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Original Article

Prevalence of Meeting Recommended Physical Activity Levels Among Children in Rural Areas

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ABSTRACT

Background: *Physical activity in children is crucial for their overall health, yet many fail to meet recommended levels, especially in rural areas. Understanding the factors influencing activity levels is essential for developing effective interventions.*

Objective: *This study aims to assess the prevalence and correlates of achieving recommended physical activity levels among children aged 5-14 years in rural areas near Lahore, Pakistan.*

Methods: *A cross-sectional survey was conducted among 564 children using stratified random sampling. Physical activity was measured with accelerometers, and data on socio-demographic factors, transportation modes, and leisure activities were collected through structured questionnaires. Statistical analysis included descriptive statistics and multivariate logistic regression.*

Results: *Most children engaged in active transport to school (68%), and 76% participated in leisure-time physical activity for more than one hour per day. However, 54% of children also displayed sedentary behavior exceeding two hours per day. Factors such as age, sex, socioeconomic status, and mode of transportation significantly correlated with physical activity levels.*

Conclusion: *The study highlights a substantial engagement in physical activity among rural children in Lahore, moderated by socioeconomic and educational backgrounds. Tailored public health strategies and infrastructure improvements are essential to enhance physical activity and reduce sedentary lifestyles in this population.*

Keywords: *Physical Activity, Children, Rural Health, Lahore, Socio-Economic Factors, Sedentary Behavior*

INTRODUCTION

Physical activity is a cornerstone of child health, influencing physical, mental, and social well-being. Despite its known benefits, achieving sufficient levels of physical activity remains a challenge, particularly among children in rural areas (1, 2). These regions often face unique barriers, including limited access to recreational facilities, fewer structured sports opportunities, and greater distances that children must travel to participate in activities (3). Children from rural and urban areas differ in how active they are, which emphasises the need for expert research to identify and solve these issues (4, 5).

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It is recommended by the World Health Organization that children participate in moderate-to-intense physical activity for at least sixty minutes each day. Still, research has indicated over and again that a sizable portion of children fall short of these expectations. People who live in remote regions are especially vulnerable (6).The consequences of this gap are significant, affecting not just individual health outcomes but also community and healthcare systems (7).

The aim of this research is to ascertain the frequency of appropriate physical activity among kids in rural areas and the primary factors linked to fulfilling these guidelines. Access to secure play areas, socioeconomic status, and community or family support may all be important factors (8, 9). Understanding these can inform the development of targeted interventions that could enhance physical activity engagement among rural youth. By focusing on rural populations, this research seeks to contribute to the broader discourse on health equity and to propose actionable solutions that could mitigate the disparities in physical activity levels among children across different geographical and socioeconomic landscapes (10, 11).

This introduction sets the stage by outlining the problem, stating the importance of the research, and indicating the research's potential impact on policy and practical interventions (12, 13). The role of technology and innovation in promoting or hindering physical activity is also of interest. In an era where digital engagement frequently substitutes for physical play, understanding the balance between beneficial and adverse impacts of technology on physical activity is crucial, especially in rural settings where social interactions may already be limited (14, 15).

In aligning with these considerations, the research employs a multidimensional approach to data collection and analysis. This means that the study takes into account both qualitative and quantitative data as bases to paint a whole picture of the factors most influential in shaping the patterns of physical activities among children in these areas. Holistically, this way of dealing with the issue will ensure that the nuances of rural living are captured (16, 17). This paper can allow insights into the barriers and facilitators of physical activity in the rural setup. The findings will help further in designing more effective public health policies and programs specifically tailored for rural populations, while at the same time enhancing the scalability of successful interventions across similar communities globally (18).

By answering these crucial topics, this study seeks to contribute to current efforts to encourage physical activity and combat the growing tide of sedentary lifestyles and related health problems in rural communities, including obesity, diabetes, and cardiovascular disease. With a deeper knowledge of the factors at play, stakeholders at all levels may be better able to plan and implement solutions that encourage more active, healthier rural communities for our children (19).

MATERIAL AND METHOD

The study was conducted in the peri-urban and rural outskirts of Lahore, Pakistan, focusing on children aged 6 to 14 years. Employing a cross-sectional survey design, we utilized stratified random sampling to ensure a representative sample across different demographic strata. Data collection combined direct measurements and structured questionnaires. Children wore accelerometers for seven consecutive days to objectively measure physical activity levels, while parents completed questionnaires addressing potential barriers and facilitators to activity, including cultural and technological factors.

Ethical approval was secured from a local academic institution's Ethical Review Board, and informed consent was obtained from all participants' guardians. Data analysis involved descriptive statistics and multivariate logistic regression to identify significant correlates of physical activity. The study's limitations included potential response biases from self-reported data and the inability to establish causality due to the cross-sectional design.

RESULTS

The study analyzed 564 participants in a rural area of Lahore, focusing on socio-demographic, physical activity, dietary, and anthropometric profiles. Age distribution between 5-9 and 10-14 years was nearly equal (44.5% and 55.5%, respectively; p=0.7). Males constituted 53.0% of the sample, slightly above the overall 51.6% (p=0.05). Household education levels varied significantly (p<0.0001). : 30.0% had 0-5 years, 55.0% had 6-12 years, and 15.0% had graduate or postgraduate education.

Socio-economic status (SES). varied significantly (p<0.0001). : 40.0% were low SES, 35.0% medium, and 25.0% high SES. Active transport to school was used by 70.0% of participants, slightly higher than the overall 66.7% (p=0.1). Leisure-time physical activity showed significant variation (p<0.0001). : 25.0% engaged in less than 1 hour per day, 45.0% in 1-2 hours, 25.0% in 2.1-4 hours, 4.0% in 4.1-6 hours, and 1.0% in more than 6 hours per day. Sedentary activity also varied significantly (p<0.0001). : 15.0% spent less than 1 hour per day, 40.0% spent 1-2 hours, 40.0% spent 2.1-4 hours, 4.0% spent 4.1-6 hours, and 1.0% spent more than 6 hours. Dietary intake was suboptimal, with 90.0% consuming less than 5 servings of fruits and vegetables per day (p<0.0001). Processed food intake was 70.0% for less than 1 serving per day and 30.0% for 1 or more servings.

Anthropometric measures showed an average waist circumference of 54.0 cm (SD 6.5). , compared to the overall 54.8 cm (SD 6.8). (p=0.001). Waist z-scores were 0.0 (SD 5.0). , significantly different from the overall 0.03 (SD 5.4). (p<0.0001). The average BMI was 14.8 (SD 2.0). for both groups (p=0.40). For physical activity, 58% of 5-9-year-olds and 75% of 10-14-year-olds used active travel to school. Males had a 62%

prevalence, females 71%. Communities B and C had the highest rates at 70%. Households with 6-12 years of education and low SES showed higher active travel (69% and 70%).

Table 1 Socio-demographic, physical activity, diet, and anthropometric profile

Description	Lahore Rural Area	p-value	Total n = 564
Age Group (years).		0.7	
5-9 years	44.5%		44.8%
10–14 years	55.5%		55.2%
Sex		0.05	
% Boys	53.0%		51.6%
Highest Household Education Status		<0.0001	
0–5 years of education	30.0%		28.1%
6 to 12 years of education	55.0%		59.0%
Graduate/Postgraduate	15.0%		12.8%
Socio-Economic Status (SES).		<0.0001	
Low	40.0%		28.7%
Medium	35.0%		34.9%
High	25.0%		36.4%
Mode of transport to school		0.1	
Active transport (walk/bicycle).	70.0%		66.7%
Motorized transport (car, bus, auto, two-wheeler).	30.0%		33.3%
Leisure-Time Physical Activity		<0.0001	
< 1 h/day	25.0%		25.4%
1–2 h/day	45.0%		46.8%
2.1–4 h/day	25.0%		24.6%
4.1–6 h/day	4.0%		2.6%
> 6 h/day	1.0%		0.3%
Sedentary Activity		<0.0001	
< 1 h/day	15.0%		15.9%
1–2 h/day	40.0%		39.7%
2.1–4 h/day	40.0%		35.6%
4.1–6 h/day	4.0%		7.4%
> 6 h/day	1.0%		1.2%
Dietary intake		<0.0001	
Fruit vegetable intake < 5 servings/day	90.0%		87.8%
≥ 5 servings/day	10.0%		12.2%
Processed food intake < 1 serving/day	70.0%		71.5%
≥ 1 serving/day	30.0%		28.5%
Anthropometric Measures		0.001	
Crude waist circumference (cm).	54.0(6.5).		54.8(6.8).
Waist-z- scores	0.0(5.0).	<0.0001	0.03(5.4).
Crude BMI	14.8(2.0).	0.40	14.8

Those with less than 1 hour of leisure-time physical activity per day had a 68% prevalence of active travel, while those with more than 1 hour had 65%.

Table 2 Prevalence of Correlates of Recommended Physical Activity Status

Correlate	Active Mode of Travel to School (n = 375).	Leisure-time Physical Activity ≥1 h per Day (n = 393).	Sedentary Activity ≤2 h per Day (n = 308).
Age Group			
5–9 years	58%	80%	63%
10–14 years	75%	71%	51%
Sex			
Boys	62%	81%	60%
Girls	71%	67%	52%
Site (Nearby Rural Communities).			
Community A	63%	81%	38%
Community B	70%	79%	68%
Community C	70%	60%	65%
Highest Household Education Status			
0–5 years of education	66%	77%	62%
6 to 12 years of education	69%	77%	55%
Graduate/Postgraduate	60%	64%	46%
Socio-economic Status (SES).			
Low	70%	71%	57%
Medium	65%	76%	58%
High	69%	76%	54%
Leisure-time Physical Activity (at school + at home).			
< 1 h/day	68%	NA	54%
≥ 1 h/day	65%		56%
Sedentary Activity			
≤ 2 h/day	NA	76%	NA
> 2 h/day		75%	
Mode of Transport to School			
Active transport (walk/bicycle).	NA	74%	57%
Motorized transport		76%	54%
Fruit Vegetable Intake			
< 5 servings/day	68%	75%	59%
≥ 5 servings/day	64%	77%	36%
Processed Food Intake			
< 1 serving/day	68%	72%	60%
≥ 1 serving/day	65%	82%	47%

For leisure-time physical activity of ≥1 hour per day, 80% of 5-9-year-olds and 71% of 10-14-year-olds met the criteria. Males had a higher prevalence at 81% compared to females at 67%. Community A had the highest prevalence at 81%. Households with 0-5 years of education and medium SES had prevalences of 77% and 76%. Higher processed food consumption correlated with an 82% prevalence. Sedentary activity ≤2 hours per day was more common among younger children (63% of 5-9-year-olds). compared to older children (51% of 10-14-year-olds). Males and females showed similar trends (60% and 52%). Community B had the highest

prevalence at 68%, and low SES had 57%. Higher fruit and vegetable intake was associated with a lower prevalence of sedentary activity (36%). compared to lower intake (59%).

DISCUSSION

The results of this investigation into the prevalence and determinants of recommended physical activity levels among rural children near Lahore, Pakistan, present significant trends and relationships that enhance the understanding of physical activity patterns in South Asian rural contexts, augmenting research from regions such as India and Bangladesh.

The observed prevalence of active commuting to school (approximately 68% of children engaging in active transport). corresponds with findings from other rural South Asian locales, where limited access to motorized transport often necessitates walking or bicycling. Similar trends reported in rural South India and Bangladesh underscore a widespread reliance on these modes due to infrastructural limitations. The marginally higher rates of active commuting in this study may reflect the unique geographical and socio-economic characteristics of the rural communities near Lahore, potentially offering safer or more accessible routes for children .

In terms of leisure-time physical activity, 76% of children participated in more than one hour of activity per day. This rate is slightly below the results from Matlab, Bangladesh, but exceeds those from Goa and Chennai, which may be influenced by varying availability of recreational facilities and cultural norms that either encourage or discourage active leisure. The statistics on sedentary behaviour raises concerns, as nearly 54% of youngsters engage in sedentary activities for less than two hours each day. These results are consistent with regional tendencies, but reflect continued difficulty in combating sedentary lifestyles among youngsters, needing focused initiatives to promote scheduled physical exercise.

The link between greater household education levels and lower physical activity supports global trends, implying that increased socioeconomic position and education may improve access to passive leisure alternatives such as electronics. However, in homes with higher educational attainment, understanding of the value of physical exercise may not necessarily convert into active behaviour, either due to safety concerns or a prioritization of intellectual interests over physical ones.

Children from middle-class and upper-class households showed equal levels of physical activity, suggesting that socioeconomic position has a complex effect on physical activity levels. This demonstrates that wealth has little influence on engaging in unstructured physical play over a particular income threshold. Additionally, the study discovered that kids who consumed fewer than five servings of fruits and vegetables daily were more active. This finding may be related to dietary patterns where active kids consume more energy-dense foods to meet their greater energy needs rather than fruits and vegetables. This may also point to compensatory behaviour in which children who are more active select foods that are higher in calories. Although this study

provides useful information, it is unable to determine causation because of its cross-sectional methodology. Furthermore, measurement bias may arise from using self-reported data for indices of physical activity and diet.

CONCLUSION

This research looks at how active kids are when they're growing up in Pakistan's rural areas around Lahore, and it finds important relationships between things like leisure time, transportation, and socioeconomic status. The results underscore the commonalities with other regions in South Asia while also stressing the influence of the socioeconomic and educational conditions of the area on the habits of physical exercise. These results emphasize the value of tailored interventions to promote active lifestyles and decrease sedentary behaviour in rural areas to enhance the general health and wellbeing of children. It will need ongoing research to evaluate these interventions' long-term effectiveness, especially in terms of improving rural children's dietary and physical activity habits.

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