of new non-traumatic method of preclinical diagnosis and computer monitoring (integrated automated systems) of medical examinations and the dynamics of children's health indicators. Thus, the only way to improve the health of young children, reduce their morbidity and disability is to fully strengthen the

state pediatric service and its central link responsible for medical examination - children's district polyclinics - with the widest participation of specialists from research institutes and departments of pediatrics in medical examinations of the pediatric population, pediatric centers.

Purpose of the study is to develop recommendations for improving the treatment and preventive care for children in their first year of life based on a comprehensive study of their health status and lifestyle.

Materials and Method

To achieve this goal, it is necessary to identify the risk factors for morbidity and mortality in children of the first year of life. It is also need to be identified the combinations of risk factors that are most unfavorable from the point of view of the development of morbidity and the occurrence of a "death case" in children of the first year of life. As for the interaction of risk factors with each other, as well as with factors that favorably affect the child's body, these issues have been studied extremely insufficiently. An increase in the incidence of the disease, an increase in the proportion of children often ill in the structure of the incidence of children in many countries, are attributed by most authors to changes in the conditions and lifestyle of families. The study of the interaction of health and lifestyle with the use of multivariate analysis can make a significant contribution to the development and improvement of the primary and secondary prevention of children. The approaches to choosing an object of study for studying the lifestyle on the health of children in their first year of life can be different, and each approach, in our opinion, has a number of advantages and disadvantages. The elimination of these shortcomings can be promoted by a combination of separate approaches, each of which involves solving a separate problem. An integrated approach to the selection of the object of study, in our opinion, makes it possible to obtain more informative data. In this article we will consider some approaches to the selection of the object of socio-hygienic research, the influence of the lifestyle of the development of diseases and the occurrence of a "death case" of children of the first year of life. First of all, it is necessary to decide which group of children should be examined to identify risk factors for children's health. Risk factors for disease, death act on the body until the moment when an accurate diagnosis is made or the causes of death are identified.

From our point of view, their identification can be approached in two ways: by conducting a retrospective study using the analytical method and by prospectively studying risk groups selected taking into account known factors. The first of these approaches is used more often and is technically simple. In this case, the examined group of children (patients - often ill) is formed with a confirmed, specified and final diagnosis or cause of death. A control group may be - health of children (who have never been ill for a year) of the same age and gender.

To characterize the choice of research base, from our point of view, is essential. The volume (n) and sampling method (cluster, stratified, random mechanical, randomized) were determined. The second approach to the selection of the object of study is based on known risk factors for morbidity and causes of death in children of the first year of life. Since the number of these factors is very significant, it is necessary to consider which of them should be relied upon in the selection of the studied group of children to study the influence of lifestyle, diagnosis on morbidity, or causes of death of children. For example: rest and nutrition of pregnant women, body weight at birth, the nature of feeding, may themselves be the result of a particular lifestyle and, therefore, are not suitable for the selection of the studied group.

Study Population: Based on the foregoing, 767 outpatient records of children under 1 year were analyzed. A survey of the parents of those children was also conducted. The objectivity of the information obtained is guaranteed by the directed application of the method and techniques used in public health and healthcare, namely, medical-statistical analysis, sociological, psychological and expert analysis.

In our opinion, for the selection of the examined group in order to prospectively study the impact of lifestyle on children's health, it is possible to use factors such as the mother's age (up to 20 years), the body weight of the child at birth (up to 1,500 grams), the sex of the child, the order of birth a child.

In this case, control groups are selected in accordance with which of the factors is taken as the basis for the choice of the examined group. So in the control group can include healthy children born to mothers whose age was 21-24 years old, born from 2-3 pregnancies, with a body weight at birth of 3000-3499 gr. So, the control group should correspond to the subject - by age, gender,

place of residence, examination of children in family clinics. In the study, it should be kept in mind that often male children born from mothers up to 20 years old, from the first birth, with low birth weight, who were breastfed, are ill. One of the criteria for children's health is the assessment of ontogenesis features.

In the study, the risk group selected by such factors as the age of the mother, gender, the child's birth order, and body weight of the child at birth should be used to compare the lifestyle of children who are often ill and who have never been ill during the study period, and observation should be carried out from their birth and during the first year of life.

Statistical Analysis: For statistical processing and analysis of the obtained data, personal computers of the Intel Centrino type (Core2 Duo) and Microsoft Office 2007 packages were used.

Results

In order to evaluate ontogenesis, genealogical, biological, and social anamnesis were collected, and the burden coefficient of the genealogical anamnesis in children of the first year of life was calculated and gained the results as follow (Table 1).

Table 1: The structure of the genealogical history in children of the first year of life by burden ratio (M±t, %)

Burden coefficient	Children under the study n = 767
Low	58,03±1,80***
Moderate	41,97±2,73
Significant	-
High	-

Note: *** - p < 0.001

The table shows that most children had a low risk of developing chronic diseases, including those with a hereditary predisposition.

As a result of a comprehensive assessment of the health status of children in the first year of life, a health group was determined (Table 2).

Most of the children under one year old had a IIB health group, these are children with background of conditions and risk factors that can cause the formation of a chronic pathology. The third group of healthy children was represented by children with chronic pathology in

the stage of compensation, the number of such babies was small (5.9 ± 0.85%), as well as healthy babies with I (6.0 ± 0.86%) and II A (4.2 ± 0.72%) by health groups.

Table 2: The health group of children aged 1 year (M±t, %)

Healthy group	Children under the study n = 767
I (1)	6,0±0,86
IIA (2)	4,2±0,72
IIB (3)	83,9±1,32***
III (4)	5,9±0,85
IV (5)	-
V (6)	-

Note: *** - p1-3, 2-3, 4-3 < 0.001

The level of the functional state of the body of children is reflected in the table. 3.

Table 3: The functional level of children in their first year of life (M±t, %)

Functional condition level	Children under the study n = 767
Normal	56,9±1,80***
Poor	43,1±1,80
Worse	-

Note: *** - p < 0.001

The table shows that more than half of the children of the first year of life had a normal functional state of the body. However, in 43% of cases, the functional state was impaired, which is manifested by the presence of various pathological conditions. So, small abnormalities of the development of the heart (false chord, open oval window) and pyeloectasia were found in 63.1 ± 1.76% of infants. Perinatal damage to the central nervous system was diagnosed in 65.1 ± 1.72% of children, possibly due to a deterioration in the health status of expectant mothers and the pathological course of pregnancy. Almost every fifth child of the first year of life has atopic dermatitis (19.6 ± 1.43%) and iron deficiency anemia (21.3 ± 1.48%). Rickets was diagnosed in 10.3 ± 1.10% of infants, dystrophy by type of malnutrition - in 7.6 ± 0.95%. 5.5 ± 0.82% of children in the first year of life were observed by an infectious disease specialist for intrauterine infection. Only 7.2 ± 0.93% of children under one year-old did not have background diseases. All this raises questions about the additional search for risk factors for the development of these diseases and the improvement of preventive measures.

Thus, as a result of a comprehensive study of the health status of children of the first year of life living in Tashkent, it was found that the IIB health group prevails ($83.9 \pm 1.32\%$), most children have a low risk of developing chronic diseases, including with a hereditary predisposition (58.3%), a good level of resistance (87.3%) and the normal functional state of the body (56.9%).

However, the presence of babies with a retardation in neuropsychic development (36.0%), congenital malformations (63.1%) and weight loss (8.0%) pose new challenges for the outpatient service in terms of

strengthening pedagogical and psychological support for families with small children, more effective interaction with obstetric care services and improvement of medical check-ups for children in their first year of life.

The number of children with the first health group during the year ranged from 0 to 3%. Upon discharge from the maternity hospital 2A, a sufficiently large number of newborns had a health group ($p < 0.01$). Subsequently, in the process of neonatal screening and clarification of the anamnesis, the number of children with a 2A group of health significantly decreased, without significant differences (Fig. 1).

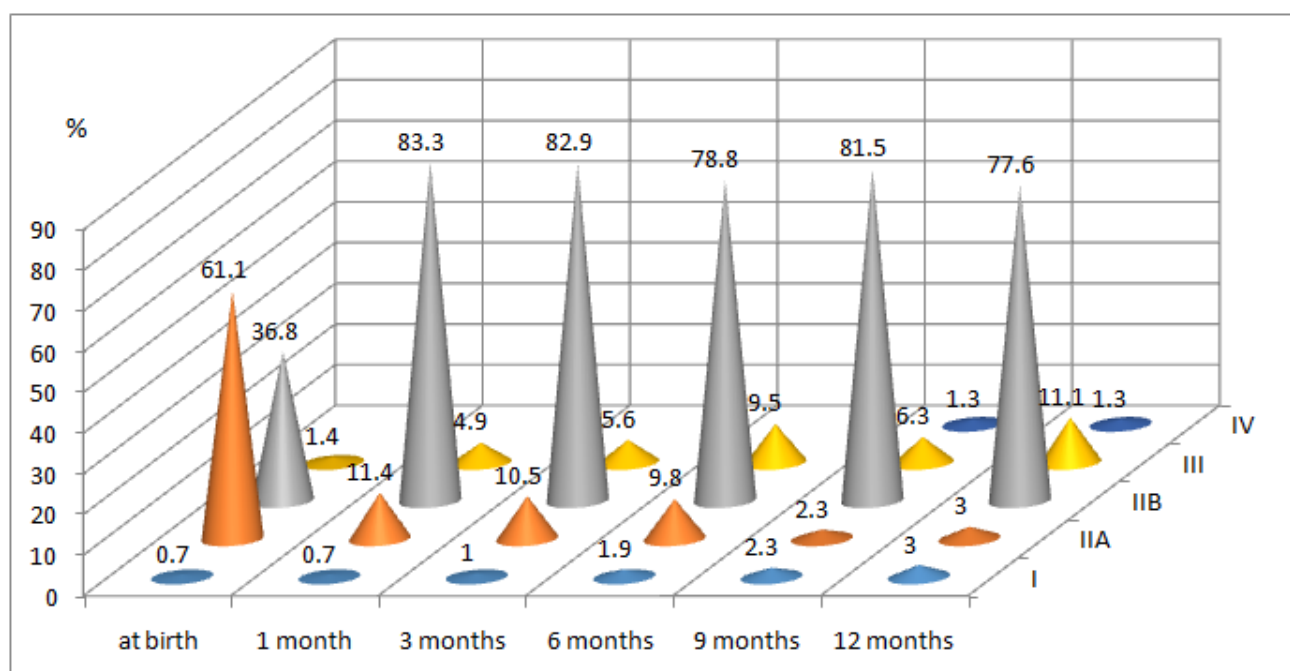


Fig. 1. Dynamics of monitoring children depending on the health group during the first year of life

The number of children with the third group of health did not exceed 13%. At the age of 12 months, children with chronic pathology in the compensation stage were found in 11.1% of cases. The fourth group of health was observed in one baby (1.3%).

Discussion

Analysis of scientific and medical publications on the topic of the study indicates that children in their first year of life, their state of health, taking into account the importance of socio-hygienic factors, are a fairly common object of scientific research. However, to date, a comprehensive study of the health status of children

of the first year of life has not been carried out taking into account indicators of the physical development of morbidity and mortality, health levels of children have not been developed and determined, taking into account complex factors, assessment tables of physical development have not been studied and developed, and children's health has not been established taking into account the leading factors of lifestyle and the quality of medical care. Treatment and prophylactic and organizational and methodological measures have not been developed to improve the health status and differentiated medical care of children in their first year of life, taking into account a set of factors affecting their health.

The literature mentions a significant number of risk factors for children's health, the identification of which is carried out mainly by comparing the frequency of the studied symptoms in the group of patients and healthy children (Bezler & Galitsa, 2015; Sovetkhan et al, 2019)^{1,3}. In this case, the question arises about the specificity of individual factors, which to date cannot be considered resolved (Dvorkina et al, 2015; and Peterkova et al, 2016)^{2,3}.

On the basis of the data obtained, it was established that the family history had a low coefficient of burden. The adaptation period in the maternity ward in newborns proceeded, as a rule, without pathology ($p < 0.05$). Most of the newborns discharged from the hospital had II A health group ($p < 0.01$). The number of children with the first group of health during the year was insignificant (0.7%), group II A in the process of neonatal screening and clarification of the anamnesis significantly decreased from 61.1% upon discharge to 7% at 12 months of a child's life. Number children from group IIB by the end of 12 months of life increased almost 2 times ($P < 0.05$) from indicators at birth. A similar picture was noted for the III group of health ($P < 0.05$).

However, in this case, the influence of lifestyle cannot be ruled out, therefore it is advisable to conduct a comparative study of the influence of several complex lifestyle factors in children of the first year of life, to eliminate the influence of previously known risk factors for morbidity and mortality in children. A comparison of the risk factors for morbidity and mortality of children and their interaction as a cause and effect for various approaches to the selection of an object, the study will allow us to determine with sufficient accuracy the most significant factors and their unfavorable combinations, and to develop recommendations on this basis for the primary prevention of children's morbidity and secondary prevention of causes death of children. Prevention is carried out by the family in which the child lives and primary health care institutions (SP, SVP, Central District Hospital, Central City Hospital, etc.), each of which contributes to this great business in accordance with its capabilities.

In order to develop specific recommendations for the family and medical institutions for the formation and upbringing of a healthy child, it is necessary not only to identify risk factors for children's health, but also to carefully study the contingent of sick children and the features of the work of outpatient and inpatient

facilities, the relationship, and the continuity in their conduct primary and secondary prevention of morbidity in children.

Conclusion

Thus, a comprehensive integrated approach and using evidence-based medicine principles for studying the medical condition of children under 1 year-old in conjunction with their lifestyle factors will make it feasible to obtain the most reliable data on the state of health and affecting risk factors. Moreover, this method helps us to develop evidence-based recommendations for primary and secondary prevention of diseases that cause of postnatal death.

Study Limitations: The study was conducted on children living in Uzbekistan. Therefore, some of the results and outcomes of the study are specific for locals only. Thus, if needed, further researches can be conducted worldwide or in certain areas.

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Ethical Approval: The ethical approval for the study was granted by the Committee of Ethical Approval for Researches under the Ministry of Health of the Republic of Uzbekistan.

Consent: Written informed consent was obtained from all participants' parents of the research for publication of this paper and any accompanying information related to this study. A copy of the written consent is available for review by the authors.

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