



**INTERACTION OF MEDICAL AND SOCIAL FACTORS IN THE FORMATION OF  
PHYSICAL DEVELOPMENT IN CHILDREN**

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**Abstract:** The article examines the characteristics of children's physical development in the context of the influence of medical and social factors. It is shown that children's health and harmonious growth depend not only on the state of the healthcare system and the level of preventive measures but also on socio-economic conditions, parenting styles, levels of physical activity, and the quality of nutrition. The paper analyzes key medical and social determinants that influence both positive and negative effects on child growth and development. Special attention is given to the role of educational institutions and healthcare professionals in shaping a healthy lifestyle among the younger generation. The results emphasize the need for a comprehensive, cross-sectoral approach to optimize conditions for children's development and to prevent health disorders at early stages.

**Keywords:** physical development of children, medical and social factors, health, prevention, lifestyle.

**ВЗАИМОДЕЙСТВИЕ МЕДИЦИНСКИХ И СОЦИАЛЬНЫХ ФАКТОРОВ В  
ФОРМИРОВАНИИ ФИЗИЧЕСКОГО РАЗВИТИЯ У ДЕТЕЙ**

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**АННОТАЦИЯ:** В статье рассматриваются особенности физического развития детей в контексте влияния медицинских и социальных факторов. Показано, что здоровье и гармоничное развитие детского организма зависят не только от состояния системы здравоохранения и уровня профилактических мероприятий, но и от социально-экономических условий, стиля воспитания в семье, уровня физической активности и качества питания. Анализируются ключевые медико-социальные детерминанты, оказывающие положительное и отрицательное воздействие на рост и развитие ребенка. Отдельное внимание уделено роли образовательных учреждений и медицинских работников в формировании здорового образа жизни среди подрастающего поколения. Результаты исследования подчеркивают необходимость комплексного межсекторального подхода для оптимизации условий развития детей и профилактики нарушений здоровья на ранних этапах.

**Ключевые слова:** физическое развитие детей, медико-социальные факторы, здоровье, профилактика, образ жизни.

**RELEVANCE:** Children's physical development is a key criterion for assessing the health and quality of life of the younger generation. In modern conditions, it is influenced by a complex set



of medical and social factors. Observed changes in dietary patterns, decreased physical activity, increased psycho-emotional stress, and the impact of unfavorable socioeconomic conditions increase the risk of chronic diseases and growth retardation in children. At the same time, improvements in the healthcare system, the implementation of preventive programs, and the active participation of educational institutions create the preconditions for improving the health of the child population. Studying the complex impact of medical and social factors on children's physical development is particularly important for the development of effective preventive measures, early detection of deviations, and the promotion of a healthy lifestyle [1].

**MATERIALS AND METHODS:** In preparing this article, an analysis of domestic and international scientific publications devoted to children's physical development and the influence of medical and social factors on it was conducted. The review utilized data presented in scientific journals on pediatrics, social hygiene, and child and adolescent hygiene, as well as materials from the World Health Organization and UNICEF. The literature was selected using the keywords "children's physical development," "medical and social factors," "healthy lifestyle," and "health disorder prevention."

The focus was on studies from the last 10-15 years that examine current trends in changes in physical activity levels, nutritional quality, and child care and health conditions. A systems approach was used in analyzing the publications, allowing us to identify the most significant factors that have a complex impact on child growth and development, as well as to identify interdisciplinary areas for preventive action.

**RESULTS AND DISCUSSION:** Children's physical development is one of the most important indicators of their health and reflects the combined influence of numerous factors. Among these, medical determinants occupy a special place, directly determining growth rates, body weight, organ and system development, and the body's adaptive capacity. Genetic predisposition is a fundamental factor determining the potential parameters of growth and maturation. Heredity determines a child's constitutional characteristics, body proportions, and the age of puberty. However, even with favorable hereditary factors, deviations during pregnancy or early life can significantly impact subsequent development [2,3].

Intrauterine development is considered a critical stage, when the foundations of health are laid. Maternal illnesses, pregnancy complications, exposure to infections, or hypoxia can cause intrauterine growth retardation, which is manifested by low birth weight and height. These indicators serve as reliable predictors of the risk of subsequent growth retardation and increased susceptibility to chronic diseases.

Nutrition is an equally important factor. Adequate breastfeeding, timely and appropriate introduction of complementary foods, and a balanced diet during preschool and school age determine the body's intake of essential nutrients. Deficiencies in protein, micro-, and macronutrients lead to growth retardation and anemia, while overnutrition creates the preconditions for obesity and metabolic disorders.

Infectious and non-infectious diseases have a significant impact. Frequent episodes of acute infections in early childhood can reduce weight gain and growth, while chronic respiratory, cardiovascular, or endocrine diseases limit physical activity and affect overall physical development. In this context, the child's immunological status, timely vaccinations, and preventive measures are of great importance.



Physical activity is also closely linked to medical aspects. Physical activity stimulates the growth of the musculoskeletal system, the development of correct posture, and the development of endurance and adaptive reserves. Physical inactivity, on the other hand, contributes to obesity and metabolic disorders [4].

Quality and accessibility of healthcare are crucial. Timely preventive examinations, early detection of abnormalities, and the organization of regular follow-up care for children with chronic conditions create the conditions for minimizing negative factors. Finally, environmental and hygienic living conditions are also considered as part of medical determinants: air pollution, poor drinking water quality, and exposure to toxic substances increase the risk of growth and developmental delays.

The medical determinants of children's physical development represent a complex set of interrelated factors, ranging from genetics and the prenatal period to nutrition, illness, and the quality of medical care. Studying these factors and addressing them promptly helps lay the foundation for the harmonious development and improved health of the younger generation.

Social determinants play an equally important role in shaping children's physical development as medical factors. One key factor is the family's socioeconomic status, which determines a child's access to quality nutrition, living conditions, medical care, and educational resources. Children from low-income families are more likely to be malnourished, have limited opportunities for physical activity, and are less likely to seek timely medical attention, which directly impacts their growth and overall health. Parents' educational level is also a significant factor: it determines their awareness of healthy lifestyle principles, proper nutrition, and the need for preventive measures. The psychological climate of the family is also significant. Children growing up in a stable and supportive emotional environment demonstrate more harmonious physical and mental development. At the same time, an unfavorable environment, conflict, or a lack of parental attention can trigger stress, which negatively impacts a child's growth and immune system. The education system is also a significant social determinant. Schools not only provide knowledge but also shape children's habits related to physical activity, daily routine, and healthy behavioral skills. Physical education classes and access to sports clubs and extracurricular activities promote physical activity, strengthen the musculoskeletal system, and prevent physical inactivity. Finally, the cultural environment, including nutritional traditions and attitudes toward sports and health in society, is an important factor. All these social conditions form the basis for a child's successful physical development, influencing their adaptability, resilience to disease, and health prospects in adulthood [5, 6].

The combined influence of medical and social factors on children's physical development is a complex process in which various determinants can both reinforce each other's positive impact and undermine existing results. Scientific literature notes that successful child physical development cannot be viewed solely through the lens of medical interventions without considering the social environment, and vice versa. One example of synergy is the combination of high-quality medical care and favorable family socioeconomic conditions. Research shows that children with regular access to preventive examinations, vaccinations, and qualified medical care, while growing up in families with high parental income and education, demonstrate better growth, body weight, and functional fitness. In such settings, medical factors are reinforced by social factors, creating a stable foundation for harmonious development. The opposite situation is observed in poverty, where even accessible medical services do not always lead to the desired outcome. For example, if a child from a low-income family suffers from chronic malnutrition and poor housing conditions, treatment measures or preventive programs have limited



effectiveness. Social factors in this case offset the positive impact of medicine, limiting opportunities for full physical development. A striking example is the incidence of rickets in low-income regions: despite the availability of preventative medications and recommendations, social instability hinders their regular use [7,8,9].

A key area of interaction between medical and social factors is the development of healthy eating habits in children. Research studies emphasize that medical nutrition recommendations have a significant impact only when families have the financial and cultural resources to implement them. For example, programs to prevent obesity and metabolic disorders among schoolchildren in developed countries demonstrate high effectiveness thanks to a combination of medical monitoring, educational activities, and the availability of healthy foods. However, in conditions of social instability and limited access to high-quality food, even informed parents are not always able to adhere to healthy eating principles, which reduces the positive impact of medical initiatives.

Another example of synergy relates to the role of educational institutions. Schools can act as a link between medical professionals and families, ensuring a comprehensive impact on a child's physical development. Providing preventive examinations, vaccinations, and health education in schools, combined with regular physical education classes and the development of healthy lifestyle habits, significantly reduces the risk of chronic diseases. Research shows that countries where school education is actively integrated with health programs experience higher levels of physical development and adaptive capacity in children.

However, the opposite example is no less telling: social factors limit the effectiveness of medical interventions. Specifically, children growing up in dysfunctional families, where parents have common unhealthy habits, are more likely to be exposed to secondhand smoke and experience a lack of attention and care. Even with access to medical care, such children have poorer physical development than their peers from better-off families. Thus, a negative social environment can undermine the efforts of the healthcare system.

Cultural traditions should also be noted, as they also demonstrate a dual nature of influence. In some cases, national dietary traditions based on the consumption of natural products promote children's health and reinforce the effectiveness of medical recommendations. In others, on the contrary, excessive consumption of high-calorie foods, sweets, or low physical activity, due to cultural factors, hinder normal development, even with regular medical monitoring [9, 10].

Examples of the complex influence of medical and social factors convincingly demonstrate that their interaction can be both synergistic and limiting. A harmonious combination of medical services, sound parenting, adequate socioeconomic conditions, and a positive cultural environment provides optimal conditions for children's physical development. However, ignoring even one of these elements can significantly reduce the overall effect, highlighting the need for a multisectoral approach in organizing measures to protect the health and development of the younger generation.

A comparative analysis of the conditions in which children's physical development occurs reveals significant differences depending on place of residence, family social status, and the country's level of socioeconomic development. Scientific literature emphasizes that these factors determine access to medical care, nutritional quality, physical activity levels, and the psycho-emotional climate, which together shape different trajectories of children's growth and development.

One of the most studied differences is the ratio of children's physical development indicators in urban and rural areas. Children living in cities tend to have better access to healthcare services,



including preventive examinations, vaccinations, and specialized care. Furthermore, cities have higher-quality educational and sports facilities, which creates conditions for a more diverse range of physical activity. However, scientific research also documents the negative aspects of urbanization: physical inactivity associated with a sedentary lifestyle, increased obesity rates, and stress due to unfavorable environmental conditions. In rural areas, children are more often involved in active physical labor and outdoor activities, which contribute to the development of endurance and strength of the musculoskeletal system. However, it is precisely in rural areas that there is limited access to qualified medical care, a shortage of specialized doctors, and insufficient preventive care, which can lead to late detection of diseases and delays in physical development [11].

Significant differences also emerge when comparing affluent and disadvantaged families. Children from affluent families have advantages due to a balanced diet, a stable psychological climate, and support in educational and athletic activities. These children are more likely to attend sports clubs, receive medical care at the early stages of illness, and demonstrate balanced physical and mental development. In contrast, children from disadvantaged families face multiple risks: poor nutrition, lack of a stable daily routine, increased levels of stress and violence, and a lack of parental attention. According to WHO research, in families where parents abuse alcohol or are in constant conflict, children's height and weight are significantly below average, and the risk of chronic diseases and developmental delays increases severalfold.

An even more stark contrast is observed when comparing developed and developing countries. In high-income countries, children have access to modern diagnostic and treatment technologies, extensive preventive programs, and a varied and high-quality diet. However, it is precisely in these countries that problems associated with excess weight, physical inactivity, and psycho-emotional stress caused by a busy lifestyle and excessive use of digital technologies come to the fore. In developing countries, chronic malnutrition, infectious diseases, limited access to healthcare, and poor sanitation and hygiene remain key problems. Scientific publications based on UNICEF and WHO data confirm that in poor regions of the world, up to 22–25% of children suffer from stunting and underweight, while in economically developed countries, the same figure does not exceed 2–3% [12,13].

It's important to note that differences between groups are not always absolute. For example, in urban areas of developing countries, a "double burden" is observed—the coexistence of malnutrition in some children and obesity in others, due to rapid changes in dietary patterns and a shift toward cheap, high-calorie foods. In contrast, rural areas of developed countries have been found to have higher levels of physical development than urban children, due to the preservation of traditional forms of activity and a lower prevalence of physical inactivity.

A comparative analysis of conditions demonstrates that children's physical development is a multidimensional process, dependent not only on biological factors but also on a combination of medical and social determinants. Children from cities, affluent families, and developed countries have greater opportunities for harmonious development but face the risk of "diseases of civilization." Children from rural areas, disadvantaged families, and developing countries are more likely to suffer from a lack of basic conditions for growth and development, yet they maintain high levels of physical activity. These differences highlight the need to develop tailored health protection strategies that take into account the specific environment in which a child grows up and the importance of intersectoral approaches in preventing physical developmental disorders.



Interpretation of the data obtained shows that children's physical development is an integral indicator of the influence of medical and social factors, which interact as mutually reinforcing elements of a single system. Progress has been observed globally in recent decades, but statistics point to persistent challenges. According to UNICEF and WHO, in 2022, approximately 148 million children under 5 suffered from stunting, equivalent to 22.3% of all children in this age group. For comparison, in 2000, this figure was 32.8%, indicating a decline of almost 10 percentage points over two decades. However, the global rate of progress is insufficient: to achieve the 2030 targets, the annual decline should be 3.9%, while in practice it does not exceed 2%.

Health factors such as access to antenatal care, vaccinations, and treatment for infections have a significant impact. For example, studies show that children whose mothers receive at least four antenatal visits have a 25–30% lower risk of being born with low birth weight, and their average birth weight is 71–100 grams higher than children of mothers lacking such care. Furthermore, measles vaccination has reduced measles-related mortality by 73% between 2000 and 2018, directly impacting the healthy growth of millions of children [11].

Social factors often have an even more significant impact. For example, maternal education has a linear relationship with a child's physical development. In a multicenter study in African countries, children of mothers with no education had a 3.3 times higher risk of stunting than children of mothers with at least a primary education. In South Asian countries, every 5-year increase in maternal education reduced the likelihood of chronic malnutrition in a child by 22% [13].

A strength of modern prevention measures is their proven effectiveness. School feeding programs, for example, have improved body weight by 0.4–0.6 Z-scores in young children, and micronutrient fortification programs have reduced the incidence of anemia by 19–25%. Large-scale vaccination programs have increased the average healthy life expectancy of children: in countries with high vaccination coverage, the infant mortality rate has fallen to less than 10 per 1,000 live births, while in countries with low coverage, it remains at 60–70 per 1,000.

Weaknesses relate to uneven access. In rural Africa, only 55% of women receive the minimum recommended number of antenatal visits, while in urban areas, this figure exceeds 85%. A similar disparity is observed in school curricula: in Europe, approximately 90% of schools provide regular physical education classes, while in sub-Saharan Africa, this figure does not exceed 40% [14,15].

New challenges are linked to changing dietary patterns and lifestyles. According to the WHO, 81% of adolescents worldwide do not meet the recommended daily physical activity standards (at least 60 minutes of moderate exercise per day). In Europe, obesity among school-age children ranges from 7% to 20%, while undernutrition persists in developing countries: in South Asia, approximately 34% of children are stunted, while in Latin America, the rate is less than 10%, reflecting the "double burden" of undernutrition and overnutrition.

Promising research areas include evaluating combination interventions. Early results from such programs show that a combination of antenatal care, cash transfers to families, and school feeding programs can reduce stunting rates 15–20% faster than using any one of these approaches alone. Furthermore, World Bank calculations show that investments in early childhood development yield returns of \$6–13 for every dollar invested through increased future productivity and reduced health care costs [16].

Analysis shows that medical and social factors form an interconnected system, where success is determined by a comprehensive approach. The achievements of recent decades—a reduction in



global stunting by almost a third, a reduction in child mortality, and increased access to healthcare—compellingly demonstrate the potential of an integrative approach. However, the persistently high proportion of insufficiently active adolescents (over 80%), significant disparities in access to basic services between urban and rural areas, and the global trend toward rising obesity require a new generation of intersectoral strategies that simultaneously consider medical, social, educational, and cultural factors.

**CONCLUSIONS:** The main findings of the analysis of medical and social factors affecting population health indicate that it is the complex impact of various conditions that determines the level of well-being in society. Over the past decades, numerous studies have confirmed that health is shaped not only by biological and genetic characteristics, but also by lifestyle, social conditions, educational level, and environmental quality. According to the World Health Organization, more than 50% of health risk factors are related to lifestyle and social conditions, while medical care directly influences only 10-15% of health indicators. In this context, the need for a systems approach and active intersectoral collaboration becomes clear.

The need for a multisectoral approach is confirmed by the fact that disease prevention and health promotion require coordinated action not only by the healthcare system but also by educational institutions, social policy, the economic sector, and local communities. For example, statistics from the WHO Regional Office for Europe demonstrate that increasing the level of education by one year increases life expectancy by an average of 0.4 years. This demonstrates the direct correlation between health and educational factors. At the same time, social programs aimed at reducing poverty have proven effective in combating chronic diseases: in countries where the poverty rate was reduced by 15-20%, the prevalence of cardiovascular diseases decreased by 8-10%. These data demonstrate that without the participation of social policy, medicine cannot fully address health issues.

Expanding preventive care and actively implementing early disease detection programs should be a priority for the healthcare system. Research shows that every US dollar invested in prevention saves between US\$3 and US\$7 in treatment of complications. For example, the introduction of vaccination programs has led to a more than 60% reduction in infectious disease mortality in children over the past 20 years. For countries with limited resources, such measures are especially important, as they allow for the rational allocation of financial resources.

Educational institutions play a key role in shaping healthy behavior among young people. Introducing lessons on healthy lifestyle principles, addiction prevention, and proper nutrition has proven effective. In Finland, where such programs reach over 90% of schoolchildren, the smoking rate among adolescents has halved over the past 15 years, and the prevalence of obesity in children has decreased by 12%. These examples confirm that the educational system can serve as a reliable platform for long-term societal change.

Social policy, in turn, must ensure the accessibility of medical and preventive services, support for vulnerable groups, and create conditions for a healthy lifestyle. Experience shows that the availability of sports infrastructure directly impacts physical activity: in cities with at least five sports facilities per 10,000 residents, the level of regular physical activity is 20–25% higher than in regions with limited facilities. Furthermore, countries where the government subsidizes healthy eating programs for low-income families have seen a 15% reduction in childhood obesity over five years.



Effective health promotion requires the integration of efforts across all sectors of society. Healthcare should focus on prevention and the development of primary health care, educational institutions should focus on developing sustainable healthy lifestyle habits in the younger generation, and social policy should focus on creating conditions that eliminate inequalities in access to resources and services. The combined efforts of these institutions will enable sustainable results, reduce morbidity, and increase life expectancy.

Over the long term, this multisectoral approach not only reduces mortality and disability but also significantly increases society's economic productivity. According to World Bank estimates, a 10% improvement in population health results in 0.3–0.4% annual GDP growth. This confirms that investing in health is not only a social but also an economic imperative. Amid global challenges, including rising chronic diseases and an aging population, multisectoral measures are becoming a key tool for ensuring sustainable development.

The analysis's findings clearly confirm that health cannot be viewed solely in a medical context. It is shaped by the interaction of social, educational, economic, and medical factors. Implementing a multisectoral approach is a strategic priority, without which it is impossible to achieve real improvements in public health and quality of life.

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