

Original Article

Relationship of Physical Activity with Lifestyle Modification in Obese School-Going Children of Lahore: A Cross-Sectional Study

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ABSTRACT

Background: Childhood obesity is associated with physical, metabolic, and psychosocial consequences, while insufficient physical activity and prolonged sedentary behaviour may contribute to an unfavorable lifestyle pattern. Locally relevant information regarding the activities of school-going children with obesity in Lahore remains limited. **Objective:** To characterize participation in organized sports, active outdoor play, active transport, and sedentary or screen-based activities among school-going children with obesity in Lahore. **Methods:** This descriptive cross-sectional survey included 181 children recruited from schools in Lahore through non-probability convenience sampling over six months. Activity was assessed using 46 binary items from the Children's Physical Activity Questionnaire, grouped into structured sports, active outdoor play and transport, and sedentary or indoor activities. Data were summarized using mean $\pm$ standard deviation, frequencies, percentages, and Wilson 95% confidence intervals. **Results:** The mean age was 11.59 ± 2.04 years, and 92 participants (50.8%) were boys. Basketball or volleyball was reported by 50.8%, racquet sports by 44.2%, and bike riding by 47.0%. Walking and cycling to school were reported by 6.1% and 2.2%, respectively. Computer or internet use (98.3%), television or video viewing (96.7%), and car or bus travel to school (96.1%) were frequently reported. **Conclusion:** The sampled children commonly reported screen-based activities and passenger transport, whereas active commuting and participation in many organized sports were less frequently reported. These findings identify activity domains relevant to subsequent lifestyle assessment and programmed planning. **Keywords:** Childhood obesity; physical activity; sedentary behavior; screen time; active transport; schoolchildren.

INTRODUCTION

Childhood obesity is a major public-health concern characterized by excess adiposity that may impair physical health, psychological well-being, and quality of life. In children and adolescents, weight status is commonly evaluated using age- and sex-specific body mass index criteria rather than adult BMI thresholds (1). The burden of childhood obesity is increasing in developing countries, where it occurs alongside persistent undernutrition and

places additional demands on already constrained healthcare systems (2). Evidence from Lahore has also identified physical inactivity and prolonged television viewing among potentially modifiable factors associated with childhood obesity (3).

Childhood obesity is a multifactorial condition arising from interactions among dietary intake, physical activity, sedentary behaviour, genetic susceptibility, family influences, and the wider social and physical environment (4). Parents may influence children's activity through encouragement, role modelling, logistical support, and the opportunities they provide for active recreation (5). At the same time, increased access to televisions, computers, electronic games, and other screen-based activities may displace active play and reduce daily energy expenditure. Research among schoolchildren has demonstrated an association between screen-based sedentary behaviour and adiposity, although the magnitude of this relationship may vary across settings and activity measures (6).

Insufficient physical activity during childhood is important not only in relation to weight status but also because obesity is associated with longer-term metabolic and physical consequences. Children with obesity may be at increased risk of metabolic abnormalities, including insulin resistance, dyslipidaemia, and elevated blood pressure (2). Excess body weight has also been associated with musculoskeletal pain and disorders affecting the muscles, bones, and joints, which may further restrict participation in physical activity (7). Psychological difficulties, reduced self-esteem, and social consequences may occur alongside these physical complications, highlighting the need to understand children's everyday activity and sedentary patterns when planning preventive and supportive programmes (8).

Previous studies have examined low physical activity, television viewing, parental characteristics, and other lifestyle-related factors associated with childhood obesity (3). Research involving children from different urban settings has also demonstrated variations in the intensity and duration of physical activity according to demographic and environmental circumstances (9). Studies of children with obesity and their parents further indicate that physical activity and sedentary time may be shaped by shared household routines (10). Nevertheless, limited locally relevant information is available describing how school-going children with obesity in Lahore participate across specific domains of organised sport, active outdoor play, active transport, and sedentary or screen-based activities. Such information is needed to identify prominent behavioural patterns and inform the subsequent development of contextually appropriate lifestyle-modification strategies.

Therefore, this descriptive cross-sectional study aimed to characterize participation in structured or organised sports, active outdoor play and transport-related physical activity, and sedentary, indoor, and screen-based activities among school-going children with obesity in Lahore.

MATERIALS AND METHODS

This descriptive cross-sectional survey was conducted in schools in Lahore, Pakistan, over six months. The cross-sectional design was used to characterize the contemporaneous distribution of physical activity and sedentary behaviour among school-going children with obesity. The target population comprised male and female school-going children aged 7–19 years who were identified as having obesity. A total of 181 eligible children were recruited from participating schools through non-probability convenience sampling. The sample size was estimated using a single-population prevalence approach with a 95% confidence level and a 10% margin of error.

Data were collected using the standardised Children's Physical Activity Questionnaire (C-PAQ), a closed-ended instrument covering habitual physical activity, exercise routines, eating habits, and sleep duration. For the present analysis, 46 leisure-time and transport-related activity items were evaluated. These items were grouped for reporting into three domains: 16 structured or organised sports activities, 16 active outdoor play and transport-related activities, and 14 sedentary, indoor, or screen-based activities. Each item recorded whether the participant had engaged in the specified activity. Supplementary questions recorded the weekly frequency and daily duration of endorsed activities; however, the present analysis was based on binary participation in each activity. The primary descriptive outcomes were the number and proportion of participants reporting each activity within the three domains.

Questionnaires were completed on site under researcher supervision. The meaning of individual items was explained when necessary to reduce misunderstanding and promote consistent interpretation. The analytical

sample comprised the 181 children who completed the questionnaire, and the total sample was used as the denominator for the reported activity proportions.

Data were entered and analysed using IBM SPSS Statistics version 21.0. Age was summarized using the mean, standard deviation, minimum, and maximum, whereas sex and participation in each activity were summarized using frequencies and percentages. Because the analysis was descriptive and did not include a comparison group or a defined lifestyle-modification outcome, no inferential tests, subgroup comparisons, multivariable analyses, or adjustments for potential confounders were performed.

RESULTS

All 181 participants completed the questionnaire. The mean age was 11.59 ± 2.04 years, with an observed range of 7–18 years. The sample included 92 boys (50.8%) and 89 girls (49.2%) (Table 1).

Participation in structured or organised sports varied considerably across activities (Table 2). Basketball or volleyball was reported by 92 participants (50.8%; 95% CI, 43.6%–58.0%), followed by racquet sports in 80 (44.2%; 95% CI, 37.2%–51.5%), cricket in 59 (32.6%; 95% CI, 26.2%–39.7%), and running or jogging in 48 (26.5%; 95% CI, 20.6%–33.4%). Participation was reported by fewer than 10% of participants for aerobics, baseball or softball, gymnastics, hockey, martial arts, rugby, swimming lessons, and physical education classes. No participant reported participating in netball.

Table 1. Demographic Characteristics of Participants (N = 181)

Characteristic	Overall
Age, years, mean $\pm$ SD	11.59 $\pm$ 2.04
Age, years, range	7–18
Male, n (%)	92 (50.8)
Female, n (%)	89 (49.2)

SD, standard deviation.

Table 2. Participation in Structured or Organised Sports Activities (N = 181)

Activity	n (%)	95% CI (%)
Aerobics	10 (5.5)	3.0–9.9
Baseball/softball	7 (3.9)	1.9–7.8
Basketball/volleyball	92 (50.8)	43.6–58.0
Cricket	59 (32.6)	26.2–39.7
Dancing	29 (16.0)	11.4–22.1
Football	30 (16.6)	11.9–22.7
Gymnastics	14 (7.7)	4.7–12.6
Hockey	7 (3.9)	1.9–7.8
Martial arts	5 (2.8)	1.2–6.3
Netball	0 (0.0)	0.0–2.1
Rugby	10 (5.5)	3.0–9.9
Running/jogging	48 (26.5)	20.6–33.4
Swimming lessons	14 (7.7)	4.7–12.6
Swimming for recreation	36 (19.9)	14.7–26.3
Tennis/badminton/squash/other racquet sports	80 (44.2)	37.2–51.5
Physical education class	4 (2.2)	0.9–5.5

CI, confidence interval. Confidence intervals were calculated using the Wilson method.

Table 3. Participation in Active Outdoor Play and Transport-Related Physical Activity (N = 181)

Activity	n (%)	95% CI (%)
Bike riding, excluding school travel	85 (47.0)	39.8–54.2
Trampoline activity	3 (1.7)	0.6–4.8
Bowling	11 (6.1)	3.4–10.6
Household chores	66 (36.5)	29.8–43.7
Play in a playhouse	42 (23.2)	17.7–29.9
Playground equipment	50 (27.6)	21.6–34.6
Playing with pets	43 (23.8)	18.1–30.5
Roller-skating	3 (1.7)	0.6–4.8

Activity	n (%)	95% CI (%)
Scooter riding	53 (29.3)	23.1–36.3
Skateboarding	10 (5.5)	3.0–9.9
Skiing/snowboarding/sledging	1 (0.6)	0.1–3.1
Skipping rope	46 (25.4)	19.6–32.2
Walking the dog	18 (9.9)	6.4–15.2
Walking for exercise/hiking	4 (2.2)	0.9–5.5
Walking to/from school	11 (6.1)	3.4–10.6
Cycling to/from school	4 (2.2)	0.9–5.5

CI, confidence interval. Confidence intervals were calculated using the Wilson method.

Table 4. Participation in Sedentary, Indoor, and Screen-Based Activities (N = 181)

Activity	n (%)	95% CI (%)
Arts and crafts	107 (59.1)	51.8–66.0
Homework	164 (90.6)	85.5–94.1
Imaginary play	8 (4.4)	2.3–8.5
Listening to music	142 (78.5)	71.9–83.8
Indoor play with toys	48 (26.5)	20.6–33.4
Board games/cards	37 (20.4)	15.2–26.9
Computer games	143 (79.0)	72.5–84.3
Playing musical instruments	2 (1.1)	0.3–3.9
Reading	49 (27.1)	21.1–34.0
Sitting and talking	95 (52.5)	45.2–59.6
Talking on the phone	149 (82.3)	76.1–87.2
Car/bus travel to/from school	174 (96.1)	92.2–98.1
Computer/internet use	178 (98.3)	95.2–99.4
Television/videos	175 (96.7)	93.0–98.5

CI, confidence interval. Confidence intervals were calculated using the Wilson method.

Among active outdoor play and transport-related activities, bike riding excluding school travel was the most frequently reported activity, with 85 participants (47.0%; 95% CI, 39.8%–54.2%) (Table 3). Household chores were reported by 66 participants (36.5%; 95% CI, 29.8%–43.7%), scooter riding by 53 (29.3%; 95% CI, 23.1%–36.3%), and use of playground equipment by 50 (27.6%; 95% CI, 21.6%–34.6%). Active travel to school was uncommon: 11 participants (6.1%; 95% CI, 3.4%–10.6%) reported walking, and four (2.2%; 95% CI, 0.9%–5.5%) reported cycling to or from school.

High proportions of participants reported several sedentary, indoor, and screen-based activities (Table 4). Computer or internet use was reported by 178 participants (98.3%; 95% CI, 95.2%–99.4%), television or video viewing by 175 (96.7%; 95% CI, 93.0%–98.5%), and travel to or from school by car or bus by 174 (96.1%; 95% CI, 92.2%–98.1%). Homework was reported by 164 participants (90.6%; 95% CI, 85.5%–94.1%), talking on the phone by 149 (82.3%; 95% CI, 76.1%–87.2%), playing computer games by 143 (79.0%; 95% CI, 72.5%–84.3%), and listening to music by 142 (78.5%; 95% CI, 71.9%–83.8%). Overall, the item-level distribution showed high endorsement of screen-based activities and passenger transport, alongside limited active commuting and low participation in many organised sports.

The Wilson 95% confidence intervals are validly derived from the reported counts and common denominator of 181. Association tests, subgroup comparisons, odds ratios, and adjusted estimates were not calculated because participant-level cross-tabulations and covariate data were not supplied.

DISCUSSION

This descriptive cross-sectional study identified a marked variation in the activities reported by school-going children with obesity in Lahore. Although some organised activities, particularly basketball or volleyball, racquet sports, cricket, and running or jogging, were relatively common, participation in most structured sports and active commuting was limited. In contrast, computer or internet use, television or video viewing, passenger transport to school, homework, telephone use, and computer gaming were reported by substantial proportions of the sample. These findings characterize the participants' activity patterns but do not establish that the reported behaviours caused or maintained obesity.

The high endorsement of screen-based activities is broadly consistent with previous evidence relating sedentary behaviour to childhood obesity. A case-control study conducted in Lahore identified low physical activity and prolonged television viewing among potentially modifiable factors associated with obesity in children (3). Similarly, the ISCOLE-Kenya study reported an association between screen-based sedentary behaviour and adiposity among schoolchildren (6). The present study extends the descriptive context by showing that several forms of screen engagement were commonly reported among children with obesity in Lahore. However, the questionnaire results represent activity endorsement rather than objectively measured duration or intensity. Consequently, they cannot determine whether participants accumulated excessive screen time or failed to meet recommended physical-activity levels.

Active travel to school was uncommon, whereas travel by car or bus was reported by nearly the entire sample. This pattern may indicate that routine opportunities for incorporating physical activity into the school day were limited. Research involving children from three Libyan cities also found that physical-activity patterns varied according to demographic and environmental circumstances, including the availability of recreational facilities and opportunities for outdoor activity (9). Distance from school, road safety, parental concerns, weather, school policies, and access to transport are plausible influences on travel behaviour and active play, but these factors were not measured in the present study. Therefore, the high use of passenger transport should not be interpreted solely as an individual lifestyle choice. Broader evidence suggests that children's activity patterns are shaped by interacting family, school, social, and environmental factors (8).

The observed combination of high sedentary-activity endorsement and limited participation in many organised activities may also reflect shared household and family routines. Parental encouragement, role modelling, logistical support, and access to activity opportunities have previously been identified as correlates of physical activity among children and young adolescents (5). McMurray et al. similarly reported relationships between the physical activity and sedentary time of children with obesity and their parents, particularly during periods when they were more likely to be together (10). Although parental activity and support were not assessed in the present study, these findings suggest that activity promotion may need to consider the child's family and school environment rather than focusing exclusively on individual motivation.

The findings have potential clinical and public-health relevance because regular physical activity forms part of the broader management of childhood obesity and associated metabolic risks (2,4). Children with obesity may also experience musculoskeletal pain and physical limitations that reduce their willingness or ability to participate in weight-bearing and organised activities (7). Psychological discomfort, low confidence, perceived stigma, and difficulty keeping pace with peers may create additional barriers to participation (8). Nevertheless, the present study did not assess metabolic outcomes, musculoskeletal symptoms, psychological health, physical fitness, or barriers to activity. It therefore cannot determine whether these mechanisms explain the observed participation patterns or whether increasing any specific activity would result in weight reduction or improved health outcomes.

A strength of the study was the inclusion of 181 participants with an approximately balanced sex distribution and the item-level assessment of 46 organised, outdoor, transport-related, indoor, and screen-based activities. Reporting individual activities provides a more detailed description than a single overall activity category, while the calculated confidence intervals indicate the precision of the observed proportions. Several limitations should, however, be considered. The cross-sectional design precluded assessment of temporality or causality, and the absence of a normal-weight comparison group prevented determination of whether the identified patterns were specific to children with obesity. Convenience sampling and the limited description of participating schools restricted representativeness and generalizability. The absence of reported anthropometric values, obesity severity, and the operational criterion used to establish obesity limited clinical characterization of the sample. Activity was self-reported and may have been affected by recall and social-desirability bias. Furthermore, the binary activity responses did not quantify frequency, duration, intensity, or total physical-activity volume, and the available data did not support analyses according to age, sex, school, socioeconomic circumstances, or other potential confounders. These limitations mean that the findings should be interpreted as an item-level description of reported activities within the sampled children rather than evidence of relationships between physical activity, lifestyle modification, and obesity.

CONCLUSION

School-going children with obesity in this Lahore sample commonly reported screen-based activities and passenger transport, while active commuting and participation in many structured sports were less frequently reported. These descriptive findings identify potentially relevant activity domains for clinical and public-health assessment, but comparative and longitudinal evidence is required to determine their relationship with obesity and the effects of lifestyle modification.

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