

Original Research Article

## Pattern of Physical Activity among School going Adolescents (10-18 Years) in District Ambala, Haryana

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### ABSTRACT

**Background:** Despite recognition of the important influence of environmental determinants on physical activity patterns, minimal empirical research has been done to assess the impact of environmental/ contextual determinants of physical activity.

**Objective:** The aim of this study was to analyze pattern of physical activity among school going adolescents (10-18 years) in district Ambala, Haryana.

**Methods:** A Cross-Sectional Study among 200 school going adolescents of age 10-18 years in district Ambala, Haryana. A self designed semi- structured questionnaire was used to assess nutritional status and level of physical activity followed by anthropometric measurement of the children. Frequency and duration of each activity was recorded and metabolic equivalents (MET) assigned. Sedentary activity included activities with MET < 1.5, and moderate-to- vigorous physical activity (MVPA) with >3.0. For each activity, daily duration, intensity (MET), and the product of the two (MET-minutes) were computed. Children were categorized by age group, gender and socio-economic status. Height and weight were measured.

**Results:** Sedentary activity was higher in children aged >12 yr, while intensity of MVPA was higher in boys than girls. Physical activity significantly decreased ( $P<0.001$ ) with increase in age. There was also a significant decrease in MVPA with increase in age, MET-min ( $P<0.001$ ) with interaction effects of age group ( $P<0.001$ ) and gender ( $P<0.001$ ).

**Conclusions:** Level of moderate-to-vigorous physical activity was low in school going adolescents. There appears to be a gap between State educational policies that promote physical well-being of school-going children and actual practice.

**Key word:** Adolescents, Physical activity, sedentary life.

### INTRODUCTION

It is well recognized that diet and physical activity play important roles in maintaining health and preventing diseases. [1] Globally, non-communicable diseases (NCDs) are the leading causes of death, killing more people each year than all other causes combined. [2] According to the World Health Organization (WHO) Report 2002, the most important risks of

NCDs included high blood pressure, high concentrations of cholesterol in the blood, inadequate intake of fruit and vegetables, being overweight or obese, physical inactivity and tobacco use. [3] Five of these risk factors are closely related to diet and physical activity.

Physical activity has been associated with a wide range of beneficial health outcomes in adults, including bone

and cardiovascular health and reduction of selected cancers. Inactivity, in particular, TV viewing, has been associated with obesity in cross-sectional studies of children, adolescents, and adults. Physical activity habits and specifically inactivity, track significantly from adolescence to young adulthood. [4]

A few studies have examined physical activity in relation to childhood overweight and obesity in developing countries, including India. In absolute terms, Asia has the highest numbers of overweight children. [5] Prevalence rates of overweight are reported between 4 to 30 per cent across different regions in India. [6-8] Promoting physical activity in childhood may increase physical activity in adulthood and help reduce the burden of chronic disease.

The formative years of adolescence represent a crucial stage in the human life cycle since it is the stage when lifestyles are formed and become established. During this period, adolescents increase their social interactions with peers of similar age and develop individual eating habits and physical-activity patterns. [9]

The physical activity literature has examined environmental determinants such as school and community sports and home access to fitness equipment, perceived physical environments, outdoor play spaces, time spent outdoors, exercise opportunity, and an environment that promotes excessive food intake and discourages physical activity. [5]

Thus it is important to understand the pattern of physical activity and find out the determinants affecting the physical activity in adolescents, so that specific steps can be taken to target these determinants which lower the physical activity to bring down the incidence and prevalence of non-communicable diseases (NCD) in adulthood. So aims of this study to analyze pattern of physical activity and its pattern among school going adolescents in district Ambala, Haryana.

## **MATERIALS AND METHODS**

A school- based cross sectional study was conducted in 200 school going adolescents of age group 10-18 years in schools of district Ambala, Haryana. Stratified random sampling was used to collect sample. Although individual questionnaires are there for physical activity, and diet surveys, a questionnaire with all these put together was not available. Hence with the guidelines given in WHO publications and NHANES III, a new questionnaire has been constructed. General assessment of their well being was also enquired with respect to their activity and weight. Duration of sleep and sedentary activities such as television or video viewing and computer games were also recorded. Physical activity was assessed using an interviewer-administered Physical Activity Questionnaire (PAQ) which was developed as per WHO STEPS proforma and metabolic equivalents were calculated.

The metabolic equivalent or MET (multiples of basal metabolic rate reflecting intensity of activity) was assigned for each reported activity using the Compendium of Energy Expenditure for Youth, and a published compilation of METs. Sedentary activity was defined, as activity with MET levels below 1.5 and included television or video viewing, computer games and passive games. Moderate-to-vigorous physical activity (MVPA) was computed using a MET cut-off value of 3 or above. [10] Based on current recommendations, children were categorized into 2 groups based on whether they engaged in daily MVPA above or below 60 minutes.

## **RESULTS**

Total 200 adolescents students were taken as sample from age group 10-18 years, (table-1) categorized into three age groups, 10-12 years, 13-15 years and 16-18 years and students were evenly distributed in all three age groups. Among them, 55% were male and 45% female and

61% were from rural and 39% from urban background. Nearly 68.5% of the adolescents fall in lower middle and upper lower socioeconomic status, respectively 34.5% and 34%.

Table 2 shows sex-wise distribution of sedentary activities (minutes per day) like sleep, television viewing, tuition, homework and computer use among adolescents. The mean sedentary activity like sleep minutes per day, television viewing minutes per day was seen more in females whereas tuition and homework minutes per day and computer use minutes per day activities was seen more in males. Thus the table highlights that total sedentary activity duration (195±25) and total sedentary activity MET minutes (292.5±23) was more in females than males.

Sex-wise distribution (table-3) of moderate to vigorous physical activity like walking, cycling, physical activity in school, physical activity outside school among adolescents. The mean of the entire moderate to vigorous physical activity was seen more in males. Thus, the table highlights that total moderate to vigorous physical activity duration (55±15) and total moderate to vigorous physical activity MET minutes (165±15) was more in males as compared to females.

Table 4 shows the age-wise distribution of sedentary activities minutes per day among adolescents. The mean of sedentary activities like sleep, television viewing and computer use was more in

increasing age group i.e. 16-18 years whereas tuition or homework mean was seen more in 13-15 years of age. Least sedentary activity was seen in 10-12 years of age group. The findings in the table suggested that total sedentary activity duration was increasing from 184±19 to 198±16 and total sedentary activity MET (minutes) were increasing from 280.5±19 to 304.5±27 with an increasing age from 10 years to 18 years.

Table 5 depicts the age-wise distribution of moderate to vigorous physical activity like walking, cycling, physical activity in school, physical activity outside school among adolescents. The mean of moderate to vigorous physical activity was seen maximum in 10-12 years and least in 16-18 years of age group. Thus, the table highlights that total moderate to vigorous physical activity duration and total moderate to vigorous physical activity MET minutes were decreasing with an increasing age.

**Table 1- Basic characteristics of the adolescents**

VARIABLES	N	%
<b>AGE ( year)</b>		
10-12	62	31%
13-15	74	37%
16-18	64	32%
<b>SEX</b>		
MALE	110	55%
FEMALE	90	45%
<b>BACKGROUND</b>		
RURAL	122	61%
URBAN	78	39%
<b>SOCIOECONOMIC STATUS</b>		
UPPER	4	2%
UPPER MIDDLE	51	25.5%
LOWER MIDDLE	69	34.5%
UPPER LOWER	68	34%
LOWER	8	4%

**TABLE 2: Sex-wise distribution of sedentary activity among adolescents**

COMPONENTS OF PHYSICAL ACTIVITY PER DAY	MALE	FEMALE
	Mean±SD	Mean±SD
Sleep Minutes/Day	450±30	490±45
Television viewing Minutes/Day	120±22	155±30
Tuition/Homework Minutes/Day	115±30	105±25
Computer use Minutes/Day	55±30	30±15
Total sedentary activity duration (minutes)	185±25	195±25
Total sedentary activity MET (minutes)	277±27	292.5±23

**TABLE 3: Sex wise distribution of moderate to vigorous physical activity among adolescents**

COMPONENTS OF PHYSICAL ACTIVITY PER DAY	MALE	FEMALE
	Mean±SD	Mean±SD
Walking & cycling MET (minutes)	45±30	30±25
Physical activity in school (minutes)	45±15	35±15
Physical activity outside school (minutes)	75±15	60±20
Total Moderate to vigorous physical activity duration (minutes)	55±15	41.3±20
Total Moderate to vigorous physical activity MET (minutes)	165±15	124±20

**TABLE 4: Age-wise distribution of sedentary activity among adolescents**

COMPONENTS OF PA/DAY	AGE GROUP IN YEARS		
	10-12	13-15	16-18
	Mean ± SD	Mean ± SD	Mean ± SD
SLEEP M/D	420±22	450±35	450±30
TV VIEWING M/D	90±15	110±18	120±22
TUTION/HW M/D	68±12	120±12	115±30
COMPUTER USE M/D	40±30	110±20	170±30
TOTAL SEDENTARY ACTIVITY DURATION	184±27	187±19	198±16
TOTAL SEDENTARY ACTIVITY MET(MIN)	280.5±19	297±16	304.5±27

**TABLE 5: Age-wise distribution of moderate to vigorous physical activity among adolescents**

Components of PA/day	AGE GROUP IN YEARS		
	10-12	13-15	16-18
	Mean±SD	Mean±SD	Mean±SD
WALKING & CYCLING MET (MIN)	70±35	60±30	45±30
PHYSICAL ACTIVITY IN SCHOOL (MIN)	60±20	45±15	45±15
PHYSICAL ACTIVITY OUTSIDE SCHOOL (MIN)	90±30	75±15	75±15
TOTAL MVPA DURATION (MIN)	73±30	57±15	55±15
TOTAL MVPA MET (MIN)	219±30	171±15	165±15

## DISCUSSION

The present study reported the sedentary activity [minutes per day (mean±SD)] among male and female. Time spent in sleep by male adolescent was 450±30 minutes/day and 490±45 minutes/day among females. Time spent in television viewing in males was 120±22 minutes/day and 155±30 minutes/day in females. Time spent in computer use among males was 55±30 minutes per day and 30±15 minutes/day among females. Total sedentary activity duration (minutes) in males was 185±25 minutes/day and 195±25 minutes/day in females. Total sedentary activity measured in MET (minutes) in males was 277±27 and 292.5±23 in females. Sedentary activity duration was seen more in females as compared to males. Swaminathan et al [11] in south India reported the near similar findings with not much of gender difference in sedentary activity. He reported that sleep minutes/day among males 510±30 and 510±30 among females. Television viewing in males was 60±50 minutes/day and 56.6±40 minutes/day and in females Tution/homework minutes/ day among males 104±50 and among females 115±45. Total sedentary activity duration (minutes) in males was 200±50 and 199±50 in females. Total sedentary activity MET (minutes) in males was 288±80 and 282±75 in females.

The present study reported the moderate to vigorous physical activity (minutes mean±SD) among male and female. Walking & cycling MET (minutes) among males was 45±30 and 30±25 among females. Physical activity in school (minutes) in males was 45±15 and 35±15 in females. Physical activity outside school (minutes) among males 75±15 and among females 60±20. Total moderate to vigorous physical activity duration (minutes) in males was 55±15 and 41.3±20 in females. Total moderate to vigorous physical activity MET (minutes) in males 165±15 and 124±20 in females. Moderate to vigorous physical activity duration was seen more in males as compared to females. Swaminathan et al [11] in south India reported the moderate to vigorous physical activity duration more in males as compared to females. He reported that walking & cycling MET (minutes) among males 60±30 and 50±40 among females. Physical activity in school (minutes) in males 175±50 and in females 156±60. Physical activity outside school (minutes) among males 116±70 and among females 98.7±70. Total moderate to vigorous physical activity duration (minutes) in males was 66±35 and 58.6±30 in females. Total moderate to vigorous physical activity MET (minutes) in males 320±120 and 252±85 in females. In contrast to present study, Brahmhatt et al [12] in

Gujarat reported the significant more mean time spent physically active by females was  $34.26 \pm 24.91$  while that of males was  $29.10 \pm 21.06$ .

The present study reveals that the sedentary activity among adolescents increases along with the increase age group from 10-12 years to 16-18 years of age. The total sedentary activity duration (minutes) in 10-12 years of age group is  $184 \pm 24$  which increased to  $198 \pm 16$  in 16-18 years of age group. Similarly, total sedentary activity MET (minutes) in 10-12 years of age group is  $280.5 \pm 19$  which increased to  $304.5 \pm 27$  in 16-18 years age group. Similar trend was shown by Swaminathan et al <sup>[11]</sup> in south India in 7-15 years of age group by categorized it into less than 11 years and more than 11 years. He mentioned that the total sedentary activity duration (minutes) in less than 11 years was  $176 \pm 55$  and  $223 \pm 40$  in more than 11 years group. The total sedentary activity MET (minutes) in less than 11 years was  $249.2 \pm 50$  and more than 11 years  $316.4 \pm 55$ .

It was found in the present study that the moderate to vigorous physical activity reduced along with increase age group from 10-12 years to 16-18 years of age. The total moderate to vigorous physical activity duration (minutes) in 10-12 years is  $73 \pm 30$  which reduced to  $55 \pm 15$  in 16-18 years. The total moderate to vigorous physical activity MET (minutes) in 10-12 years is  $219 \pm 30$  which reduced to  $165 \pm 15$  in 16-18 years of age. In the conducted by Swaminathan et al <sup>[11]</sup> in south India in 7-15 years of age group which categorized it into less than 11 years and more than 11 years of age group. The total moderate to vigorous physical activity duration (minutes) in less than 11 year was  $62.5 \pm 30$  which reduced to  $60.7 \pm 25$  in more than 11 years. The total moderate to vigorous physical activity MET (minutes) in less than 11 years was  $282.3 \pm 66$  which reduced to  $277 \pm 68$  in more than 11 years of age. Brahmabhatt et al <sup>[12]</sup> in Gujarat reported the significant

more mean times spent physically active by adolescents in 10-14 years was  $33.45 \pm 23.37$  while that of 15-19 years was  $30.10 \pm 22.88$ .

## CONCLUSION

Necessary steps in form of primordial prevention need to be taken at an early age by educating the school children regarding the importance of diet, physical exercise, curtailing the period of T.V watching in order to have good health and a healthy future. The results of this study show the importance of PE classes and recreation centers in increasing physical activity and give powerful evidence supporting the importance of increasing opportunities for physical activity and the potential impact of PE programs and community recreation programs on physical activity. In addition, it is imperative that we provide safe and accessible places for exercise for our nation's youth. In many communities, the only such place may be the school. Clearly our national public health initiatives should consider these options. More research is needed on the role of these factors in affecting activity and inactivity and on ways to most effectively change them. PE and community recreation programs should receive attention at a national level, particularly for segments of the population without resources to locate and pay for extracurricular and extra-community physical activity opportunities. Availability of such resources will increase success for pediatricians in recommendations to patients to increase physical activity and decrease inactivity. This research also suggests that with increased opportunities for physical activity, adolescents may opt to selectively engage in these activities instead of more inactive behaviors.

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