

ORIGINAL ARTICLE

Assessment of difference in physical activities in urban and rural adolescents of Mangalore

Rashmi Kundapur¹, Sharon Baisil²

¹Professor, ²Postgraduate, Department of Community Medicine, K S Hegde Medical Academy, Nitte University, Mangalore, Karnataka

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Corresponding Author

Address for Correspondence: Dr Rashmi Kundapur, Professor, Department of Community Medicine, K S Hegde Medical Academy, Nitte University, Mangalore, Karnataka
E Mail ID: drrashmikundapur@gmail.com



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Abstract

Background: The increasing prevalence of adolescents who are overweight is one of the most pressing public health problems in India. **Aim & Objective:** To find the difference in Physical Activities(PA) among urban adolescents to that of rural in Mangalore. **Materials and Methods:** Cross sectional study among high school students using a standard questionnaire (PAQ-A) to elicit total hours of PA during the past seven days. **Results:** Average age of the adolescents was 13.9. We could find 56% boys and 44% girls studying in urban schools and 53.3% boys and 46.6 % girls in rural. Seventy seven percent of the total students do running/jogging as their major PA and 66.6% students do cycling. Only 32.8% students had PA while coming to school every day and it was most common among boys in rural schools (55%). Total PA Score for rural areas was 453.5 with a mean of 3.06(out of 5). For Urban areas, total score was 376.3 with a mean of 2.5 and the difference in proportion was statistically significant. **Conclusion:** We found that the adolescents studying in the schools of rural areas had better physical activities compared to their urban school counterparts.

Keywords

Physical Activity; Sedentary Behaviour; Obesity; Children; India

Introduction

Development of childhood obesity is a multifactorial mechanism, which depends on inadequate physical activity(PA), sedentary lifestyle, dietary behaviours and genetics. (1,2,3) According to CDC, drastic reduction in school physical education time and the lesser number of students walking to school are the contributing factors for obesity epidemic among students. (4)

Adequate physical activity is a well-known factor in combating overweight among all age groups, but it is

difficult to assess and interpret its measurement. (5) A school based health survey in 34 countries by Guthold *et al* revealed that only 23.8% of males and 15% of female students met the standard recommendations of sixty minutes of physical activity/day. (6) Studies conducted in Turkey and Taiwan to assess the difference in physical activity among urban and rural school students showed a significant difference among their peers. (7,8) Study by Bachani *et al* in India revealed that only 8.8% boys and 9.2% girls had good scores for adequate physical activity. (9)

Studies evaluating the differences in physical activity among urban and rural adolescents are very few in South Indian states, and such investigations can help to identify the subgroups of population that may need to be targeted for special intervention programs.

Aim & Objective

To assess differences in the correlates of physical activity between urban and rural adolescents in Mangalore taluka of Karnataka state in India.

Material & Methods

A community based cross sectional study was conducted. Considering 14% prevalence of physical activity among the adolescents in the Urban schools of Karnataka (10) and expecting double the amount of physical activity in Rural schools, at 95% confidence interval and 80% power, the sample size for each group was calculated as 132 using the StatCalc tool of the Epi Info software version 7.2. Expecting incompleteness in data, we took 15% of extra samples to make it 150 in each group as the final sample size. Pen drop (also called as pin drop) method (11) of random sampling was used for choosing the schools in urban and rural areas. Snowball Technique was employed for selection of students from each school. We used a nine item, self-administered PA questionnaire for adolescents (PAQ-A) which includes the amount and pattern of physical activity and various modes of those activities, with the modification of distance travelled to school and the mode of travelling to elicit the total hours of physical activity in the adolescents. PAQ-A has high validity and reliability and captures the child's physical activity during the last 7 days. (12) The questionnaire was translated into the local language (Kannada) and was linguistically validated. After taking informed consent from parents, it was given to the students, explained well and helped in between if not understood, as the researcher was present along with students during filling.

The proportion of boys and girls was as per the admission into the school and only the co-education schools were included in the study. The idea was to elicit the difference in physical activity pattern by considering the fact that those areas were much similar to any rural and urban areas of Mangalore and the sampling of schools will not hinder the generalizability.

Children who had physical or mental disabilities or chronic diseases were excluded from the study. The

collected data was cleaned and entered in MS Excel and analyzed using SPSS software version 16. Mean, Standard Deviation of hours of physical activity and the proportion of types of activities were separately calculated. Chi square test was applied to see the association of different types of physical activities with the variables like sex, region etc. among the students and ANOVA was applied to find the relationship between physical activity and age across the different regions. This study had obtained the ethical clearance approval from the institutional ethical committee of KS Hegde Medical Academy, Mangalore, Karnataka.

Results

The mean age of the participants from the urban and rural schools was 13.9 years (± 0.9). [Table 1](#) explains the distribution of children according to their age. Among the participants, we found 56% boys and 44% girls studying in urban schools and 53.3% boys and 46.7 % girls in rural schools. Mean physical activity level (n = 300) amongst the adolescents was 2.7 (± 0.7) out of a total PA score of 5. There was a difference in physical activity in males 2.9 (± 0.7), when compared with female students 2.6 (± 0.6) which was statistically significant ($p = 0.001$). Total physical activity score for rural areas was 453.5 with a mean score of 3.06 (± 0.7). For urban areas, the total score was 376.3 with a mean value of 2.5 (± 0.6) and the difference is statistically significant ($p= 0.04$). 76.9% of the total students do running or jogging as their major physical activity and 66.7% students do cycling. Skipping was the most frequently played game among the girls (66.9%) and football among boys (75.6%). The comparison of physical activity scores across the age groups from the two regions using ANOVA showed no statistically significant difference ($p= 0.52$).

There was a notable difference in the total number of students having physical activities in the evening after school hours each day, when we compare the urban and rural areas. We could find only 9.3% adolescents from urban area and 26% from rural area who are actively playing outdoor sports or taking part in activities like dancing. Frequency of physical activity in the evening among the students in urban and rural area are described in [Table 2](#).

60.9% of boys and 57.3% of girls simply sat down in the classrooms during the lunch break hours at their schools without involving in any of the outdoor games. Only 32.8% students had any form of physical

activity while coming to school every day (either by walking or cycling) and was most commonly found among boys in rural schools (55%). School Bus is the commonly preferred mode of transport to school for students studying in the educational institutions in urban areas (44.7%). [Table 3](#) explains the mode of travel to school among the urban and rural students in detail. Association of physical activity of the adolescents with region, gender and age is represented in [Table 4](#)

Discussion

Although a number of studies were done in Asia for identifying the correlation of gender differences and childhood physical activity behaviour, exceedingly lesser number of them examined the importance of regional differences as predictors of inactivity. (13) The intent of this study was to find the difference in physical activities among school students in urban areas to that of rural areas.

Promoting physical activity during childhood is an important strategy to avoid the increasing rates of overweight and obesity among children and young adults. (14) The updated physical activity guidelines for all healthy children (5-11 years) and youth (12-17 years) recommend a minimum of sixty minutes of moderate-to-strenuous physical activity every day. (15) However, recent studies using accelerometers shows that only 7% of adolescents are meeting this recommendation. Moreover, they are getting only 14 minutes (8%) of Moderate to Vigorous Physical Activity (MVPA) out of the 3 hours available during the after-school period in the evening (from 4-7 pm). (16) Results from the youth risk behaviour surveillance in the United States, document that only 18.4% of adolescents met these physical activity recommendations. (15) The results from the present study reveal that the adolescents in Mangalore city have better physical activity scores compared to their counterparts in US cities.

In this study using the PAQ-A questionnaire, daily activity was calculated using the seven-day recall. Self-report techniques were used in this study, because they were practical, handy, cost-efficient and exerted a minimal amount of burden on the study participants. We found that there is significant difference in physical activity between boys and girls in both rural and urban areas. This result is in accordance with similar studies conducted by Barnes *et al* in Canada, Reilly *et al* in Scotland and Ortega *et al* in European youth. (17,18,19)

Only 32.8% students had some form of physical activity while coming to school every day (either by walking or cycling) and was more common among boys in rural schools (45%) compared to their urban counterparts (20.6%). This can be explained by the impact of urbanization and the significant number of school buses in the educational institutions located in urban areas. Moreover, parents discourage their children from cycling or walking to schools in cities due to the concerns of road safety owing to the large amount of traffic during school hours. (20)

Running and Jogging were found to be the most commonly performed physical activity (76.9%) among the students during school physical education classes and lunch breaks, instead of common outdoor sports like football or cricket. This can be attributed to the fact that the majority of the schools were having inadequate gaming equipment and about one half of the schools in rural areas lacked a proper playground. (21)

We found that only 9.3% of students from urban area and 26% from rural area are involved in any form of sports, dance or games after their school hours in the evening. This can be attributed to the huge academic work load due to the content-heavy syllabus in Indian schools, which creates work pressure among the students. Moreover, the pressure from teachers and parents to excel in academics force them to join additional coaching or tuition classes after school hours and during holidays. This can be the reason for the low proportion of physical activity in the evening. This study found that the highest amount of physical activity is found in male students from rural areas. This finding is in accordance with similar studies in other parts of India such as Punjab, Maharashtra and Delhi. (22) According to the study conducted by Murrie *et al*, the adolescents living in urban areas have easy availability of television and computer games and they prefer them over the outdoor sports. (23) Lack of playgrounds and open spaces may also be a contributing factor. In urban areas, both the parents will be working and they may find it convenient to promote indoor activities for their children, rather than taking them for outdoor sports in parks, due to the lack of time and difficulty in accessing open spaces. This attitude of the parents can be the key reason for the restricted physical activities of their wards.

We observed a statistically significant gender difference in the overall physical activity score in both urban and rural areas, where the male children

had moderate physical activity compared to their female counterparts, who exhibited a lower score. Similar findings were observed in the studies conducted by Armstrong *et al* and Greiser *et al*. among the African American, Hispanic, and Caucasian adolescents. (24, 25) It can be imputed to the fact that the adolescent girls are restricted from playing outside by the parents or the family in order to safe guard them from harm, especially in the Indian scenario. Murrie *et al* points out that fear of injury, embarrassment due to low self-esteem, lack of interest or motivation, negative comments from boys regarding the lack of skill are additional factors that prevent the majority of adolescent girls from participating in outdoor games and sports, especially in the rural areas. On the contrary, they involve more in indoor activities like watching television, helping with household chores or indulging in arts and crafts. (23)

In the light of evidences from the present study, we believe that schools can play a significant role in reversing the epidemic of childhood obesity. It requires a well-coordinated long term approach by teaching our adolescents regarding the importance of adopting and maintaining a healthy life style with adequate physical activity. This can be achieved through a school based systematic approach using a well-constructed set of interventions, services and policies which should be initiated at the national level by involving public private partnerships and non-government organizations (NGOs).

Conclusion

This study analysed the magnitude of physical activity among the students from rural and urban schools, in the age group of twelve to sixteen. We found that the adolescents studying in the schools of rural areas had better physical activities compared to their urban school counterparts. There was a statistically significant gender difference in physical activity, with boys performing better than girls. Health promotion efforts should be carried out for initiating behavioural change among the parents which can significantly improve the physical activity pattern among the children.

Recommendation

The result of this study gives an outlook on the pattern of exercise among adolescents and community interventions should be planned using this model to reduce the burden of non-communicable diseases. We recommend that the

physical activity and outdoor sports need to be given a higher priority during the school curriculum development. Health promotion efforts should be initiated in improving the level of awareness among the parents to bring about behaviour change, which can improve the physical activity of their children at home.

Limitations of the study

The sample size was limited to 150 in each category, which could have been increased for better generalizability. Additionally, measurement of Body Mass Index (BMI) of the participants and assessing their socio-economic status and eating habits could have helped us in finding out the association of these components with the physical activity pattern of these adolescents. This study made use of self-reported methods for collecting data, and may be subjected to constraints such as response and recall bias and misapprehension of questions.

Relevance of the study

Studies evaluating the differences in physical activity among urban and rural adolescents are very few in South Indian states, and such investigations can help to identify the subgroups of population that may need to be targeted for special intervention programs. With the changing paradigm of the schools and adolescents, this study will give an outlook on the role of exercise in adolescent health.

Authors Contribution

RK: Concept design, Data Analysis, Critical revision of manuscript

SB: Acquisition and interpretation of data, Sampling, Drafting of manuscript

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Tables

TABLE 1 DISTRIBUTION OF CHILDREN ACCORDING TO AGE

Age (Years)	Number of subjects (%)		Total number of subjects (%)
	Rural	Urban	
12	8 (5.3)	8 (5.3)	16 (5.3)
13	45 (30)	48 (32)	93 (31)
14	46 (30.7)	50 (33.4)	96 (32)

15	48 (32)	42 (28)	90 (30)
16	3 (2)	2 (1.3)	5 (1.7)
Total	150 (100)	150 (100)	300 (100)

TABLE 2 FREQUENCY OF PHYSICAL ACTIVITY IN EVENING AMONG THE STUDENTS IN URBAN AND RURAL AREA

Active involvement in sports, dance or games in the evening during the past 7 days	Frequency among Urban Students		Frequency among Rural Students	
	Frequency	Percentage	Frequency	Percentage
1 time in the past week	35	23.3%	28	18.7%
2-3 times in the past week	45	30%	41	27.3%
4-5 times in the past week	28	18.7%	30	20%
6-7 time in the past week	14	9.3%	39	26%
None	28	18.7%	12	8%

TABLE 3 MODE OF TRAVEL TO SCHOOL AMONG URBAN AND RURAL STUDENTS

Mode of Transportation to School	Urban Students		Rural Students	
	Frequency	Percentage	Frequency	Percentage
Auto rickshaw	27	18%	26	17.5%
Bus	67	44.7%	43	28.9%
Car	7	4.7%	4	2.7%
Cycle	2	1.3%	5	3.4%
Walking	29	19.3%	62	41.6%
Others	18	12%	9	6%

TABLE 4 ASSOCIATION OF PHYSICAL ACTIVITY OF ADOLESCENTS WITH REGION, GENDER AND AGE

		Number of subjects (%)	Mean PAQ Score*	SD*	p-value**
Region	Urban	150 (50)	2.5	±0.6	0.04
	Rural	150 (50)	3.1	±0.7	
Gender	Male	164 (54.7)	2.9	±0.7	0.001
	Female	136 (45.3)	2.6	±0.6	
Age	12 years	16 (5.3)	2.5	±0.6	0.52
	13 years	93 (31)	2.8	±0.6	
	14 years	96 (32)	2.7	±0.7	
	15 years	90 (30)	2.8	±0.7	
	16 years	5 (1.7)	3	±0.9	

*Mean PAQ Score- Mean physical activity questionnaire score out of 5, SD- Standard Deviation

** p-value less than 0.05 is taken as significant