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PATTERNS OF MORPHOMETRIC STATUS FORMATION IN ADOLESCENTS AGED 13–16 YEARS UNDER MODERN CONDITIONS (LITERATURE REVIEW)

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Abstract. Adolescence is one of the most dynamic periods of human postnatal ontogenesis, characterized by intensive body growth, hormonal restructuring, and significant changes in morphometric parameters. Anthropometric characteristics reflect not only individual features of growth and development but also serve as objective indicators of the health status of the pediatric population. The study of morphometric indicators in adolescents makes it possible to assess the level of physical development, identify regional growth characteristics, determine the influence of environmental factors, and develop normative criteria for evaluating the health status of the younger generation.

Keywords: adolescents, morphometry, anthropometry, physical development, body height, body weight, chest circumference, pubertal period.

Introduction. The study of morphometric indicators in children and adolescents is one of the most important tasks of modern developmental anatomy, anthropology, and pediatrics. Anthropometric characteristics reflect not only individual features of growth and development but also serve as objective indicators of the health status of the pediatric population [1, 5, 11, 12, 19, 24]. In recent decades, special attention has been paid to investigating age-related changes in the physical development of adolescents, as this period is characterized by the most intensive processes of growth, morphological restructuring, and reproductive system maturation [2, 6, 9, 10, 11].

Aim of the study: To conduct a retrospective analysis of the literature data on the patterns of morphometric status formation in adolescents aged 13–16 years under modern conditions.

Discussion. The importance of studying morphometric parameters stems from the fact that human growth and development are influenced by a wide range of factors. Among the most significant are heredity, sex, nutritional status, level of physical activity, socioeconomic conditions, climatic and geographical characteristics of the region of residence, environmental conditions, and ethnic background [4, 6, 12, 14, 20, 23, 26]. Even within the same country, anthropometric characteristics of children may differ considerably depending on climatic conditions, altitude above sea level, degree of urbanization, and lifestyle patterns.

Numerous studies have demonstrated that children living in different geographical regions differ in body height, body weight, chest circumference, body proportions, and rates of biological maturation [3, 8, 16, 19, 24, 25]. Therefore, the use of universal standards for physical development assessment does not always provide an objective evaluation of the morphofunctional status of adolescents in a specific region. Consequently, regular regional anthropometric surveys and the development of local reference standards are necessary.

Particular interest is focused on adolescents aged 13–16 years, a period characterized by pronounced changes in morphometric parameters due to intensive growth and hormonal restructuring. During this stage, significant increases in body height and weight occur, body proportions change, sexual dimorphism becomes more apparent, and the main somatotypological characteristics are established [1, 4, 5, 7, 17, 19].

Morphometry comprises a set of methods for the quantitative assessment of the dimensions and proportions of the human body.

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Body height is one of the most informative indicators of physical development. Between the ages of 13 and 16 years, the maximum intensity of linear growth is observed. The average annual increase in body height may reach 5–10 cm. In girls, the growth spurt begins earlier and usually reaches its peak between 11 and 13 years of age. By 15–16 years, growth velocity gradually declines. In boys, the peak growth period generally occurs between 13 and 15 years, and therefore by the age of 15–16 years they begin to surpass girls in body height [2, 6, 8, 9, 10, 26].

Numerous studies indicate that during this age period there is a marked increase in lower limb length, resulting in temporary disproportions in body build and alterations in physical development indices [1, 4, 5, 7, 17, 19].

Body weight reflects not only growth processes but also metabolic characteristics, nutritional status, and levels of physical activity. During puberty, a rapid increase in body weight is observed. In boys, weight gain is primarily associated with the development of muscle tissue and enlargement of the skeletal system. In girls, the accumulation of adipose tissue, related to hormonal changes, plays a substantial role.

The average annual body weight gain in adolescents ranges from 3 to 7 kg; however, these values may vary considerably depending on individual developmental characteristics [3, 5, 8, 16, 19].

Changes in transverse body dimensions represent an important criterion of sexual dimorphism. In adolescent boys, active expansion of the shoulder girdle occurs, leading to the formation of a characteristic male body type with shoulder dimensions exceeding pelvic dimensions. In girls, a more pronounced increase in pelvic width is observed, reflecting the body's preparation for future reproductive functions.

One of the most widely used integral indicators is the Body Mass Index (BMI), which is applied to assess the relationship between body weight and height [2, 6, 9, 10, 11, 12]. During adolescence, BMI values may change substantially due to intensive growth processes; therefore, age- and sex-specific reference standards are required for interpretation. Monitoring this parameter is essential for the early detection of overweight and obesity, the prevalence of which has increased significantly worldwide in recent decades.

Contemporary studies also emphasize the need to develop regional standards of physical development, as universal references do not always adequately reflect the characteristics of specific populations [1, 4, 7, 15, 22, 25].

Conclusion. Adolescence between the ages of 13 and 16 years represents a critical stage of postnatal human development characterized by intensive morphological transformations. During this period, substantial changes occur in body height, body weight, chest circumference, trunk and limb proportions, and pronounced sex-related differences in body structure become established.

Morphometric studies provide an objective means of assessing the level of physical development in adolescents, identifying age- and sex-related growth characteristics, determining the influence of environmental factors, and developing regional reference standards. Contemporary evidence indicates the need for further investigation of the patterns of physical development in adolescents under changing social and environmental conditions, which is of great importance for preserving and promoting the health of future generations.

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REFERENCES:

1. Cai S., Zhang Y., Liu J., et al. Changing landscape of physical fitness and urban–rural inequalities: evidence from 1.2 million children and adolescents over 20 years of urbanization // BMC Medicine. — 2026. — Vol. 24. — Article 175. — P. 1–16.
2. Caldwell A.E., Gurven M., et al. Adolescence is characterized by more sedentary behaviour and less physical activity // Proceedings of the Royal Society B. — 2023. — Vol. 290. — Article 20231567. — P. 1–10.
3. Crouch E., Radcliff E., Probst J.C. Rural–urban differences in overweight and obesity, physical inactivity, and food insecurity among children and adolescents // Preventing Chronic Disease. — 2023. — Vol. 20. — Article 230136. — P. 1–11.
4. F.A.Ibragimov, M.I.Kosimhojiev, D.I.Sadikova. Mintaqaviy antropometrik baholash –sog'lom millat garovi// «Problems and solutions of scientific and innovative research», Indiya, -Vol. 02, Issue 02, 2025. –P. 104-105
5. F.A.Ibragimov, M.I.Kosimhojiev, D.I.Sadikova. Bolalarning jismoniy rivojlanishini individual baholanishi// «Problems and solutions of scientific and innovative research», Indiya, -Vol. 02, Issue 02, 2025. –P. 160-161
6. F.A.Ibragimov, M.I.Kosimhojiev, D.I.Sadikova. Bolalar tanasining antropometrik ko'rsatkichlarini yoshga nisbatan o'zgarishlari// "Journal of science-innovative research in Uzbekistan". –Vol. 3, ISSUE 02, 2025. –P 289-293
7. Li H., Xue H., Wang Y., et al. Physical activity and sedentary behavior among school-going adolescents in low- and middle-income countries: a systematic review // Frontiers in Public Health. — 2024. — Vol. 12. — Article 1367688. — P. 1–18.
8. Lobstein T., Jackson-Leach R. Planning for the worst: estimates of obesity and comorbidities in school-age children in 2025 // Pediatric Obesity. — 2016. — Vol. 11. — № 5. — P. 321–325.
9. Onis M., Onyango A.W., Borghi E., et al. Development of a WHO growth reference for school-aged children and adolescents // Bulletin of the World Health Organization. — 2007. — Vol. 85. — № 9. — P. 660–667.
10. Pirgon Ö., Aslan N. The role of urbanization in childhood obesity // Journal of Clinical Research in Pediatric Endocrinology. — 2015. — Vol. 7. — № 3. — P. 163–167.
11. Suárez-Reyes M., Button A.M., Beyl R.A., et al. Family, social, and built environment: examining associations with physical activity and sedentary time in adolescents // Frontiers in Sports and Active Living. — 2026. — Vol. 8. — Article 1709140. — P. 1–13.
12. Vrevic E., Bianco A., Drid P., et al. Differences in nutritional status and level of physical activity between urban and rural adolescents // BMC Public Health. — 2024. — Vol. 24. — Article 18402. — P. 1–12.
13. Zhao Y., Gong J.X., Ji Y.T., et al. Cross-sectional study of characteristics of body composition among children and adolescents aged 3–17 years // BMC Pediatrics. — 2023. — Vol. 23. — Article 421. — P. 1–11.
14. Абрамов М.С., Рыбалко А.И. Современные подходы к оценке уровня физического развития важного показателя общественного здоровья // Гигиена и санитария. - 1983. - №6. - С.69-71.
15. Абросимова Л.П., Кабирова Е.В., Симакова Т.А., Шерстобитов Р.Г. Физическое развитие детей Кировской области // Гигиена и санитария. 2008. - № 2. — С. 30-32.
16. Агаджанян Н.А., Уйба В.В., Куликова М.П., Кочеткова А.В. Актуальные проблемы адаптационной, экологической и восстановительной медицины. М.: Медика, 2006. 208 с.

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
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http://houghtonstreetreview.com/index.php/hsr

17. Агоол Е.М. Влияние социально-гигиенических, экологических факторов на состояние здоровья и физическое развитие школьников республики Тыва // Гигиена и санитария. 2007. - № 1. - С. 64-67.
18. Апханова С.А., Шестов Д.Б., Хоптяр В.П. Уровень физического развития у подростков 14 лет жителей Улан-Удэ //Гигиена и санитария. 2013. - № 12.-С. 30-33.
19. Аристова И.С. Анатомическая изменчивость пояса и свободных нижних конечностей во взаимосвязи с показателями физического развития и типами телосложения девушек 17-20 лет Саратовского региона. Автореф. дисс. . канд. мед. наук. Волгоград, 2005. 31 с.
20. Баранов А.Н. Здоровье детей на пороге XXI века: пути решения проблемы// Рус. мед. журн. 2010. - Т.8, №8. — С. 737-738.
21. Беляков В.А., Васильев А.В. Влияние загрязненного атмосферного воздуха на физическое развитие детей // Гигиена и санитария. 2013. - №4. — С. 33-34.
22. Беляков В.А., Попова И.В., Жуков В.Н. Физическое развитие детей школьного возраста, проживающих в Кирове, за 10-летний период // Здравоохранение Российской Федерации. 2015. - №6. - С. 53-55.
23. Калмыкова А.С., Ткачева Н.В., Зарытовская Н.В., Феодосиади О.С. Характеристика физического развития детей Ставропольского края // Медицинский вестник Северного Кавказа. 2007. - №1 (5). - С. 36-38.
24. Лебедева Т.Б., Баранов А.Н. Современные тенденции в физическом и половом развитии девочек, проживающих на Европейском Севере России // Репродуктивное здоровье детей и подростков. — 2008 . №4. - С. 9-15.
25. Рожавский Л.А. Некоторые аспекты состояния здоровья подростков Ленинградской области//Здравоохранение Российской Федерации. 2007. -№ 1. — С. 36-38.
26. Руденко Н.Н., Мельникова И.Ю. Влияние физического развития на формирование соматической патологии//Вестник Санкт-Петербургской медицинской академии последипломного образования. 2009. - №2. - Т. 1. -С. 94-104.