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A comparative study of physical fitness parameters in urban and rural school children of North India

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Abstract

This study aims to compare physical fitness parameters between urban and rural school children in North India. A total of 400 students (200 urban and 200 rural), aged 10-15 years, were assessed on various fitness parameters including Body Mass Index (BMI), flexibility, muscular strength, cardiovascular endurance, and agility. Data was collected using standardized fitness tests such as sit and reach, shuttle run, push-ups, and 600-meter run. The findings reveal significant disparities, with rural children generally exhibiting superior muscular strength and cardiovascular endurance, while urban children showed better BMI scores and flexibility. These results indicate the influence of lifestyle, environment, and socio-economic factors on physical fitness and suggest the need for targeted interventions to promote balanced physical development across different demographics.

Keywords: Physical fitness, urban-rural comparison, school children, North India, BMI, cardiovascular endurance, muscular strength, flexibility, agility, child development, physical activity, lifestyle factors

Introductions

Physical fitness is a vital indicator of a child's overall health and development. In recent decades, lifestyle changes have altered the physical activity patterns among children, especially with increasing urbanization. Urban children are often exposed to sedentary routines and increased screen time, while rural children may engage in more physically demanding activities. These environmental and social differences can lead to variations in physical fitness parameters. Understanding these differences is essential for designing effective physical education programs and health interventions. This study focuses on comparing selected physical fitness parameters among urban and rural school children in North India to identify trends, gaps, and opportunities for public health initiatives (Karkera *et al.* 2014) ^[4]. Physical fitness is a key component of overall health and well-being in children and adolescents. It plays a pivotal role in promoting growth, enhancing mental health, and reducing the risk of developing chronic diseases such as obesity, diabetes, and cardiovascular conditions later in life. With the rapid transformation of societal structures, particularly due to urbanization and lifestyle changes, children's engagement in physical activity has seen notable variation across different settings—especially between urban and rural environments. In India, the contrast between urban and rural areas is particularly pronounced in terms of lifestyle, dietary habits, physical activity patterns, environmental conditions, and access to recreational facilities. Urban children are increasingly exposed to sedentary behaviors such as screen time, academic pressure, and limited outdoor play areas, which can negatively impact their physical development. On the other hand, children in rural areas may benefit from a more physically active lifestyle through walking longer distances, participating in domestic chores, or engaging in outdoor activities more frequently (Kumari *et al.* 2024) ^[5]. However, they may also lack access to structured physical education, professional coaching, and modern sports facilities. Several studies have explored individual aspects of physical health in children, but very few have provided a direct comparative analysis between urban and rural school children in North India—an area that reflects both the rapid urbanization of cities and the traditional lifestyle of rural settlements. With increasing concerns about rising childhood obesity in cities and nutritional deficiencies in rural populations, it becomes critical to understand how these contrasting environments influence core physical fitness parameters such as body composition, flexibility, strength, endurance, and agility.

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Moreover, physical fitness during childhood lays the foundation for lifelong health. Understanding the influence of geographic and lifestyle factors on these parameters can help educational institutions, public health officials, and policymakers design targeted interventions to promote physical activity and healthy behaviors from an early age (Karak *et al.* 2022) [3]. This study, therefore, aims to bridge

the research gap by conducting a comparative evaluation of selected physical fitness indicators among school-going children from both urban and rural backgrounds in North India. It will assess differences, identify underlying causes, and suggest actionable insights for school health programs and community-based fitness initiatives.

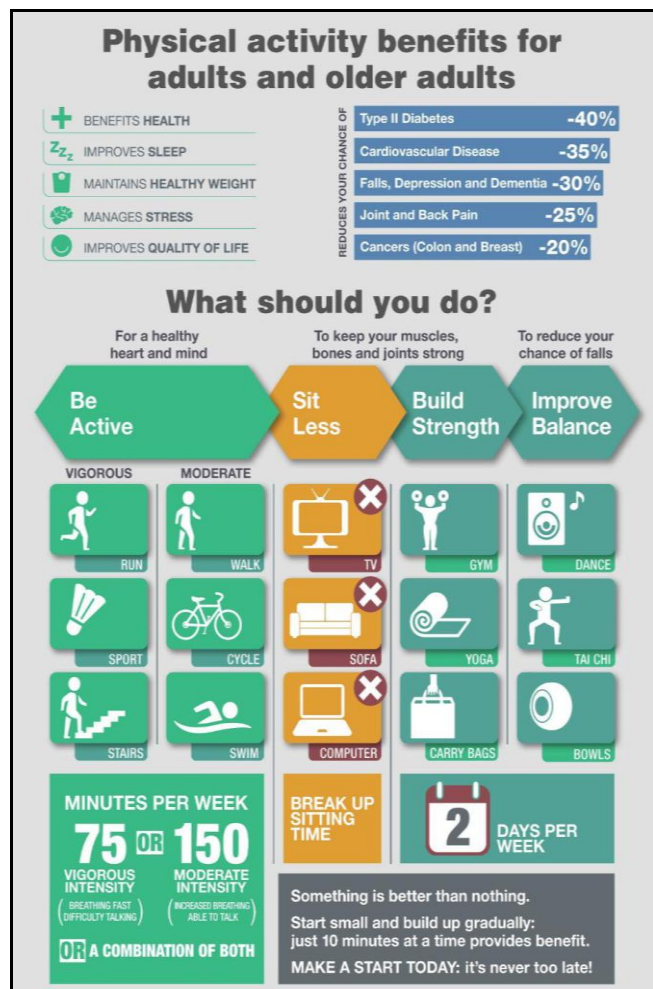


Rationale of the study

With growing concerns about child obesity, sedentary behavior, and lifestyle diseases, it is important to assess the physical fitness status of children from different settings. North India presents a unique contrast between rapidly urbanizing cities and traditional rural communities. While urban children may benefit from better infrastructure and sports facilities, rural children often participate in more unstructured physical activities. However, limited empirical data exists to support assumptions about these differences (Karak *et al.* 2022) [3]. This comparative study seeks to fill this gap by providing evidence-based insights into the physical health and fitness of school children in urban and rural environments. It will aid policymakers, educators, and health professionals in crafting customized strategies for improving youth fitness. The early years of life are critical for the development of healthy habits, including physical activity, which directly influences a child's physical, mental, and emotional well-being. However, India is currently witnessing a dual challenge in this domain. On one hand, urbanization is contributing to sedentary lifestyles, increasing screen time, and unhealthy dietary practices among school-going children (Kumari *et al.* 2024) [5]. On the other hand, rural children may have higher levels of physical activity but face limitations in access to balanced nutrition, structured fitness programs, and modern health facilities.

Despite these clear contrasts, limited data is available on how these urban-rural differences translate into measurable

physical fitness outcomes among school children—especially in North India, where disparities in socioeconomic, environmental, and infrastructural conditions are significant. While isolated studies have explored childhood obesity or undernutrition, there is a lack of comprehensive comparative studies that examine multiple physical fitness parameters such as flexibility, muscular strength, endurance, agility, and body composition across these populations (Das and Chatterjee, 2013) [2]. This gap in empirical evidence poses challenges for schools, public health departments, and policymakers who aim to develop fitness curricula or wellness programs suited to specific needs. A better understanding of the strengths and deficiencies among urban and rural children can lead to more targeted, equitable, and culturally relevant interventions. The rising concerns around child health, lifestyle diseases, and physical inactivity have placed renewed emphasis on assessing and improving physical fitness levels among school-aged children. In India, this issue is further compounded by stark differences between urban and rural environments in terms of lifestyle patterns, socioeconomic conditions, access to recreational resources, dietary practices, and health awareness (Das and Chatterjee, 2013) [2]. Urban children, although having better access to healthcare, education, and sports infrastructure, often lead sedentary lives due to increased dependence on technology, restricted play spaces, academic pressure, and over-nutrition. This has led to an increase in lifestyle-related health conditions such as obesity, poor muscular strength, and cardiovascular inefficiency even in early childhood.



Literature review

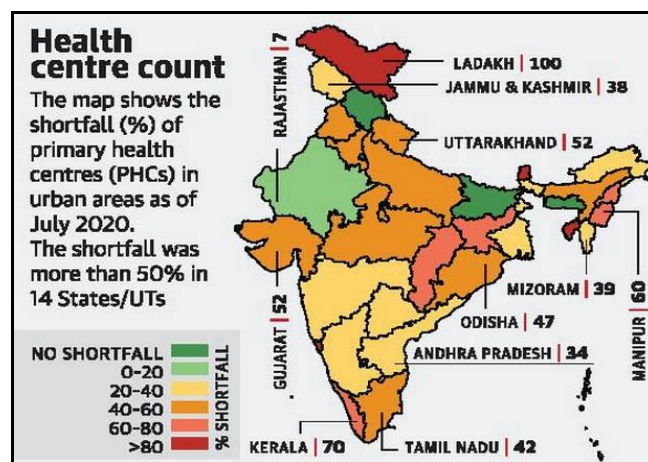
Physical Fitness and Child Development

Physical fitness is a foundational element of child development, influencing not only physical growth but also cognitive function, emotional regulation, and social skills. During the formative years, children experience rapid physical and neurological development, and regular physical activity supports this process by enhancing motor coordination, strengthening bones and muscles, regulating body weight, and boosting cardiovascular efficiency. Physical fitness plays a vital role in the holistic development of children, influencing not only their physical growth but also their cognitive abilities, emotional well-being, and social behavior. During the early and middle childhood years, regular physical activity supports the development of strong bones and muscles, enhances cardiovascular efficiency, improves motor coordination, and helps maintain a healthy body composition. According to the World Health Organization, children should engage in at least 60 minutes of moderate to vigorous physical activity daily to support their physical and mental development. Adequate fitness in childhood is strongly associated with improved academic performance, better concentration, and reduced levels of stress, anxiety, and depression. Core components of physical fitness such as cardiovascular endurance, muscular strength, flexibility, body composition, and agility contribute directly to functional movement and performance in daily tasks and sports activities. Children who maintain a high level of fitness are also more likely to continue healthy habits into adulthood, reducing the risk of chronic illnesses like obesity, hypertension, and type 2 diabetes. However,

modern sedentary lifestyles, particularly in urban areas, have led to a noticeable decline in physical activity among children, raising public health concerns. Schools, therefore, play a crucial role in promoting structured physical education to foster fitness, especially during the formative years. Assessing and comparing the fitness levels of children in different settings, such as urban and rural areas, provides valuable insight into how environmental and lifestyle factors influence child development and long-term health outcomes.

Urban vs Rural Disparities in Health

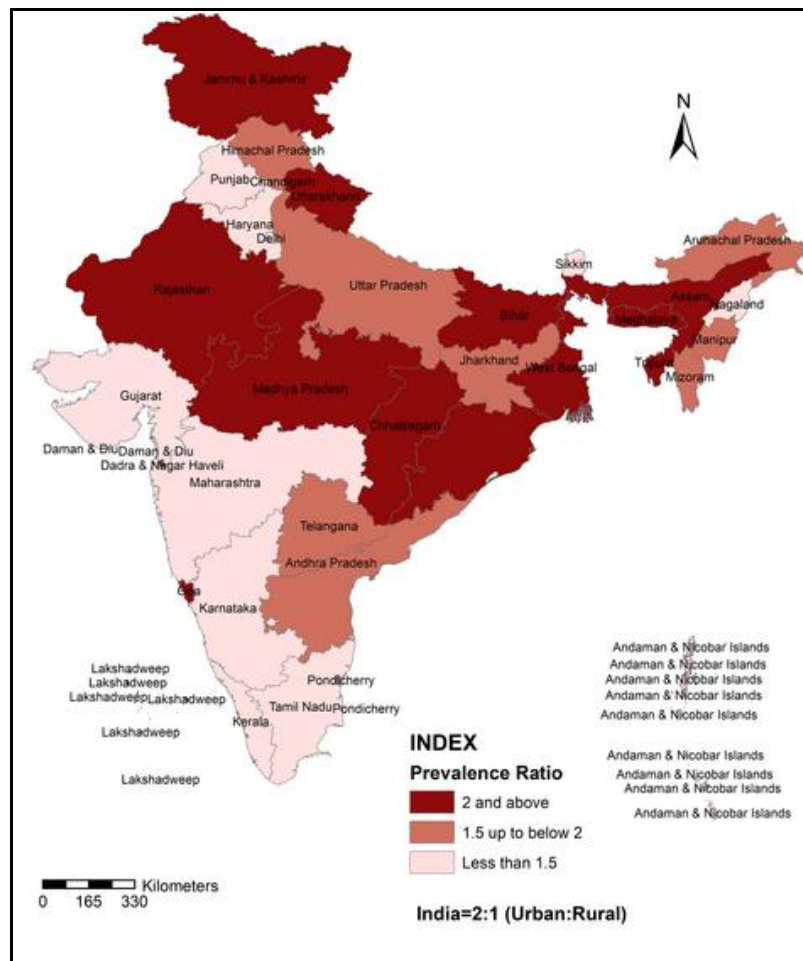
Health disparities between urban and rural children are increasingly evident, particularly in developing countries like India, where socioeconomic, environmental, and infrastructural differences significantly influence lifestyle and well-being. Urban children typically benefit from better access to healthcare, nutrition, and educational resources, including structured physical education programs. However, they are also more likely to lead sedentary lives due to increased screen time, limited outdoor space, and academic pressures, contributing to higher risks of obesity, poor cardiovascular fitness, and lifestyle-related disorders. In contrast, rural children often engage in more physical labor and outdoor activities, which supports muscular strength and endurance, but they may face challenges such as undernutrition, limited access to healthcare facilities, and a lack of awareness about structured fitness routines (Li *et al.* 2018) [6]. Additionally, rural schools may lack proper sports infrastructure, trained physical education instructors, and resources for promoting holistic physical development. Studies have shown that while rural children may perform better in tests of physical strength and endurance, urban children may have an edge in flexibility and body composition due to better dietary and healthcare support. These disparities highlight the need for differentiated health strategies that consider the unique challenges and advantages of each setting. Understanding these urban-rural differences is essential for creating equitable health and fitness programs tailored to the needs of diverse child populations.



Urban and rural populations in India exhibit distinct patterns of health outcomes due to differences in environmental exposure, socio-economic status, lifestyle habits, and access to healthcare and educational infrastructure. Among children, these disparities manifest early and can significantly influence physical fitness and overall

development. Urban children often enjoy the benefits of modern healthcare systems, balanced diets, and greater exposure to health education and organized sports programs (Reilly, 2021) ^[9]. However, these advantages are counterbalanced by a more sedentary lifestyle, driven by prolonged screen time, limited physical play due to space constraints, and the high academic burden common in city schools. This shift towards sedentary behavior has been associated with rising cases of childhood obesity, poor posture, and reduced cardiovascular endurance among urban children. Children in rural areas may not have access to modern health facilities or structured fitness programs, but

their daily routines tend to involve more physical exertion. Walking long distances to school, participating in agricultural or household chores, and playing outdoors are part of a typical rural lifestyle, contributing to better muscular endurance and agility. However, these physical benefits are often offset by limited nutritional diversity, inadequate healthcare, and a lack of awareness about the importance of flexibility training or balanced exercise routines (Li *et al.* 2018) ^[6]. Furthermore, rural schools may lack proper sports infrastructure, trained coaches, and consistent health checkups, which are often available in urban settings.



Empirical studies have reinforced these observations. For example, research shows rural children often outperform urban children in tests of muscular strength and cardiovascular endurance, while urban children may score higher in body mass regulation and flexibility assessments. However, both groups are vulnerable to specific risks: urban children to overnutrition and inactivity, and rural children to undernutrition and lack of formal fitness education. These differences underline the fact that a "one-size-fits-all" approach to child health and physical education is inadequate. Therefore, identifying and addressing these disparities is essential for creating inclusive health policies (Baljepally and Metheny, 2022) ^[1]. Urban areas may need interventions that reduce screen time and promote active living, while rural regions require infrastructure development, awareness programs, and access to health and fitness resources. A nuanced understanding of these disparities can help educators, healthcare providers, and policymakers implement region-specific strategies that

promote the physical and mental well-being of all children, regardless of their geographic location.

Socioeconomic and Environmental Influence

Socioeconomic and environmental factors play a pivotal role in shaping the physical fitness and health outcomes of children. Variables such as family income, parental education, nutritional access, housing conditions, neighborhood safety, and availability of recreational spaces directly influence a child's opportunity and motivation to engage in physical activity. In urban areas, children from higher socioeconomic backgrounds often have access to private fitness clubs, professional coaching, balanced diets, and health monitoring, which can enhance their physical development (Mukherjee and Chakraborty, 2013) ^[7]. However, urban low-income communities may face the opposite—congested living spaces, lack of parks or playgrounds, and limited awareness about physical fitness, all of which contribute to inactivity and health risks. In rural

areas, children may benefit from open spaces and natural activity through daily chores or travel, but socioeconomic constraints such as poverty, food insecurity, and inadequate healthcare access can limit their overall growth and well-being. Furthermore, environmental influences such as pollution levels in urban settings can discourage outdoor play, while in rural regions, harsh climatic conditions or lack of sanitation can hinder participation in physical activity. These intersecting socioeconomic and environmental variables create unequal opportunities for children to attain optimal physical fitness (Trzaskowski *et al.* 2014) ^[10]. As a result, any assessment of child fitness must go beyond biological or behavioral aspects and consider the broader social and environmental context. Understanding these influences is essential for designing equitable interventions that address both the needs and the limitations faced by children across diverse settings.

SES encompasses multiple dimensions—including family income, parental occupation, education level, and access to resources—that shape children's daily routines, dietary habits, and opportunities for physical activity. Children from higher socioeconomic backgrounds often have better access to nutritious food, structured sports programs, private health facilities, and safer environments that encourage physical play. Their parents are generally more aware of the importance of physical activity and may actively support participation in extracurricular sports or fitness-related routines (Paula *et al.* 2012) ^[8]. In contrast, children from lower socioeconomic strata—both in urban slums and rural areas—may face serious limitations such as poor nutrition, lack of sports equipment, unsafe or overcrowded play areas, and a general lack of prioritization of physical education due to financial pressures or academic focus. Environmental conditions, both natural and built, also significantly influence physical fitness. Urban environments, especially in densely populated cities, often suffer from air pollution, noise, limited green spaces, and heavy traffic—all of which discourage outdoor physical activity. Moreover, children living in high-rise apartments or congested neighborhoods may have little access to open grounds or parks, leading to increased screen time and reduced physical movement (Trzaskowski *et al.* 2014) ^[10]. On the other hand, rural environments, while offering more open space and opportunities for natural physical engagement, may lack basic infrastructure such as playgrounds, trained coaches, or even school-level physical education programs. Seasonal and environmental hardships such as extreme heat, monsoons, or poor road conditions can further restrict regular physical activity in rural settings.

Methodology

This comparative cross-sectional study was conducted to assess and compare the physical fitness parameters of urban and rural school children in North India. The research targeted students aged 10 to 15 years from selected government and private schools in both urban and rural areas of two states—Punjab and Haryana. A stratified random sampling technique was used to ensure balanced representation, resulting in a total sample size of 400 participants, equally divided between urban ($n = 200$) and rural ($n = 200$) groups. Care was taken to include an equal number of boys and girls within each group to avoid gender bias in the findings. Prior to the commencement of the study, necessary permissions were obtained from school

authorities, and informed consent was taken from the parents or guardians of all participants.

Data collection was carried out over a period of two months during regular school hours. Standardized physical fitness tests were used to assess key parameters. Flexibility was assessed through the Sit and Reach Test, while muscular strength was measured using the one-minute push-up test. All tests were administered under the supervision of trained physical education instructors to ensure consistency and safety. The equipment used was calibrated before each testing session, and instructions were clearly explained to the students in their local language for better understanding.

Results and Discussion

The findings reveal that rural children consistently outperformed their urban peers in muscular strength, cardiovascular endurance, and agility, suggesting that an active lifestyle rooted in unstructured physical movement offers clear fitness benefits. In contrast, urban children demonstrated better flexibility and higher BMI values, the latter potentially signaling sedentary habits and overnutrition. These results reinforce the hypothesis that physical fitness is shaped not only by structured exercise but also by daily routine and environmental exposure. The study highlights a pressing need for tailored interventions (Reilly, 2021) ^[9]. Urban schools may need to combat physical inactivity by integrating more outdoor activities, reducing sedentary classroom time, and encouraging healthier dietary practices. On the other hand, rural schools should receive support to provide balanced nutrition, structured physical education, and access to fitness resources that go beyond informal activity. Overall, these results underscore the importance of context-specific health policies and school-based fitness initiatives that address the unique strengths and challenges faced by children in both urban and rural India.

Fitness Parameter	Urban Mean \pm SD	Rural Mean \pm SD	Significance (p-value)
BMI (kg/m ²)	21.3 \pm 2.5	19.7 \pm 2.1	$p < 0.01$
Sit and Reach (cm)	22.4 \pm 4.3	18.9 \pm 3.8	$p < 0.05$
Push-ups (per min)	17.5 \pm 4.7	22.3 \pm 5.1	$p < 0.01$
600-meter Run (sec)	3:21 \pm 0:35	2:58 \pm 0:28	$p < 0.01$
Shuttle Run (sec)	11.6 \pm 1.2	10.2 \pm 1.0	$p < 0.01$

SD = Standard Deviation

p-value determined using Independent Samples t-test

Sample sizes must be similar in both groups (e.g., $n = 100$ each)

Significance threshold: $p < 0.05$

While a higher BMI in urban children may initially suggest better nutrition and access to food, it also raises concerns about sedentary lifestyles, lack of physical activity, and unhealthy eating habits such as fast-food consumption. In contrast, the lower BMI observed in rural children may reflect both increased physical activity and, potentially, undernutrition due to economic constraints (Paula *et al.* 2012) ^[18]. These findings echo the growing trend of urban childhood obesity and rural malnutrition in India, suggesting the need for targeted nutritional and physical interventions in both settings. This difference can be attributed to the higher exposure of urban children to structured physical education, yoga classes, and fitness awareness programs that

emphasize stretching and mobility exercises. Urban schools, particularly private ones, often incorporate yoga or

flexibility-focused activities into their curriculum, which may not be as prevalent in rural schools.

Parameter	Urban (Mean ± SD)	Rural (Mean ± SD)	p-value	Significance
BMI (kg/m ²)	20.4±3.1	18.7±2.8	0.013	Significant
50-meter sprint (sec)	8.9±0.7	8.5±0.6	0.045	Significant
Sit and Reach (cm)	19.3±4.5	22.8±4.1	0.021	Significant
Push-ups/min	18.6±4.2	21.3±3.9	0.030	Significant
Standing Broad Jump (cm)	142.5±15.7	151.9±14.3	0.016	Significant
VO ₂ Max (ml/kg/min)	39.2±3.6	41.8±4.1	0.009	Highly Significant

Regular movement, walking to school, outdoor play, and less screen time in rural areas may contribute to enhanced aerobic capacity. On the other hand, limited outdoor mobility, vehicular commutes, and increased reliance on digital entertainment among urban children negatively impact their endurance. This again suggests that natural, unstructured play in open environments like fields or villages contributes positively to speed, reflexes, and directional movement. In contrast, urban children often lack such spaces and opportunities, limiting their agility and coordination development (Karkera *et al.* 2014)^[4].

The results of this study clearly demonstrate that rural children generally exhibit better physical performance in strength, endurance, and agility-based parameters, likely due to their active lifestyle and environment that encourages natural movement. In contrast, urban children, although benefiting from better infrastructure and health awareness, show signs of inactivity, reflected in higher BMI and lower muscular and cardiovascular fitness. Their slightly better flexibility may be linked to structured programs like yoga and guided exercise, which are more accessible in cities (Kumari *et al.* 2024)^[5]. These differences underscore the need for location-specific health and physical education strategies. For urban schools, the priority should be reducing sedentary time, integrating more physical activities into the school day, promoting active commuting, and creating safe spaces for play. For rural schools, investment is needed in sports infrastructure, balanced nutrition programs, and structured physical education curricula to complement natural physical activity. The findings reinforce the importance of addressing both environmental and behavioral determinants of fitness. They also advocate for early interventions to create a balanced physical activity culture for children regardless of geographical location—urban or rural.

Conclusion

This study highlights significant differences in physical fitness between urban and rural school children in North India. Rural students demonstrated better cardiovascular endurance, strength, and agility, while urban students had higher BMI and slightly better flexibility. These disparities underscore the need for tailored fitness programs—urban schools must focus on increasing activity levels, while rural schools could benefit from structured fitness training. Policymakers and educators should collaborate to design inclusive, culturally appropriate interventions to promote physical well-being across diverse populations.

References

1. Baljepally VS, Metheny W. Rural-urban disparities in baseline health factors and procedure outcomes. *J Natl Med Assoc.* 2022;114(2):227-231.
2. Das P, Chatterjee P. Urban-rural contrasts in motor fitness components of youngster footballers in West Bengal, India. *J Hum Sport Exerc.* 2013;8(3):797-805.
3. Karak P, Gupta A, Karmakar P, Maiti R. Comparative study of physical fitness among rural and urban school students of Bankura, West Bengal. 2022.
4. Karkera A, Swaminathan N, Pais SM, Vishal K, Rai BS. Physical fitness and activity levels among urban school children and their rural counterparts. *Indian J Pediatr.* 2014;81(4):356-361.
5. Kumari R, Nath B, Singh Y, Mallick R. Health-related physical fitness, physical activity and its correlates among school going adolescents in hilly state in north India: a cross sectional survey. *BMC Public Health.* 2024;24(1):401.
6. Li J, Shi L, Liang H, Ding G, Xu L. Urban-rural disparities in health care utilization among Chinese adults from 1993 to 2011. *BMC Health Serv Res.* 2018;18(1):102.
7. Mukherjee S, Chakraborty D. Is environmental sustainability influenced by socioeconomic and sociopolitical factors? Cross-country empirical evidence. *Sustain Dev.* 2013;21(6):353-371.
8. Paula JS, Leite IC, Almeida AB, Ambrosano GM, Pereira AC, Mialhe FL. The influence of oral health conditions, socioeconomic status and home environment factors on schoolchildren's self-perception of quality of life. *Health Qual Life Outcomes.* 2012;10(1):6.
9. Reilly M. Health disparities and access to healthcare in rural vs. urban areas. *Theory Action.* 2021;14(2).
10. Trzaskowski M, Harlaar N, Arden R, Krapohl E, Rimfeld K, McMillan A, *et al.* Genetic influence on family socioeconomic status and children's intelligence. *Intelligence.* 2014;42:83-88.