A study on obesity and factors influencing physical activity among adolescents aged 11-15 years in urban school of Coimbatore

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Abstract
Introduction: The epidemic of obesity is increasing at an alarming rate. Unhealthy diet and physical inactivity are two of the main risk factors for obesity among adolescents.

Objectives: To determine the prevalence of obesity among adolescents aged 11-15 years in the selected urban school and to measure the level of physical activity and find out the correlates influencing physical activity among them.

Methodology: A cross-sectional study was conducted among 156 students aged 11-15 years in an urban school of Coimbatore. A questionnaire was used to find out the background details on parents’ education, income and factors influencing physical activity. The actual physical activity was measured by using Previous Day Physical Activity Recall (PDPAR) questionnaire. Height and weight were measured as per WHO recommendations. Results: The study revealed that about 4.5% children were obese and 10.9% were overweight, the percentage slightly higher in boys than girls. 20.5% had inadequate physical activity. Female sex, low level of education of parents, high middle income families, location of home in non residential areas and main roads, absence of playground nearby home, travel to school by motor vehicles had a high percentage of physical inactivity.

Conclusion: Though awareness about obesity and its consequences is more practice is found to be less. Teachers/parents should motivate children on behavioral change and provide a conducive environment for outdoor games. The yearly school health examination must incorporate components to screen for the high risk children and reinforce the need for improved physical activity.

Key words: Obesity, adolescents, physical activity
Introduction

The epidemic of obesity is increasing at an alarming rate. According to the National Health and Nutritional Survey, the prevalence of overweight among adolescents in United States (U.S) increased from 5% between the years 1976-80 to 17.64% in 2003-2004. Many studies have shown rising trends in the prevalence of obesity and overweight in India also. Although the rate of malnutrition is high, increase in overweight and obesity have been observed in some areas undergoing rapid economic and epidemiological transition\(^1\). A recent study on overweight and obesity among school going children of central India showed that 4.3% were overweight/obese\(^2\).

Global increases in childhood overweight and obesity are attributable to a number of factors including:

A global shift in diet towards increased intake of energy-dense foods that are high in fat and sugars but low in vitamins, minerals and other healthy micronutrients;

A trend towards decreased physical activity levels due to the increasingly sedentary nature of many forms of recreation time, changing modes of transportation, and increasing urbanization.

According to World Health Organization (WHO), a school aged youth should accumulate at least 60 minutes of moderate to vigorous intensity physical activity every day to ensure healthy development. This can provide young people with important physical and social health benefits. Physical activity levels are decreasing among the young people in countries around the world, especially in poor urban areas. It is
estimated that less than one third of young people are sufficiently active to benefit their present and future health and well being. This decline is largely due to increasingly common sedentary ways of life. For example fewer children walk or cycle to school and excessive time is devoted to watching television, playing computer games and other sedentary activities. School based physical activities have also been decreasing\(^3\).

Many studies that have been done abroad have shown that increasing age of girls, inaccessibility to safe play areas, unsafe neighborhood as some of the factors limiting physical activity\(^4,5\).

Limited data is available about factors influencing physical activity among urban children in India. Hence, this study is undertaken with the objectives of determining prevalence of obesity among adolescents aged 11-15 years in the selected urban school and to measure the level of physical activity and find out the correlates influencing physical activity among the adolescents.

**Methodology**

**Study Area:** The study was conducted in one randomly selected co-education school in Peelamedu area, Coimbatore, India.

**Study Population:** Boys and girls in the age group 11-15 years were included for the study.

**Study design:** Cross sectional study

**Sampling:**
All co-educational high schools of Peelamedu area in Coimbatore were listed. One of the schools was chosen by lottery method. The selected school had 4 sections in each class from VI to IX standard. One section from each
class was in turn selected by lottery method. The total sample size from these classes totaled to 160, out of which 156 students participated in the study.

**Inclusion criteria:**
- All boys and girls in the age group 11-15 years from the selected classes.

**Exclusion criteria:**
- Presence of evidence of secondary causes of obesity like hypothyroidism.
- Students on medication like steroids, anti-convulsants
- Students who have medical problems which will limit physical activity.

**Data collection tools:**
1. Anthropometric measurements:

The height and weight of all the students were measured as per WHO recommendations.

2. Demographic background of respondents: The questionnaire included background details on parents’ Education and Income. Socioeconomic status (SES) was categorized using Modified Prasad’s Socioeconomic status scale [Modified for June 2010 using Consumer Price Index (Industrial Workers) for Coimbatore = Rs.166]. For purpose of analysis Class 1, 2 & 3 SES were grouped as high and middle SES and Class 4 & 5 were grouped as low SES.

3. The actual physical activity was measured by using Previous Day Physical Activity Recall (PDPAR) questionnaire. This scale has
been used in many studies and validated.  

4. Factors influencing physical activity were grouped under Demographic factors, Physical and social environmental factors.

Data collection method:

1. Questionnaire was administered to find out background details and factors influencing physical activity. Height and weight were measured for all students.

2. Previous day physical activity recall (PDPAR) questionnaire was administered to measure the actual level of physical activity in a day.

Measurement of weight:
The weight of the children was measured using the conventional weighing scales. These scales were calibrated before each school visit using known weights. These scales are widely used in various Epidemiological studies. With light clothing and without shoes children were asked to stand the weighing scale and the weight were measured to the nearest 0.5kg.

Measurement of height:

Height was measured using wall mountable type of portable Stadiometer which had measurements up to 200 centimeters.

Body Mass Index (BMI) was calculated using the anthropometric measurements obtained. Children more than 85th percentile and less than 95th percentile were considered as overweight and those greater than 95th percentile were considered as obese.

Statistical analysis:

Statistical analysis was performed by using SPSS version 10. Prevalence of
overweight, obesity and various factors influencing physical activity were presented in percentage. Chi square test was used to find out the significance of the various factors influencing physical activity and obesity.

**Ethical considerations:**

1. Ethical clearance was obtained from Institutional Human Ethics Committee of the Medical College to which the researcher belonged.

2. Informed consent was obtained from the Principal of the school and also from the parents of the children.

**Results**

A total of 156 students participated in the study, age ranging from 11-14 years. Among these students, 37.2% were males and 62.8% were females. A majority of them (66%) belonged to Class I Socio Economic Status as per Modified Prasad’s classification. Except the parents of a few children (7%) all others were educated up to 10th standard and above.

**Prevalence of obesity**

Our study revealed that 4.5% of the study subjects were obese and 10.9% were overweight as per WHO cut off values. The percentage of boys who were obese (5.1%) was slightly higher than girls (4%). But this difference is not statistically significant. (p>0.05)

**Level of physical activity**

The physical activity of children was assessed using PDPAR (Previous Day Physical Activity Recall). Our study showed that 79.5% had the WHO recommended 60 minutes of physical activity and 20.5% had less than 60 minutes. Physical inactivity was slightly
higher in girls (21.4%) than boys (18.9%). At least 40% of children were involved in more than 2 hours of indoor leisure activities like watching television, playing video games etc. More girls (43.8%) were involved in indoor leisure activities than boys (31.03%), but the difference is not statistically significant (p>0.05). Only 23% of children used bicycle or walked to school.

Factors influencing physical activity

The various factors influencing physical activity is shown in Table 1

<table>
<thead>
<tr>
<th>Factors influencing physical activity</th>
<th>Percentage of physical inactivity</th>
<th>of p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>18.9</td>
<td>0.713</td>
</tr>
<tr>
<td>Female</td>
<td>21.4</td>
<td></td>
</tr>
<tr>
<td><strong>Fathers education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to higher secondary</td>
<td>24</td>
<td>0.459</td>
</tr>
<tr>
<td>Graduation and above</td>
<td>18.86</td>
<td></td>
</tr>
<tr>
<td><strong>Mother’s education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to higher education</td>
<td>24.07</td>
<td>0.423</td>
</tr>
<tr>
<td>Graduated and above</td>
<td>18.62</td>
<td></td>
</tr>
<tr>
<td><strong>Socio economic status (SES)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High &amp; middle SES</td>
<td>20.66</td>
<td>0.08</td>
</tr>
<tr>
<td>Low SES</td>
<td>16.66</td>
<td></td>
</tr>
<tr>
<td><strong>Travel to school</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walk/cycle</td>
<td>19.44</td>
<td>0.103</td>
</tr>
<tr>
<td>Motor vehicles/bus/others</td>
<td>20.83</td>
<td></td>
</tr>
</tbody>
</table>
Our study revealed that female sex, low level of education of parents, children from high and middle socioeconomic status, location of home in non residential areas and main roads, absence of play ground nearby home, travel to school by motor vehicles had a higher percentage of physical inactivity but the results were not statistically significant.

Discussion

In the present study about 4.5% children were obese and the percentage was slightly higher in boys than girls. A recent study in Karnataka also showed that 4.3% of children were obese. Though this is less compared to situation in U.S (17.64%) there seems to be a rising trend in India also.

WHO has recommended that children should have at least 60 minutes of moderate to vigorous physical activity in
a day. The Previous Day Physical Activity Recall (PDPAR) for measuring the actual physical activity has been validated by many researchers for use in measuring moderate to vigorous physical activity. Using this PDPAR tool it was observed that 20.5% of the children had inadequate physical activity. This finding was almost similar to the study done in West Bengal. Females seem to be having less physical activity than males was also revealed in a cross-sectional study done in South Africa. As expected, girls spent more time in indoor leisure activities than boys.

The average time allotted for physical activity in our study school was found to be 60 minutes per week. Schools should allot more time for physical activity and also conduct health education sessions for children on the health effects of obesity, need for improved physical activity. They can also encourage students to use bicycles to schools. Children travelling by motored vehicles have a reduced opportunity for physical activity. Our study revealed that only 23% travelled to school by walk or using a bicycle in contrast to a study done in Switzerland where 77% of children used bicycles or walked to school. The same study revealed that major road crossings and distance to school to act as the main barriers to walking or biking to school. More studies are needed in our country to find out the various factors impeding active transport to school and take measures to overcome them.

As concluded by a survey done in California, access to playground was associated with increased physical activity. Our study also revealed that access to playground was an important
factor for physical activity. Other factors like parents being sports persons influence physical activity. Controversial to belief that spending time playing video games decreased physical activity, our study showed that playing video games does not affect their physical activity.

To conclude, teachers/parents should motivate children on behavioral change and provide a conducive environment for outdoor games. The yearly school health examination must incorporate components to screen for the high risk children and reinforce the need for improved physical activity.

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http://www.who.int/topics/obesity/en/
