

Physical Activity and Screen-Based Recreation Patterns Among Adolescents in South Kerala - A Cross-Sectional Study

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ABSTRACT

Background: Physical inactivity is now identified as the fourth leading risk factor for global mortality. Worldwide, 80% of adolescents do not meet the recommended levels of physical activity, and a significant number spend more than two hours each day on recreational screen activities.

Methods: The study was conducted among 1844 class eleven students recruited from fifteen Government/Government-aided Higher Secondary schools in Thiruvananthapuram district of Kerala, through a multistage cluster sampling. Socio-demographic information, frequency and duration of different types of physical activity, and screen-based recreational activities, as well as the participant's awareness and perception on physical activity and screen usage was collected through a pre-validated structured self-administered questionnaire in the local language.

Results: In the study about 34.1% students reported never engaging in at least ten minutes of continuous vigorous physical activity. Around 46.2% engage in vigorous activity less than three times a week. More than half (55.2%) of participants use social media for one to three hours per day. About 46.2% of participants watch television for one to three hours a day. A higher percentage of females (46.4%) reported never engaging in vigorous physical activity compared to males (10.4%). About 67% reported facing obstacles when trying to engage in physical activity. Also, even though more than half of the students were aware of many benefits of physical activity, only a third of them were aware of lifestyle diseases.

Conclusion: Engagement in physical activity was low, and screen-based sedentary behaviour was high among the students. Measures to improve awareness of physical activity for lifestyle disease prevention, improve engagement in physical activity and to limit screen-based sedentary behaviour need to be implemented in schools in the state.

Keywords: Adolescents, Physical Activity, Screen use

INTRODUCTION

Physical inactivity among adolescents is likely a major contributor to important global health issues, such as cardio-metabolic conditions and mental health

disorders.¹ Physical activity is thus a key modifiable risk factor and a fundamental preventive strategy for reducing non-communicable diseases.² Physical activity has been shown to offer physical as well as

psychological advantages for young people, including a reduction in anxiety and depression, as well as improvements in social development.² Worldwide, 80% of adolescents do not meet the recommended levels of physical activity, and a significant number spend more than two hours each day on recreational screen activities.¹ Technological revolution and advancements in standard of living have also lightened the need for physical exertion and active motility in day-to-day lives of almost all categories of the population, including children and adolescents. Even as the NCD burden reaches staggering levels, especially in developing countries, it is still projected to rise with increase in behavioural as well as physiological risk factors. This points towards the need for NCD prevention activities aimed at children and adolescents as well, which requires an understanding of the activity patterns and behaviours of the younger generation, to develop and implement targeted interventions suited for local situations. This becomes especially significant in states like Kerala, which have higher NCD burden than most other states in India.⁴ Physical inactivity is now identified as the fourth leading risk factor for global mortality with major implications for the prevalence of NCDs and the general health of the population worldwide.³ The present study was aimed at understanding the physical activity, and recreational screen use pattern of middle-late adolescents in capital district of Kerala.

MATERIALS & METHODS

The study was conducted among 1844 class eleven students aged 16-18 years of fifteen selected Government/Government-aided Higher Secondary Schools in Thiruvananthapuram district. The students were recruited for the study through a multi-stage cluster sampling, from five randomly selected schools each from all three educational sub-divisions in the district. From the available science, commerce and humanities divisions of class eleven in each school, one division in each available

academic stream was randomly selected and students belonging to selected class were enlisted for the study after obtaining parents' informed consent and the students' assent. Students who had learning and intellectual disabilities were excluded from the study. The required sample size was calculated from a pilot study conducted by the researchers in another school in the district.⁵ The Activity and Screen use pattern of the students were collected using a structured prevalidated self-administered questionnaire in the local language. Along with socio-demographic information, the questionnaire assessed the frequency and duration of different types of physical activity, and screen-based recreational activities, as well as the participant's awareness and perception on physical activity and screen usage.

Ethical Considerations

The study was conducted after obtaining clearance from the Institutional Ethics Committee. The privacy and confidentiality of participants were strictly maintained.

STATISTICAL ANALYSIS

Collected data were entered and analyzed using SPSS (Statistical Package for the Social Sciences, IBM, Chicago, IL, USA) software 26.0. The descriptive statistics were expressed in frequency and percentage. Along with univariate analysis, tests of association were also conducted for assessing the activity and screen-use patterns among gender, and other socioeconomic categories.

RESULTS

A total of 1844 students were selected from the 15 schools. Girls constituted the majority of the participants (65.8%), and 76.1% were from rural backgrounds. The median age of the participants was 16 years. Majority of the students used public/private transport vehicles for travelling to and back from school, while around 22% walked or bicycled to school.

Pattern of Physical Activity among the study participants

Table 1 presents the pattern of physical activity among study participants, categorized by the frequency and the type of physical activity. About 628 participants (34.1%) reported never engaging in at least ten minutes of continuous vigorous physical activity. Nearly half (46.2%) engaged in vigorous activity less than three times a week. Only 19.7% of participants engage in vigorous physical activity at least three times a week. About 17.7% of participants reported never engaging in at least ten minutes of continuous moderate physical

activity. More than half (55.2%) of participants engage in moderate physical activity less than three times a week. About 27.1% of participants engage in moderate physical activity at least three times a week. A small percentage (11.3%) reported never engaging in household physical activities, such as cleaning, gardening, or other chores that require physical effort. Over half of the participants (51.0%) engage in household physical activity less than three days a week. Around 37.7% of participants engage in household physical activity three or more days a week.

Table 1-Pattern of Physical Activity among the study participants

Criteria	Pattern of physical activity among the study participants		
	Never	Less than three days a week	Three or more days a week
At least ten minutes of continuous vigorous physical activity	628(34.1)	852(46.2)	364(19.7)
At least ten minutes of continuous moderate physical activity	327(17.7)	1017(55.2)	500(27.1)
House hold physical activity	209(11.3)	940(51.0)	694(37.7)

Pattern of screen use among the study participants

About 34.1% of participants reported watching television for less than one hour per day. About 46.2% of participants watch television for one to three hours a day. A smaller proportion (19.7%) of students watch television for more than three hours a day. Only 17.7% of participants spend less than one hour per day on social media.

More than half (55.2%) of participants use social media for one to three hours per day. About 27.1% of students spend more than three hours a day on social media. About 76.1% of participants play electronic games for less than one hour a day. About 16.6% of participants play electronic games for one to three hours a day. Only 7.3% of participants play electronic games for more than three hours a day. (Table 2)

Table 2- Pattern of screen use among the study participants

Category	Pattern of screen use among the study participants		
	Less than one hour a day	One to three hours per day	More than three hours per day
Television	628(34.1)	852(46.2)	364(19.7)
Social Media	327(17.7)	1017(55.2)	500(27.1)
Electronic games	1399(76.1)	306(16.6)	134(7.3)

Determinants of physical activity patterns among the study participants:

There is a significant difference between males and females ($p < .001$), with a higher percentage of males (38.5%) engaging in vigorous physical activity more than three days a week compared to females (9.9%).

On the other hand, a higher percentage of females (46.4%) reported never engaging in vigorous physical activity compared to males (10.4%). About 17.9% of people with high socioeconomic status engage in vigorous physical activity more than three days a week, compared to 21.8% in the low

socioeconomic group. Men and women show a statistically significant difference ($p < .001$) in their moderate physical activity. A greater proportion of males (32.0%) engage in moderate activity more than three days a week, compared to 24.6% of females. However, a higher percentage of females (20.2%) reported never engaging in moderate physical activity compared to males (13.0%). There is also a significant effect of socioeconomic status on moderate intensity physical activity with higher

proportion of lower socioeconomic individuals never engaging (19.4) compared to those with high socioeconomic status (16%). A significant proportion of males (71.4%) never engage in household physical activity, compared to only 6.7% of females. Individuals with low socioeconomic status are more likely to engage in household physical activity more than three days a week (41.3%) compared to high socioeconomic status individuals (34.2%). (Table 3)

Table 3: Determinants of physical activity patterns among the study participants:

Physical activity pattern	**Gender		*Socioeconomic status	
	Male	Female	Low	High
At least ten minutes continuous vigorous physical activity				
Never	66(10.4)	562(46.4)	281(32.5)	344(35.4)
Less than three days a week	323(51.0)	529(43.7)	395(45.7)	454(46.7)
More than three days a week	244(38.5)	120(9.9)	189(21.8)	174(17.9)
At least ten minutes continuous moderate physical activity				
Never	82(13.0)	245(20.2)	168(19.4)	156(16.0)
Less than three days a week	348(55.1)	669(55.2)	467(54.0)	548(56.4)
More than three days a week	202(32.0)	298(24.6)	230(26.6)	268(27.6)
Household physical activity				
Never	128(71.4)	81(6.7)	92(10.6)	117(12.1)
Less than three days a week	340(54.0)	600(49.5)	416(48.0)	521(53.7)
More than three days a week	162(25.7)	532(43.9)	358(41.3)	332(34.2)

**p <.001 *p<.05

Physical Activity-General Awareness and Perceived Obstacles

About 31.3% of the students were aware of lifestyle diseases. Only 16.3% of students were aware of preventive practices related to lifestyle diseases. More than half of the students (55.4%) recognize the importance of physical activity. About 12% of students were aware of recommended physical activity guidelines for adolescents. About half of the students (49.4%) were aware of recommendations regarding screen time limits for adolescents. More than half of the students (67%) reported facing obstacles

when trying to engage in physical activity. The majority (74.01%) of students perceive a lack of time as a major barrier to engaging in physical activity. About 25% of students attribute their lack of physical activity to laziness or a lack of interest. A smaller percentage (4.3%) cite health problems as a barrier to physical activity and 3.53% see lack of space or permission as a barrier. This could be related to limited access to facilities or parental or institutional restrictions. Only 1.5% of students identify economic problems as an obstacle. (Table 4)

Table 4 - Physical Activity-General Awareness and Perceived Obstacles

Awareness aspects	Number of students (%)
Lifestyle diseases	580 (31.3%)
Preventive practices for lifestyle diseases	301 (16.3%)
Relevance of Physical Activity	1026 (55.4%)
Vulnerability of adolescents to lifestyle diseases	196 (10.6%)
Physical activity recommendations for adolescents	222 (12.1%)
Screen use limit for adolescents	909 (49.4%)
Encounter obstacles in engaging in physical activity	1240 (67%)

Perceived obstacles for physical activity	
Lack of Time	74.01%
Laziness and lack of interest	24.95%
Health problems	4.3%
Lack of space and permission issues	3.53%
Economic problems	1.5%

DISCUSSION

The study results showed the patterns in physical activity and screen use of middle-late adolescents entering adulthood. The study showed that most students were not meeting the higher-intensity physical activity guidelines, which may be a concern for physical health and fitness. The WHO recommends that children and adolescents aged <18 years need to undergo at least an average of 60 minutes per day of moderate-to-vigorous intensity physical activity.⁶ A higher level of participation in moderate physical activity was seen compared to vigorous activity. However, more than half still report doing moderate activity less than three times per week, indicating a need for encouragement to increase moderate activity frequency also. Household physical activities are relatively common, one third of participants engaging three or more days a week. However, a considerable number do them less than three times a week, suggesting that these activities are often not done frequently enough to replace or supplement formal exercise. A clear trend of less frequent vigorous physical activity, was found which might be a concern since high-intensity activity is important for cardiovascular health and fitness. Active mode of transport to school was used by only around 22% of the students. This is much lower than that reported in India Report Card study on physical activity of children and youth where 65% of students were using active transport to school.⁷ Boys and urban residents were found to walk or bicycle more to school than their respective counterparts, in contrast to 2016 study among high schoolers in the district.⁸ The differences may be due to the single-window admission system in the state for class eleven, where students are admitted based on their merit and preference, and

even children in rural areas opt for schools with best academic records, rather than schools most near to them. Students who were allotted class eleven admission in distant schools may be potentially increasing the travel time and reducing their physical activity, which needs to be looked into.

Of the students reporting time, space, and other obstacles in engaging in physical activity, nearly three-fourth cited time constraints due to academic, tuition, travel requirements, while some cited engagement in screen-based entertainment and lack of motivation for physically active pursuits. Also, even though more than half of the students were aware of many benefits of physical activity, only a third of them were aware of lifestyle diseases. Majority of participants were not aware of preventive measures for lifestyle diseases including healthy diet, and physical activity, and reported that they considered lifestyle diseases as something that begins only in middle or old age. Awareness of recommended daily levels of physical activity and sedentary behaviour including screen use was also very low. This suggests that strategies to improve awareness of our adolescents on lifestyle diseases, their own vulnerabilities to the disease, as well as the need for adopting healthy lifestyle, through active school and community-based campaigns need to be implemented. Practical and feasible solutions for improving the physical activity levels with school and system level strategies ranging from dedicated activity slots, and yoga, dancing or activity groups to improvements in school allotments and physical activity as a graded subject need to be looked into.

A significant proportion of students fall within the range of watching one to three hours of television per day, with a minority

watching more than three hours. While not as excessive as some other screen activities, excessive television time is still a concern, especially when it contributes to a sedentary lifestyle. More than half of participants spend one to three hours per day on social media, and one fourth of students use it for more than three hours daily. This reflects a growing concern around excessive social media use, which is linked to potential negative effects on mental health, such as increased anxiety, depression, and disrupted sleep patterns. Moderate screen time seems to be the norm across all three categories, with television and social media being used for one to three hours a day by the majority of participants. With 27.1% of students spending more than three hours per day on social media, this could be an area of concern for students' well-being, including mental health and academic focus. Television and gaming use tends to be lower in comparison, but both still show patterns of moderate to high use among some students. Higher screen use and sedentary behaviour in children and adolescents have been linked to non-communicable diseases including psychosocial morbidities.⁹⁻¹¹ In the present era of technological advancements in global connectivity and online learning; strategies to reduce screen use and improve screen hygiene need to be employed at school levels, with parent and teacher engagement.

There is a moderate to high level of awareness about the importance of physical activity, but much lower awareness about the vulnerability of adolescents to lifestyle diseases and preventive practices. Lack of time is by far the most frequently cited obstacle to engaging in physical activity, suggesting that students may need strategies to better manage their schedules or make time for physical activity. While awareness about the relevance of physical activity is relatively high, there are significant gaps in awareness about lifestyle diseases and preventive measures, and a large number of students face barriers that hinder their participation in physical activity.

Addressing these barriers and improving education on preventive practices could lead to better health outcomes for adolescents.

CONCLUSION

The levels of physical inactivity and sedentary behaviour, as well as the poor awareness on lifestyle diseases reported by the students indicate that school and educational system level strategies aimed at improving awareness of lifestyle diseases and their prevention, and limiting screen use associated sedentary behaviour need to be implemented. While many students are engaged in physical activity, there is still room for improvement, particularly in terms of vigorous exercise and ensuring that students are meeting the recommended guidelines for physical activity. Encouraging students to limit recreational screen time, particularly for activities like social media and television, could be beneficial. Programs aimed at promoting balance in screen use can help students reduce excessive screen time and encourage other activities like physical exercise, outdoor play, and face-to-face social interaction.

Declaration by Authors

Ethical Approval: Approved

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