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A COMPARATIVE STUDY ON THE PREVALENCE OF OBESITY AND PHYSICAL ACTIVITY LEVELS AMONG COLLEGE STUDENTS IN SOUTH INDIA

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HOW TO CITE THIS ARTICLE:

Shankar K, Satheesh B. C. "A Comparative Study on the Prevalence of Obesity and Physical Activity Levels among College Students in South India". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 87, October 29; Page: 15159-15164, DOI: 10.14260/jemds/2015/2154

ABSTRACT: BACKGROUND: Obesity is a chronic disease, prevalent both in developed and developing countries affecting children as well as adults by increasing lifetime cardiovascular risk. There is evidence that children and adolescents of affluent families are overweight than in the past possibly because of decreased physical activities, sedentary lifestyles, altered eating patterns and increased fat content in the diet. **AIMS:** To find out the proportion of obesity among college students and to assess the level of physical activity and also compare the level physical activity among the obese and nonobese college students. **SETTINGS AND DESIGN:** This study was done as a cross-sectional study with both descriptive and analytical components. This study was conducted on a random sample of college students who attended an intercollegiate meet in Chennai. **METHODS AND MATERIALS:** Based on the current prevalence of obesity, as published by various studies, the sample size was estimated to be 350. This cross-sectional survey comprised of a self-administered questionnaire and collected anthropometric measurements from these students. Body mass index (BMI) was used for weight status. The questionnaire "International Physical Activity Questionnaire (IPAQ)" was given to students to fill in the physical activity. **STATISTICAL ANALYSIS:** The data were analysed using SPSS. Socio demographic factors, BMI and physical activity were calculated as percentages. Multivariate logistic regression was performed for men and women separately with obesity as the dependent variable. **RESULTS:** This study reports the predominance of male obesity (18.47%) than the female obesity (16.58%) though the overall prevalence of obesity was not statistically significant. Only 17.1% belonged to the high activity category. 45.7% (160) and 37.1% (130) of students belonged to moderate and low activity group respectively. Significantly more number of females exhibited physical inactivity compared to males ($p < 0.001$). Only 60 non-obese students were physically active ($p < 0.001$). **CONCLUSION:** This study shows a positive association between physical activity and obesity. Integrating physical education at the school and college level to promote the physical well-being of children as well as college students is the need of the hour.

KEYWORDS: Obesity, Physical activity, College students, Prevalence.

INTRODUCTION: Obesity is a chronic disease, prevalent both in developed and developing countries, and affecting children as well as adults. Indeed, it is now so common that it is replacing the more traditional public health concerns, including under nutrition and infectious disease, as one of the most significant contributors to ill health.¹

Obesity accounts for 2-6% of total health care costs in several developed countries. Some estimates put the figure as high as 7%. The true costs are undoubtedly much greater as not all obesity-related conditions are included in the calculations.²

The World Health Organization warns that chronic disease is likely to be the primary disease cluster in the world in the future and obesity is a 'Global Epidemic'.³

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This problem of obesity is of particular concern in India that have transitional economies and changing lifestyles.⁴ exposed to a new lifestyle that fosters ill health. There is evidence that children and adolescents of affluent families are overweight than in the past possibly because of decreased sedentary lifestyles, physical activities, changing eating patterns and increased fat content in the diet.⁵

There is a need to identify obesity among college students as an ongoing activity and develop strategies to deal with it both at the individual level and curricular level by bringing reforms.

The present study was carried out with the objectives to determine the problem of Obesity and to identify the level of physical activity.

AIMS AND OBJECTIVES:

1. To estimate the prevalence of obesity among the sample population.
2. To assess the level of physical activity among them.
3. To compare the level of physical activity among the obese and the non-obese.

MATERIALS AND METHODS:

Sample and Procedure: This cross-sectional study was carried out with both descriptive and analytical components. A cultural event organized in a college, Tamil Nadu where in students from South India participated. The anonymous, self-administered questionnaire was developed in English, Hindi, Tamil, Kannada, Telugu and Malayalam. A convenience sampling was taken and sample size of 350 was considered.

The students were then briefed regarding the purpose of the study and were invited to participate and provide their response, after obtaining an informed consent. Students were also informed that participation was voluntary and anonymity would be maintained. The required ethics approvals were obtained by all participating institutions. The questionnaire "International Physical Activity Questionnaire (IPAQ)" was given to students. Their height and weight was measured as per standard protocol.

STUDY VARIABLES:

Anthropometric Measurements: Students were weighed and measured by trained researchers using standardised protocols.⁶ Standing height was measured to the nearest 0.1cm without shoes, using a stadiometer. Participants wearing light clothes, were weighed to the nearest 0.01kg, on a load-cell-operated digital scale which was first calibrated using a standard weight and re-checked daily. Body mass index (BMI) was calculated as weight in kg divided by height in metres squared.

Obesity: Any subject with a BMI of 30 and above was classified as obese. A limitation of BMI however is that it cannot differentiate an obese individual from a muscular one, also cannot locate the site of fat. 'Central obesity' may have normal BMI. In spite of several limitations, BMI as of now appears to be the most practical way of measuring and comparing obesity for clinical and epidemiological purposes.⁷

Physical Activity: Physical activity was assessed using the self-administered International Physical Activity Questionnaire (IPAQ) short version, for the last 7 days (IPAQ-S7S). We used the instructions given in the IPAQ manual for reliability and validity, which is detailed elsewhere.⁸

We categorized physical activity (short form) according to the official IPAQ scoring protocol.⁹ as high, moderate and low.

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High Physical Activity: (Any one of the following 2 Criteria):

- Vigorous intensity activity reported by the student at least on three days, aggregating a MET of 1500 MET minutes/week,
- Or 7 days of any combination of walking, moderate or vigorous intensity activities accumulating at least 3000 MET Minutes/week.

Moderate Physical Activity:

The Student should fulfil any of the following Criteria:

- Three or more days of vigorous activity of at least 20minutes/day.
- 5 or more of vigorous intensity activity and/or walking for at least 30 minutes/day.
- Any combination of the above achieving a minimum of at least 600 MET minutes /week.
- Low physical activity: The student does not report any activity, or some activity was reported but was less than the above two criteria.

Data Analysis: The data were analysed using SPSS. Socio demographic factors, BMI and physical activity were calculated as percentages. Multivariate logistic regression was performed for men and women separately with obesity as the dependent variable.

Results/ Discussion: A total of 350 students participated in the study. Out of the 350 study subjects, 157(44.9%) male and the rest 193(55.1%) were females. All the students were in the age group of 18 to 22 years, with a mean age of 19 years. The students were from faculties of education, humanities and arts, social sciences, business and law, science, engineering, manufacturing and construction, agriculture, health and welfare and services.

Prevalence of Obesity: Overall, a total of 17.4% (61) students were obese. Although 18.47% (29) of male and 16.58% (32) of female students were obese, the prevalence was not found to be statistically significant (Table -1).

Prevalence of Physical Activity: Regarding the level of physical activity that the students normally indulged in, it was observed that only 17.1% (60) belonged to the high activity category. Most of the students 45.7% (160) and 37.1% (130) of students belonged to moderate and low activity group respectively. (Figure 1).

Also a statistically significant difference in the level of physical activity was observed amongst male and female students (Table -2).

Comparison of the level of Physical Activity among the Obese and the Non-obese:

The measured physical activity levels in the obese and the non-obese students are shown in Table 3. The results demonstrate that 60 non-obese students indulged in high physical activity and none of the obese students were engaged in the high activity indicating an association between obesity and physical inactivity and it was found to be statistically significant. ($P<.001$).

DISCUSSION: This study reports the predominance of male obesity than the female obesity though the overall prevalence of obesity was not statistically significant. The results are in concordance with results from the study by the author Chattwal et al where the prevalence of obesity was higher in boys (12.9%) when compared to girls (9.9%).¹⁰ Only 16.9% of the subjects in this study population

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were found to highly physically active. This trend points the low physical activity even in younger population, which may have alarming health consequences later in their life. It would have great impact on healthful living if the percentage of students who are highly active is increased to anywhere between 80% to 90% in the age group.

The sex difference in physical activity has not been documented in many studies. A study by Strauss et al reported similar levels of physical activity amongst boys and girls before the age of 13 years and boys were significantly more active than girls after the age of 13 years.¹¹

The finding in this study that lack of physical activity were associated with obesity has also been found in a number of previous studies. Significantly more number of females exhibited physical inactivity compared to males. This sex difference in physical activity in this context may be due to certain socio cultural factors prevalent in some communities in southern India, where girls, especially after menarche, are restricted to take part in outdoor leisure time physical activities.

This study shows a positive association between physical activity and obesity. This also confirms to the fact that physical activity is an important determinant for obesity.

Obesity is a chronic disease that requires long-term strategies for its effective prevention and management. Intervention need to be taken up early in an individual's lifetime, especially during school and college days, as this is the crucial period where the children acquire most of these lifestyle behaviours. At the school and college level, physical education should be integrated in the school's curriculum. Emphasis should be made on play and activities rather than 'exercise', since many adolescents may find defined physical exercises boring and punitive and are more likely to continue activity if it is incorporated in their daily routines. In sporting events, participation should be stressed and competition de-emphasized, so as to encourage everyone to participate.

Total Number of Subjects (n)	Obese	Percentage
Male (157)	29	18.47%
Female (193)	32	16.58%
Overall (350)	61	17.4%
Table 1: Table showing the prevalence of obesity in the overall study population and the two sexes:		

$$\chi^2_2 - 0.215 \text{ P} = 0.643$$

Sex	Level of Physical Activity			Total
	Low	Moderate	High	
Male	52	79	26	157
Female	108	51	34	193
Total	160	130	60	350
Table 2: The level of physical activity in male and female students				

$$\chi^2_2 - 23.240 \text{ P} = <.001$$

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Obesity status	Level of Physical Activity			Total
	Low	Moderate	High	
Obese	33	28	0	61
Non-Obese	127	102	60	289
Total	160	130	60	350

Table 3: The level of physical activity among obese and Non-obese students

$\chi^2_2 - 15.326$ $P = <.001$

Figure 1: Physical activity levels of students

ACKNOWLEDGMENT: I sincerely thank the principals of the respective colleges for permitting me to conduct the study. I'm very grateful to all the students for their cooperation during the study.

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FINANCIAL OR OTHER

COMPETING INTERESTS: None

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Date of Submission: 06/10/2015.
Date of Peer Review: 07/10/2015.
Date of Acceptance: 17/10/2015.
Date of Publishing: 28/10/2015.