



COMPARATIVE STUDY ON SEDENTARY BEHAVIOUR AND PHYSICAL ACTIVITY PATTERN OF URBAN AND RURAL GOVERNMENT SCHOOL CHILDREN OF PUNJAB (INDIA)

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ABSTRACT

The present study was aimed to assess urban-rural disparity in the physical activity pattern of government school children of Punjab (India). A survey was conducted on 1050 children (11-17 years) randomly selected from urban and rural government schools to collect information on their physical activity pattern (school sports, leisure time physical activity/LTPA and mode of commuting to school) and sedentary behaviour (screen time). The study revealed no urban-rural disparity in mean time spent by school children in LTPA (5.1 h wk⁻¹ each) and screen activities (9.8 for urban vs. 9.5 h wk⁻¹ for rural subjects). Urban school children were spending ($p \leq 0.05$) more time (7.5 h wk⁻¹) in school sports, than rural school children (6.6 h wk⁻¹). The percentage of active commuters was more from rural schools (92%) as compared to urban schools (85%). Overall the children were spending on an average 6.9, 5.1 and 9.6 h wk⁻¹ in school sports, LTPA and screen activities, respectively. Based on AAP and WHO levels, children from government schools of Punjab did not possess sedentary behaviour as they had adequate physical activity level, low screen time and were mostly active commuters.

Key words: LTPA, physical activity, Punjab, school children, screen time, sedentary behaviour

INTRODUCTION

Regular physical activity is important for social, emotional and physical well-being of children and adolescents, resulting in optimum growth and development; whereas sedentary behaviour (SB) is emerging as an independent risk factor for obesity, lifestyle diseases, poor bone health and cognitive performance (Lee *et al.*, 2012). SB includes low energy expenditure activities, usually performed in a sitting or reclining position; and screen activities such as watching television (TV), using computer, playing video games, which is usually referred as “screen time” (Tremblay *et al.*, 2011). One of the important components of total physical activity is leisure-time physical activity (LTPA) like running, walking, cycling, dancing, gardening, hiking, swimming and other home-based activities (Mota *et al.*, 2008). A person can be physically active and sedentary if he spends a large amount of his day sitting or lying down during his leisure time (Pate *et al.*, 2008).

According to the American Academy of Pediatrics (AAP, 2013) and World Health Organization (WHO, 2011) children (5-17 yr) should not spend > 2 h day⁻¹ on screen activities; and should have at least 1 h of moderate to vigorous physical activity (MVPA) per day. Gulati *et al.* (2014) have reported that in urban India about 21% of school-children (3-11 yr) were inactive and only 17% of children (5-17 yr) followed the WHO recommendations. A study from rural areas of South India has shown that only one quarter of children (5-14 yr) had recommended physical activity level (Shridhar *et al.*, 2016). Similarly, the 2016 Indian report card on physical activity for

children and youth has highlighted that most Indian children spend major part of their day in sedentary pursuits and roughly half of children and youth meet physical activity guidelines (Katapally *et al.*, 2016). Worldwide about 80% adolescents (13-15 yr) do not engage in enough physical activity (Hallal *et al.*, 2012). The global decline in adolescent's physical activity is a serious public health issue which warrants attention especially through schools. The studies on physical activity participation and SB among Indian children are very scarce and such studies from Punjab are almost non-existent. Thus, it becomes imperative to determine these factors among school children from government schools of Punjab (India).

MATERIALS AND METHODS

Location and selection of the subjects

The present study was undertaken in the year 2015-2016 with proper approval from the Institution's Ethical Committee. Thirty-cluster multistage sampling technique was used. Five districts, 1 district each from Majha (Amritsar) and Doaba (Jalandhar) regions and 3 from Malwa region (Ludhiana, Faridkot and Patiala) of Punjab were selected targeting the school-going children. In next stage sampling, 2 blocks from each district were chosen. The last stage sampling included selection of 2 rural and 1 urban government school from each block thus making a total random sample size of 1050 children in 11-17 years age group. Of the samples, 210 subjects (20% each) were from Majha and Doaba region, of which 70 subjects from urban and 140 subjects were from rural government schools of each region. Malwa region comprised of a larger proportion of subjects i.e. 630 (60%), of which 210 and 420 subjects were from urban and rural government schools of this region, respectively. Proportion of subjects from rural area was more than urban area because the percentage of rural population to the total population of Punjab is higher. Further, the proportion of subjects from Malwa region was more than other regions, because Malwa region makes up the majority of Punjab state (65.1% of total area and 58.5% of total population), and thus is considered as the biggest region in Punjab (Census of India, 2011).

Demographic and socio-economic profile

Using a well-structured questionnaire, information regarding the age (11-12, 13-15 and 16-17 yr); gender (girls and boys); caste {general, scheduled caste (SC) and backward (BC)}; religion {Sikh, Hindu and others (Muslim, Christian, Jain)} of the subjects; and occupation (farming, business, service, labour, self-employed); education (no education, up to matric and above matric); and income {₹} (≤ 5000 , 5,001-10,000, 10,001-20,000 and $> 20,000$) of parents was recorded.

Physical activity pattern

Information regarding the type and frequency (h wk^{-1}) of participation in physical activities like school sports; LTPA (out-of-school sports, walking/running/jogging and household chores); and mode of commuting to and from school (categorized as active commuters - walking/cycling or passive commuters-scooter/auto/bus/rickshaw) was collected. Sedentary behaviour was established from screen time variable (1-2, 3-4, $>4 \text{ h day}^{-1}$ and not at all). The weighted average time spent on physical and screen activities was calculated from that reported on a typical day. Screen time of $\leq 2 \text{ h day}^{-1}$ (AAP, 2013) and at least $1 \text{ h MVPA day}^{-1}$ (WHO, 2011) was used for comparison.

Statistical analysis

The completed questionnaire was serially coded and tabulated for statistical analysis using SPSS Windows version 16.0 (SPSS Inc., USA). The mean, standard deviation and percentages were calculated using standard methods (Singh *et al.*, 1991). To assess urban-rural disparity in physical activity pattern of school children, Student's t-test was applied.

RESULTS AND DISCUSSION

Demographic and socio-economic profile

Majority of children from Punjab were Sikhs, followed by Hindus (Table 1). Over 50% subjects were SCs. The majority of children's parents were educated up to matric and very few had above matric education, thus indicating that the number of those without any worthwhile schooling was quite substantial. Labour was the most pursued occupation of fathers; and mothers were mostly housewives. Based on family income of the subjects, most children (75%) were from low socio-economic status households, earning < ₹. 10000 month⁻¹.

Physical activity pattern

The participation of urban and rural school children in school sports and LTPA is depicted in Fig. 1. Distribution of urban and rural school children as active and passive commuters based on the mode of commuting to and from school is given in Fig. 2. The average time spent by urban and rural school children of Punjab, in school sports, LTPA and screen activities is shown in Table 2.

Table 1: Demographic and socio-economic profile of school children from Punjab (N = 1050)

Parameter	Category	Number (%)
Gender	Girls	613 (58)
	Boys	437 (42)
Religion	Sikh	710 (68)
	Hindu	303 (29)
	Others (Muslim, Christian, Jain)	37 (3)
Caste	General	242 (23)
	Scheduled caste	586 (56)
	Backward caste	222 (21)
<u>Parent's education</u>		
Mother	No education	383 (37)
	Up to matric	591 (56)
	Above matric	76 (7)
Father	No education	264 (25)
	Up to matric	651 (62)
	Above matric	135 (13)
<u>Parent's occupation</u>		
Mother	Labour	170 (16)
	Housewife/non-working	798 (76)
	Self-employed/service/farming/any other	82 (8)
Father	Farming	136 (13)
	Business	48 (5)
	Service	119 (11)
	Labour	546 (52)
	Self-employed	168 (16)
	Any other	12 (1)
	Non-working/Late	21 (2)
Family income (₹.)	≤ 5000	363 (35)
	5,001-10,000	423 (40)
	10,001-20,000	164 (16)
	> 20,000	100 (9)

School sports

Almost equal percentage of urban (50%) and rural school children (49%) were engaged in school sports which indicated that overall 50% subjects surveyed from government schools were participating in school sports. The mean time spent (7.5 h wk⁻¹) by urban school children in school sports was significantly ($P_{0.05}$) higher as compared to rural school children (6.6 h wk⁻¹). Overall in Punjab the subjects spent on an average 6.9 h wk⁻¹ in school sports which is adequate as per WHO (2011) recommendations. In contrast, in Mangalore the school-age children (9-13 yr) living in rural areas spend more time on physical activities during school hours (68 vs. 27 min day⁻¹) as compared to their urban counterparts (Karkera *et al.*, 2014). The studies from other countries indicate that rural children participated less in physical activity than urban children (Moore *et al.*, 2013); some have reported inconsistent evidence (Moore *et al.*, 2014); and some did not find any rural-urban differences in the frequency of physical activity (Kenney *et al.*, 2014). Participation in sport and recreation is associated with less depression, better academic performance and social interaction, and better mental and social health, among children and adolescents (Hoare *et al.*, 2014).

Table 2: Average time spent by urban and rural school children of Punjab, in school sports, LTPA and screen activities (N = 1050)

Activity (h wk ⁻¹)	Urban (n = 350)	Rural (n = 700)	t value	Punjab
School sports	7.5 ± 4.2	6.6 ± 4.2	2.221*	6.9 ± 4.2
LTPA	5.1 ± 4.5	5.1 ± 4.4	0.258 ^{NS}	5.1 ± 4.5
Screen activities	9.8 ± 6.0	9.5 ± 5.8	0.583 ^{NS}	9.6 ± 5.9

*Significant at 5%; ^{NS} = Non-significant

LTPA

From urban and rural schools of Punjab, 52 vs. 65%, 28 vs. 27%, and 40 vs. 33% children were involved in out-of-school sports, walking/running/jogging and household chores, respectively. Overall, about 61, 28 and 35% subjects were participating in out-of-school sports, walking/running/jogging and household chores, respectively. Amarnath and Venkataramana (2017) conducted a study on south Indian school children and reported very less percentage of children jogging (30%) and running (11%) daily; while about 50% children never or rarely participated in outdoor games. The present study showed no urban-rural disparity ($p \geq 0.05$) in mean time spent by school subjects in LTPA. From Punjab state, the subjects spent, on an average, 5.1 h wk⁻¹ in LTPA. In contrast, Tiwari *et al.* (2014) observed that 45% adolescents of Allahabad district participated in outdoor games for more than 6 h wk⁻¹ and only 15% participated in household activity for more than 3 h day⁻¹ and 53% participated in household activity for 1-3 h day⁻¹. LTPA level may partly be determined on the basis of personal traits, needs and interests, and partly on external factors such as environment and availability (Aaltonen *et al.*, 2014).

Mode of commuting to and from school

The percentage of active commuters (92%) was slightly higher from rural government schools of Punjab as compared to urban schools (85%); and the rest were passive commuters (15% in urban and 8% in rural schools). Conversely, Katapally *et al.* (2016) reported that about 50% children were active commuters, however the children in rural India seem more active than their urban counterparts. Similarly, a study conducted in urban South India showed that only 42% children in older age group (> 11 yr) compared to 18% younger children (≤ 11 yr), were actively commuting to and from school (Swaminathan *et al.*, 2011). Present study showed that a greater proportion (90%) of children from government schools in Punjab had active mode of travel to school. It is believed that children studying in government schools, especially in rural areas, are more likely to actively commute to school than those from private schools. This may be attributed to their low socio-economic status wherein they may not be able to pay for school or public transport fares; thus had no choice but to walk/cycle to school. In this context, a study conducted in Hyderabad (India) reported that the percentage of passive commuters was higher in children attending private schools (41%) than those attending government schools (24%) [Tetali *et al.*, 2016]. Hence, identifying the

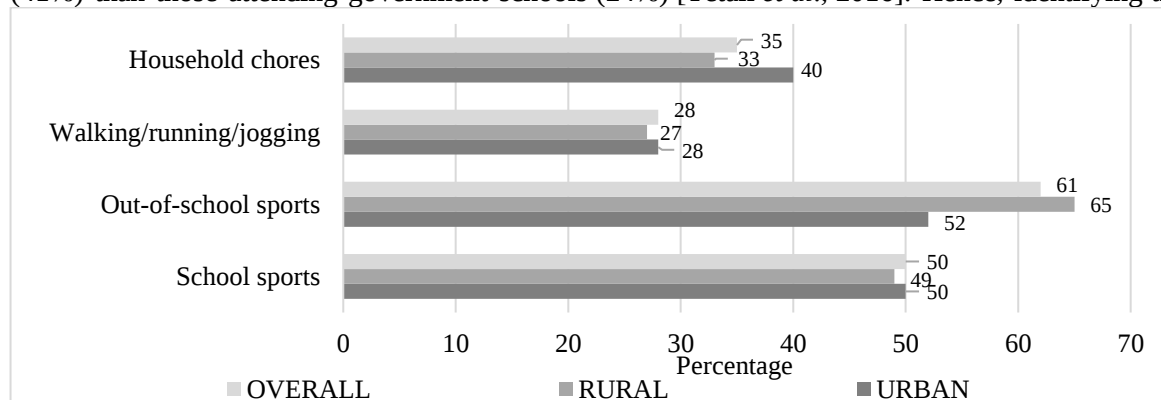


Fig. 1: Participation of urban and rural school children in school sports and LTPA (out-of-school sports, walking/running/jogging, and household chores)

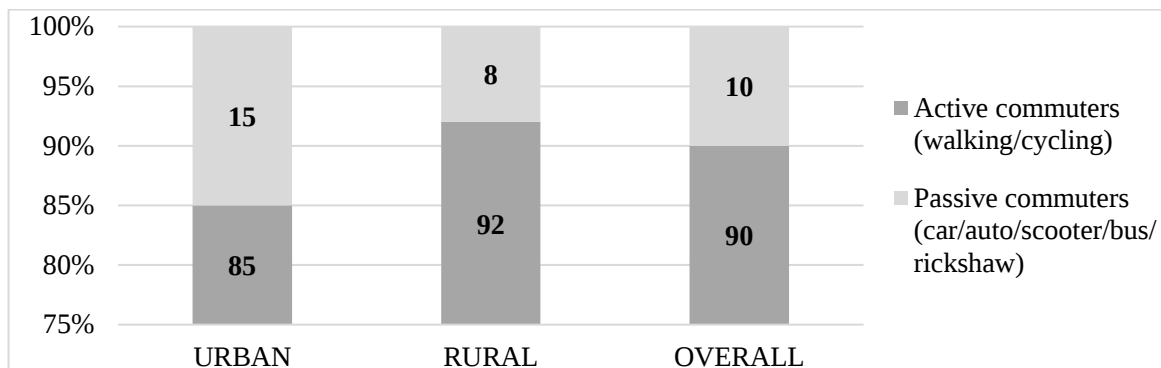


Fig. 2: Distribution of urban and rural school children, as active and passive commuters based on the mode of transportation used for school

factors affecting active travel to school such as location and type of school; government should adopt policy measures to promote active travel and to ensure that students have safe routes.

Sedentary behaviour (SB)

Majority (77% each) of urban and rural school subjects had low screen time (Fig. 3). Overall in Punjab 77% children had low screen time; 17% did not watch TV, play video games or use computers (implying no screen time); and very few (6%) had high screen time. No significant difference was noted in mean screen time of the subjects from urban (9.8 h wk⁻¹) and rural schools (9.5 h wk⁻¹) of Punjab. Overall in Punjab the children had, on an average, 9.6 h wk⁻¹ of screen time. A survey conducted by CBSE (India) in 2007 showed that more than one-third school children spent ≥ 3 h day⁻¹ on sedentary activities which was found higher than that reported in the study findings (Guthold *et al.*, 2010). As compared to developing nations, predominantly sedentary lifestyle in developed regions is the major cause of higher prevalence of overweight and obesity among children (Lucena *et al.*, 2015). Strategies to promote active living among children should focus not only on increasing physical activity but also emphasize on reduction in sedentary behaviour.

The physical activity and sedentary behaviour scenario showed that as compared to rural school children the children from urban schools spent more time in school sports and screen activities; whereas the time spent in LTPA was almost equal. Overall, Punjabi school children were spending more time in school sports than LTPA. The proportion of children participating in out-of-school sports was noted to be more from rural schools than urban schools; whereas in school sports almost equal proportion of subjects were involved. A possible explanation for this could be that rural children usually have higher outdoor activities than their urban counterparts, as they have more opportunities available to them in natural environment. In urban areas due to heavy traffic the parents prefer to keep their children at home and play indoor games or watch television which consequently hinder their participation in outdoor games and sports (Lee *et al.*, 2015).

The percentage of the Punjabi children participating in school sports and LTPA was low, however, they met the minimal physical activity recommendations (WHO, 2011) and did not exceed the maximal screen time recommendations of AAP (2013). Swaminathan *et al.* (2011) in

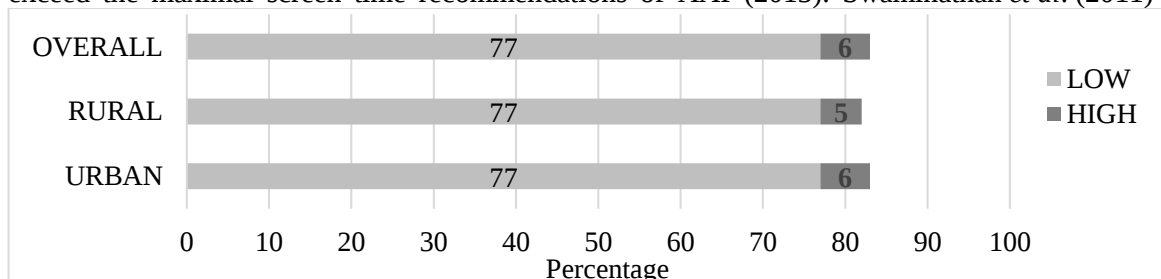


Fig. 3: Distribution of urban and rural school children, based on screen time

urban South India, Vaz *et al.* (2011) in Bengaluru, Esht *et al.* (2018) in North India and Bhat and Murtaza (2017) in Jammu and Kashmir also showed that few children had regular physical activity within recommended value of 1 h MVPA day⁻¹. Overall, in Punjab most children adopted active mode of travel to school, had adequate physical activity level and low screen time; thereby met the recommendations of AAP and WHO. The findings may be attributed to low socioeconomic status of government school children, wherein they lack basic entertainment amenities like TV, computer, video games, etc., and lack of transportation facilities; thus they are more likely to indulge in a lifestyle involving more physical activity and less screen activities. At national and state level such research is highly understudied. Therefore, to assess the overall health status of an individual, physical activity and sedentary behaviour of children should be considered simultaneously in the assessment of nutritional status.

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