



EXPLORING THE IMPACT OF PHYSICAL ACTIVITY ON ELEMENTARY SCHOOL CHILDREN AMONG RURAL AND URBAN SETTINGS

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Abstract:

The capacity of bodily systems to cooperate effectively in order to support health and enable daily activities is called as physical fitness.

Objective: This study provides an overview of the subjects' physical fitness levels, who are primary school kids.

Material and methods: The study used a random sampling technique to select 30 urban and 30 rural primary school students from Karachi and Mirpur mathelo. The physical fitness training program was carried out in each of their individual schools. The 4-factor physical fitness test was administered to each group. For example, Body composition, muscular endurance, abdominal strength and muscular flexibility. In order to collect data, measurements of height, weight, and body mass index were made. Additionally, one-minute curl-ups, one-minute push-ups, trunk lifts, and finger touch tests were used to assess muscular flexibility and strength. SPSS 22.0 was used for the data analysis.

Results: Results have shown that urban children has better abdominal endurance, muscular strength and muscular flexibility. The rural children due to weak muscular strength and endurance, performed least no: of push-ups and curl-ups in one minute.

Conclusion: Urban children exhibit superior muscular strength, flexibility, and abdominal endurance, while rural children have lower strength and endurance, resulting in reduced push-ups and curl-ups.

Keywords: physical fitness, body composition, muscular endurance, abdominal strength and muscular flexibility

INTRODUCTION

Physical activity, including physical education, sports, play, active living, and transportation, is widely recognized for its health benefits, promoting energy expenditure and developmentally appropriate activities throughout early adulthood (Piercy et al., 2018). Physical activity is crucial for children's health, promoting weight control, energy balance, and preventing adult obesity. Adherence to guidelines reduces risk of premature cardiovascular disease, type 2 diabetes, metabolic syndrome, and certain cancers. It also aids bone formation and remodeling, reduces depression, anxiety, and enhances mood, self-esteem, and quality of life (Anderson and Durstine, 2019).

Regular physical activity reduces rule-breaking behavior, improves attention span, and enhances academic performance. It also enriches a child's social life and social interaction skills. Childhood experiences positively influence attitudes and participation levels towards physical activity, leading to a more active lifestyle as children grow older (Singh et al., 2019).

High socio-economic status children benefit from better education, nutrition, healthcare, and physical education facilities, affecting their physical fitness, motor ability, health, and academic achievements. Physical activity reduces health risks like heart disease, hypertension, and obesity, and promotes social well-being and mental health among children and adolescents (Ruedl et al., 2021).

Modern life has made it difficult for children to get sufficient physical activity during the day, leading to increased obesity rates. Traditional methods like walking, biking, and outdoor play have been replaced by video games, computers, and television, causing a decrease in physical activity. Schools are not solely responsible for ensuring children get physical activity, but research shows that children learn better when given opportunities to be active (Wolfenden et al., 2020).

Less than one-third of young people worldwide are physically active, with females being less active than males. The proportion of children walking or cycling to school is declining, affecting their health. Schools provide opportunities for physical activity through physical education programs, free play, and extra-curricular sports. However, declining programs, curriculum pressure, lack of training, and removal of dedicated green spaces are causing alarming trends. Collaboration between school administrators and Physical Education teachers is crucial to promote healthy environments for children's physical activity (Siedentop and Van der Mars, 2022).

Physical activity among children outside school is increasing, but factors promoting this transition are unclear. National governing bodies provide coaching sessions to school-aged children, leading to modified sports. However, pressure from the curriculum, lack of training, and removal of dedicated green spaces hinder this progress. Research shows that children learn better when active during the day. School administrators and Physical Education teachers must collaborate to promote healthy environments (Pangrazi and Beighle, 2019).

Physical inactivity is a major cause of death, disease, and disability, with over two million deaths annually due to sedentary lifestyles. The World Health Organization (WHO) has identified sedentary lifestyles as one of the top ten global causes. Encouraging children to reduce sedentary activities, especially during daylight hours, is crucial for better learning and performance (Katzmarzyk et al., 2022).

A nation's wealth relies on its citizens' health, and physical fitness is crucial. School physical education programs should incorporate more activities to ensure a strong foundation (Siedentop and Van der Mars, 2022). Physical activity has numerous beneficial physiological effects, primarily affecting cardiovascular and musculoskeletal systems, but also enhancing metabolic, endocrine, and immune system function (Cunningham et al., 2020).

The intensity of activity and, consequently, the intensity of muscle contractions dictate the metabolic response of skeletal muscle. Muscle contractions on repeat cause changes, or adaptations (Hargreaves and Spriet, 2020).

Exercise stress and post-exercise recovery are the times when acute adaptations to exercise take place. Maximum oxygen consumption is indicated by an exceeding RER and a plateau in VO₂ despite additional intensity increases. VO₂ max levels vary widely, from less than 20 milliliters per kilogramme per minute in the case of chronically unwell individuals to over 80 milliliters per kilogramme per minute in the case of elite endurance athletes who are well-trained (Sindall, 2020).

Muscle lactate levels during low-intensity activity stayed near to the rest constant (1 mmol/kg weight), and at a certain intensity, they sharply rise. Any exercise intensity that surpasses a person's capacity to sustain a steady state condition is considered intense exercise. "A state of complete physical, mental, and social well-being, and not merely the absence of disease" is the definition of health. "The ability to meet the demands of the environment" refers to fitness, and the environment includes friends, family, and the home (Haji et al., 2018).

Eleven separate pieces or components make up physical fitness: six are related to skills and five are related to health. It is said that health-related fitness is the capacity to achieve and maintain physical health. The capacity to consistently perform at a high level on the field is known as skill-related fitness. The five elements of health-related fitness are as follows: 1-Body composition, 2-Cardiovascular fitness, 3-Muscular strength, 4-Muscular endurance and 5-Flexibility. Six elements make up skill-related fitness: 1-Agility, 2-Balance, 3-Power, 4-Coordination, 5-Speed and 6-Reaction time. Early childhood physical activity is essential for a child's development of strong bones, muscles, and lungs, as well as for boosting cognitive function, enhancing scholastic performance, and quickening neurocognitive processing (Chen et al., 2018).

The purpose of the study was to evaluate the physical fitness level of schoolchildren using the results of a physical fitness test (PFT). To evaluate body composition, muscular strength, abdominal endurance, and flexibility, researchers employed physical fitness tests such as the Body Mass Index, push-ups, curl-ups, and shoulder stretch tests.

MATERIAL AND METHODS

The study involved youngsters from several schools participating in a survey analysis. The study conducted for a full year. The 5th –class students from both rural and urban primary schools had included in the study. Children with disabilities, however, were excluded. The study was non-experimental, cross sectional and observational in nature. Sampling technique was random sampling technique drawn from the students of urban (N=30) and rural (N=30) primary school children from Karachi and Mirpur mathelo. Each group conducted the same physical fitness test that was composed of four factors of physical fitness i.e. Body composition, Muscular strength, Muscular endurance and Flexibility.

Data collection procedures include physical fitness test. The physical fitness test comprises of a body composition test, wherein measurements of height in inches and weight in kilograms are taken in order to calculate the body mass index. The second part of the test measured abdominal endurance, and it involved having the patient complete as many curl-ups as they could in a minute. The third component involved testing the subject's muscular strength through a one-minute push-up challenge, wherein they must execute as many push-ups as they can in that minute. Additionally, the subject's trunk extensor strength was assessed through an inch-measured trunk lift, wherein they must lie on their backs and raise their chest to the maximum height before the examiner records the length of the subject's nose to the floor. Muscular flexibility was assessed as the fourth component of the physical fitness test using the finger touch test, which requires the individual to touch the tips of their fingers behind their back with one arm flexed over their upper back and the other from their lower back, and vice versa. The physical fitness test includes a combination of physical fitness and health related task. Every test was given during the regular school day. Below are thorough explanations of every fitness test.

BMI. With no shoes on, the height was measured with an inch tape. Body mass index (BMI) was computed by dividing weight in kilograms by height in meters squared. Weight was measured at a weight scale machine without shoes and in light clothing.

Curl Up. Pupils must do as many Curl-Ups as they can, up to a maximum of 75. With their feet level on the mat, hands at their sides and palms facing down, students lie on their backs on a mat with their knees bent at a 140-degree angle. Students carefully curl up until their heads touch the surface, then slowly curl back down after sliding their fingers across a measurement strip on the mat.

Push -Up. Up to a maximum of 75, students are told to perform as many 90° Push-Ups as they can at a certain rate (about one push-up every three seconds). A student is permitted two form breaks when performing Push-Ups correctly, with the first form break counted as a repetition. A pupil will receive a score of 1 if they take two form breaks right after the Push-Up begins.

Trunk Lift. Students are instructed to use their back muscles to steadily raise their upper bodies off the ground while lying face down on a mat, up to a maximum of 12 inches. The measurement, which is the distance in full inches from the participant’s chin to the floor, must be held by the students.

Shoulder Stretch. Flexibility of the upper body is measured by the shoulder stretch. With one hand extended over the shoulder and the other under the elbow, students are to connect their fingertips together behind their backs. Each shoulder is checked and documented independently.

DATA ANALYSIS

Data analysis was undertaken using the statistical package for social sciences (SPSS) version 22. Descriptive statistics were calculated via means and standard deviations. Chi square and independent t test were used to examine differences between key elements of the study, such as physical activity level. P value of < 0.05 percent was considered as significant.

RESULTS

Table 1 compares the body mass index (BMI) of children living in urban and rural areas. The results show that the BMIs of the two groups of children were equal since the p value was not significant.

Table 2 compares the abdominal endurance (no: of curls up in one minute) of children living in urban and rural areas. Our results were significant since the p value for the difference between the abdominal endurance of urban and rural children was 0.001 indicating that the abdominal endurance of urban children was higher than the rural children.

Table 3 compares the abdominal strength (no: of pushups in one minute) of children living in urban and rural areas. Once more, we find a significant p value of 0.004, indicating that the abdominal strength of the urban children was greater than that of the rural children.

Table 4 compares the compression of trunk lift in inches (9 to 12 cm) across children from urban and rural areas. Since the p value was not significant, we could not find any difference in the compression of trunk lift between the two groups.

Table 5 compares the flexibility (shoulder stretch test) component of children living in urban and rural areas. Our findings showed that the proportion of positive shoulder stretch test results among urban children was higher than that of rural children, with 61% urban children having positive results compared to 38% for rural children.

Table 1: Comparison of Body mass index (BMI) in between urban and rural children

Group	N	Mean	SD	p-value
Urban children(BMI)	30	19.32	2.212	P = 0.260
Rural children(BMI)	30	19.92	1.887	

Table 2: Comparison of abdominal endurance (no: of curls up in one min) in between urban and rural children

Group	N	Mean	SD	p-value
Urban children	30	7.90	4.693	P= 0.001
Rural children	30	3.47	4.967	

Table 3: Comparison of abdominal strength (no: of pushup in one min)in between groups

Group	N	Mean	SD	p-value
Urban children	30	6.77	4.812	P=0.004
Rural children	30	3.07	4.623	

Table 4: Comparison of Compression of trunk lift in inches (9 to 12 cm) in between groups

Group	N	Mean	SD	p-value
Urban children	30	10.30	1.088	P= 0.636
Rural children	30	10.17	1.085	

Table 5: Comparison of flexibility (shoulder stretch test) component between urban and rural children

		Yes	No	P-Value
		n		
Urban children	n	19	11	0.071
	%	61.3	37.9	
Rural children	n	12	18	
	%	38.7	62.1	
TOTAL	60	31	29	

DISCUSSION

This study provides reference values for muscle flexibility, muscular endurance, abdominal strength, and BMI. Additionally, it is said that a variety of factors, such as demography, psychology, society, nutrition, and environmental factors like one's residence area, as well as parental motivation for their children's health and the availability of facilities like playgrounds, appropriate clothing, and exposure to TV and the internet, are all related to physical activity.

The findings show BMI, flexibility, muscle strength & endurance and found that urban children were fitter than rural children for five of the fitness test. The results show that the BMIs of the two groups of children were equal since the p value was not significant. In contrast to our research, a 2019 study conducted in Chicago discovered that BMI is rising in rural areas at a rate that is either higher or the same as that of cities (2019).

This study compared the abdominal endurance (no: of curls up in one minute) of children living in urban and rural areas. Our results were significant since the p value for the difference between the abdominal endurance of urban and rural children was 0.001 indicating that the abdominal endurance of urban children was higher than the rural children. On the other hand, a study found that children and adolescents from rural areas outperform their urban counterparts in terms of cardiorespiratory fitness, muscle fitness in the upper and lower extremities, coordination, speed, and agility (Sylejmani et al., 2019).

This work compared the abdominal strength (no: of pushups in one minute) of children living in urban and rural areas. Once more, we found a significant p value of 0.004, indicating that the abdominal strength of the urban children was greater than that of the rural children. According to the results of another study, there were no discernible changes in the subjects' abdominal strength across the rural, semi-urban, and urban elementary schools (Suleiman et al., 2018). Young people from rural areas have shown higher levels of physical fitness, according to a Kosovo study (Kryeziu and Iseni, 2022).

This study compared the compression of trunk lift in inches (9 to 12 cm) across children from urban and rural areas. Since the p value was not significant, we could not find any difference in the compression of trunk lift between the two groups. According to a study, rural residents had more trunk muscle endurance than their urban counterparts. (Sibson et al., 2022)

This research compared the flexibility (shoulder stretch test) component of children living in urban and rural areas. Our findings showed that the proportion of positive shoulder stretch test results among urban children was higher than that of rural children, with 61% urban children having positive results compared to 38% for rural children. According to a study, a substantial percentage of the sample lacked shoulder elasticity; however, this is due to the age range of the study sample, where flexibility is a major benefit that declines with age (Alotaibi, 2021).

Children in rural areas should be encouraged to participate in physical training programs to increase their muscle strength and endurance. Sedentary lifestyles and lack of physical activity are linked to the development of obesity and other disorders(Neil-Sztramko et al., 2021).

Due to variations in the accessibility of sports facilities and organized group sports, children living in urban areas may engage in moderate-to-intense physical activity for longer periods of time than children living in rural areas(Noukpo et al., 2023).

Parents and educators should support children in maintaining a healthy fitness level by promoting a balanced diet and weight-management activities. Parents should also serve as role models, encouraging healthy lifestyles and limiting media consumption. Behavioral changes like limiting TV viewing, getting enough sleep, and consuming fewer high-calorie foods can also contribute to good physical fitness(Briguglio et al., 2020).

Urban children perform better in muscle strength and endurance fitness tests compared to rural children due to their height and weight. This is attributed to better social conditions, increased access to sport facilities, and the presence of organized sports facilities in urban areas, which may contribute to higher muscular fitness levels(Kumar, 2019).

Physical education (PE) programming are one potentially significant influence in the physical fitness of children living in urban and rural contexts(Kellstedt et al., 2021).

Physical education aims to develop children's learning skills, competence in various activities, and qualities like cooperation, fair play, competition, and enjoyment of physical activity. It focuses on fostering active, healthy lives outside school, with information on duration, frequency, and content(Pangrazi and Beighle, 2019).

According to this study, physical education programs in urban schools featured specialist teachers, whereas in rural regions, these teachers were essentially nonexistent. Furthermore, fewer sport facilities may be available in rural campuses, which could lead to less options for sports(Hernández-Torrano, 2018, Forest et al., 2018).

CONCLUSION

Urban children have greater muscular strength, flexibility, and abdominal endurance, whereas rural children have lower strength and endurance, resulting in fewer push-ups and curls. The study suggests rural children should increase strength and endurance through physical training programs.

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