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Time Use by Rural School Going Adolescents and Its Impact- A Prospective Cohort Study

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Abstract: *In this article physical activity, screen time, and academic work are studied as mediator among school children in India. Participants were 208 school children aged 13 – 16 years from Pondicherry, India. They were sampled from private schools. physical activity and screen time, spending more time on academic work. screen time was negatively related to sleep duration, academic work was gaining weight .Time spent by them on academics, skill development activities and leisure are worthwhile. With the increase in the prevalence of obesity among the adolescents Physical activity was significant mediator. In India, academic work is a strong predictor of a lower sleep duration among children and adolescents*

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I. Introduction

Adolescents contribute to 19.6% of the Indian population. Screen time may have negative health effects by compromising the time spent on developmental activities. Time spent by them on academics, skill development activities and leisure are worthwhile. With the increase in the prevalence of obesity among the adolescents worldwide, the same in Iran has been doubled during the past two decades (1,2). Childhood obesity is linked to diabetes, asthma, and sleep disorders, and obesity in adults is linked to a higher rate of mortality. Longitudinal studies have shown that overweight children are more likely to become overweight adults (3). Overweight in adults will increase the risk of cardiovascular disease, hypertension, gallbladder disease, diabetes mellitus, atherosclerosis, gout, arthritis, and somemalignancies (4).Most of the studies conducted on different adolescent population groups have found a relationshipbetween adiposity and some risk factors associatedwith nutritional, physical and socioeconomic factors. Some of the identified risk factors are: increase in the consumption of fat (5,6), high consumptionof energy-rich foods and alcohol (7,8), low intake ofmilk and milk products (9), unhealthy dietary patterns (5,7,10), skipping the breakfast (5,8,),having been formula-fed instead of being breastfed in infancy , watching TV , physicalinactivity (7,8), insufficient sleep duration(7), high BMI in parents , and high birthweight . However, the mechanisms throughwhich TV and using mobile phones others viewing affects overweight remain controversial. It has been proposed screen timeincreases overweight because, increase screen time,people spend less time on performing PA and, atthe same time, they increase their consumption ofobesogenic foods . In the present study, we triedto investigate screen time, the level of PA, and theconsumption of obesogenic foods to find any possible relationship with overweight and obesity.To find out a practical solution among adolescents in Pondicherry, first we have to know the severityof the problem and the risk factors affecting it. Theincreasing prevalence of OAO(overweight and obesity) among adolescentshas necessitated studying a range of related riskfactors simultaneously. Overweight is the result ofgenetic and environmental factors . The tripledincrease of overweight in the last 3 decadesimplicates that environmental factors have been moreinfluential compared to genetic factors.Identifying the major cause of obesity from amongall the environmental factors in any populationwill be interesting. Therefore, we aimed to investigate the prevalence of OAO and its nutritional,physical, social and economic risk factors in a representative sample of male and female studentsaged 13-16 years in pondicherry

AIM

To determine time use by rural school going adolescents and its impact

OBJECTIVES

To assess the time spent by adolescents of age 13 to 16 years for

a. Screen time (mobile usage and television viewing)

b. interacting with parents and siblings
c. reading and doing homework
d. engaging in other leisure activities

II. Materials And Methods

I. **STUDY DESIGN** : Cohort study
II. **STUDY AREA** : Randomly selected rural school at Puducherry.
III. **STUDY POPULATION:** Mid-adolescents (14- 16 years)
a. i.e two classes of 9^{th} standard students and one class of 11^{th} standard students
IV. **SAMPLE SIZE** : 208
V. Study was done on 1^{st} Sunday and Monday of January, 2019

III. Methodology

a. Written and informeds consent will be obtained from all childrens before enrollment in the study
b. Preformed proforma was given to all childrens
c. Daily activites of the children was noted down round the clock in the proforma
d. Filled proforma was collected on the next day
e. Similar proforma was given next day and was noted down in the proforma
f. All details regarding the study will be recorded according to the pre designed proforma
g. All data were collected , analyzed and tabulated
h. Results and observations were mentioned below

IV. Observations

Table 1: Prevalence of overweight and obesity amongst the students

	Total number	Over weight	Obesity	P - value
Boys	112	16(7.69)	11(5.29)	0.8336
Girls	96	10(4.81)	6(2.88)	
Total	208	26(12.5)	17(8.17)	

In table 1 the total sample was 208 in 112 boys and 96 girls, overall the prevalence of overweight and obesity among the students were 12.5% and 4.08%. The prevalence of overweight and obesity among boys were 7.69% and 5.29 %. The prevalence of overweight and obesity amongst girls were 4.81% and 2.88%, were no significant gender differences between the percentages of overweight or obese individuals (= 0.078, p = 0.834).

Table 2. Descriptive data χ^2 for the physical characteristics and types of screen time activities according to gender.

Variable	Boys (n=112)		Girls (n=96)		T	p-Value
	Mean	SD	Mean	SD		
Age	12.62	0.38	12.74	0.64	0.269	0.843
Min/d television viewing	42.85	48.69	32.96	29.76	1.732	0.312
Min/d video game usage	21.05	51.59	76.82	13.62	10.342	0.012*
Min/d Computer usage	20.74	46.28	21.54	27.13	0.1488	0.759

Prior to analysing the findings and to ensure that the data from the two mixed-gender schools were representative, independent sample t-tests confirmed that there were significant school-type differences in MVPA, screen time activities and BMI. The descriptive data of the physical characteristics according to gender and the type of screen time activities of the sample are presented in Table 2. The mean age of the participants was 12.62± 0.38 of boys and 12.74 ± 0.64 of girls classified as overweight and/or obese. There were no significant gender differences between the percentages of overweight or obese individuals (t = 0.269, p = 0.834). In relation to the type of screen time activities, independent sample t-tests confirmed that there was a significant gender difference with boys accumulating more minutes (Mean = 21.05 ± 51.59) of daily video game usage compared to girls (Mean = 76.82 ± 13.62; t = 10.342, p = 0.012).

Table 3: Coefficients for correlation among types of screen time activities, PA and BMI scores according to gender.

Correlation Variables	Daily Television	Daily video Games	Daily Computer usage	Overall Screen Time
Male				
Moderate PA p/day	0.025	-0.201	0.034	-0.024
Vigorous PA p/day	-0.059	-0.221	-0.101	-0.119

MVPA p/day	-0.031	-0.200	-0.045	-0.069
BMI scores	-0.077	0.241*	0.0179	0.078
Female				
Moderate PA p/day	-0.254	0.264	-0.003	-0.086
Vigorous PA p/day	-0.293	0.243	0.123	-0.082
MVPA p/day	-0.357*	0.360	0.080	-0.089
BMI scores	0.036	-0.159	0.034	0.043

Note. p/day = per day; PA = physical activity; MVPA = moderate to vigorous physical activity. * p _ 0.05.

Table 3 shows the correlations among types of screen time activities, overall screen time, PA and BMI by gender. Male BMI scores showed a weak but significant positive correlation with playing computer games only ($r = 0.241$, $p < 0.05$). Among girls, time spent in MVPA showed a significant medium negative correlation with daily television viewing only ($r = 0.357$, $p < 0.05$).

V. Results

- Majority of the waking time per week
  - 50% was spent on mobiles, computers and watching television – SCREEN TIME
- The average sleep time: 8 hours/day
  - almost equal to average screen time which was 8 hours/day.
- The time spent by the adolescents during weekends on screen time, was 2.6 times higher as compared to the weekdays.
  - Almost 20 hours
- Less time was spent on reading other than textbooks, extracurricular activities and playing.
- 39 out of 208 were overweight: 19.2%

VI. Discussion

This study found relationship between OAO and the nutritional factors. Thismight be because the researchers questionnaire items to achieve validity and reliability. That is, the researchers sufficed to food items which are more likely tobeconsumed during screen time. Consequently,the FFQ contained only 6 items concerning obesogenic foods, and this may have been the causeof not arriving at insignificant results concerningthe relationship between OAO and nutritional factors. Other studies conducted on different populations, which had examined more nutritional factors,showed that OAO has a directrelationship with consumption of unhealthy dietary patterns (5), high-fat milk and milk products, refined grains (3), fatty meats (3), fat (5,6),refined carbohydrates (6), drinks containing sugar(6), and having been formula-fed in infancy (1).This study had limitations in assessment of nutritional factors but found that the factors that wereexamined had no decisive role in OAO; so, conducting specialized studies in this field is necessary.

Physical activity factors: Results of multiple logistic regression analysis revealed that, contrary tolow PA and obesogenic foods, screen time was astrong risk factor for OAO. Two important mechanisms concerning the effect of screen time on obesity have been proposed. The first proposal statesthat time spent on screen time reduces the timespent on performing PA. The results of this studywhich are consistent with the results of study conducted showed that screen time, independent of PA, increased the risk of OAO.The second proposal states that screen time provides time to consume more obesogenic foods.The obesogenic foods under study in the presentinvestigation were those that are easily availableand have high calories, such as chips, fried potatoes, sausages, bologna, hamburgers, pizzas, Tahdig, butter, and nuts. This study showed that theamount of obesogenic foods consumption wasnot related to the length of time the adolescentsspent on screen time. It means screen time affectsOAO, independent of obesogenic foods. Probably,screen time acts through mechanisms other thanreducing the expenditure of energy (1,4,7) andincreasing the consumption of obesogenic foods.These mechanisms probably include the effectsof food advertisements on dietary patterns(3),reduction of metabolic rate to lower than that inrest time (9), circulatory cortisol elevation due toexcitement (9), and disruption in the circadianrhythm (1). The findings of the present study suggest that screen time, PA or obesogenic foods,was associated with OAO in adolescents. Studentsin pondicherry spent the more amount of time on consumed amount of obesogenic foods than PA.However, screen time attributed most to the variance of OAO. To control overweight among children, parents should reduce the time their childrenspend on screen time as much as possible. Perhaps, it would have been better if we hadincluded more economic factors to find their neteffect on the frequency of OAO. The strengths of this study lies in its populationbased approach and large sample, which resultedin a great reduction of random errors. Another advantage was the precise measurement of weight andheight. In addition, this study was highly valid because of its large sample-size, valid and reliable questionnaire, relatively brief questionnaire, and extraction of the net effect of each factor under study.

VII. Conclusion

In this study, significant association p value- 0.01 (<0.05) was observed between screen time and sleeping, playing and diet pattern

- Since children were physically inactive during this period
- And most junk foods along with extra calorie foods were consumed during this period

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