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Cognizance of overweight and obesity among intermediate pre graduate and secondary school students in Rajasthan

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Abstract
Background: India is the third most obese country in the world after US and China. Obesity among children in India has become a public health issue. Childhood obesity was considered as a problem in affluent countries. But now-a-days, this problem has started appearing in the developing countries. The primary aim was to assess the prevalence of overweight and obesity among pre-graduates In Rajasthan.
Methods: A cross-sectional study that included intermediate pregraduate and secondary school students was conducted in Rajasthan between Dec. 2013 and Nov 2014. Anthropometric measurements were obtained by the researchers and body mass index (BMI) was calculated. We used the obesity risk knowledge (ORK-10) scale to assess obesity awareness. Participants who answered ≥ 5 out of 10 questions correctly were considered to be aware.
Result: A total of 1467 students were enrolled (mean age, 14.69 years). The mean BMI was 21.42 kg/m^2, and 19.3% were either overweight and 12.7% were obese. The mean ORK-10 score was 2.95 and 19.8 % were considered to be aware. Compared to those who were non-aware, participants in the aware group were more likely to be older ($P < 0.002$), male ($P < 0.002$), attend high school ($P < 0.003$), eat dinner with their families ($P = 0.032$), eat fruit at least daily ($P = 0.030$), and consider obesity to be a disease ($P < 0.004$).
Conclusion: Only 19.8 % of students who participated were considered to be aware about obesity. Those who were aware were more likely to be older male high school students.

Keywords: body mass index, overweight and obesity

1. Introduction
Overweight is defined as the presence of a body mass index (BMI 25 ≤ 30 kg/m^2) whereas Obesity BMI ≥ 30 kg/m^2 and is emerging as a major public health issue [1, 2]. There are several factors that have been found to influence the level of health, such as social environment, education, personal health practices, healthy child development, and culture [7]. Social cognition theory suggests that behavior, which occurs in a social context such as eating and physical activity, is not directly determined by the outside stimulus of a situation, but rather by mediating internal mental processes such as knowledge, attitudes, and beliefs [8].
It is important to establish good health knowledge and attitudes toward overweight and obesity because it is associated with and considered to be an important risk factor for several chronic conditions, including diabetes, heart disease, and joint pain [9]. It is also considered one of the important preventable causes of death worldwide [10].
The awareness levels about the risks associated with obesity are considered to be insufficient. Media are not viewing the obesity-related health problems as suggested by the available evidence [11]. Previous studies have demonstrated that in different developed countries, the majority of persons reveal limited data concerning obesity co-morbidities and the knowledge is even less when asking about obesity as a known risk factor for cancer [12, 13].

2. Methods
A cross-sectional study that included intermediate pregraduate and secondary school students was conducted in Rajasthan between Dec. 2013 and Nov 2014. The primary aim of this study was to assess obesity awareness and knowledge among intermediate and high school students using a reliable and validated scale, the obesity risk knowledge (ORK-10) scale [14]. Additionally, we assessed the prevalence of overweight and obesity among the participants, and the relationship between the awareness level and BMI, type of school, parent's education, and lifestyle habits.
We included intermediate and pregraduate senior secondary school students, aged 13 - 18 years, (mean age, 14.69 years) who were willing to participate in the study. We excluded students with chronic medical illness, existing psychiatric disorders, and students with learning disabilities.
A total of 15 schools were selected randomly: Ten school was

a private boys' school and the other 5 schools were government schools; of these, seven were boys' schools and three were girls' schools and five were co-edu schools. Each student's height and weight were measured by the researchers and BMI was calculated. BMI was categorized as follows: underweight (BMI < 18.5 kg/m^2), normal (BMI 18.5 ≤ 24.9 kg/m^2), overweight (BMI 25 ≤ 30 kg/m^2), and obesity (BMI ≥ 30 kg/m^2) see Figure-1.

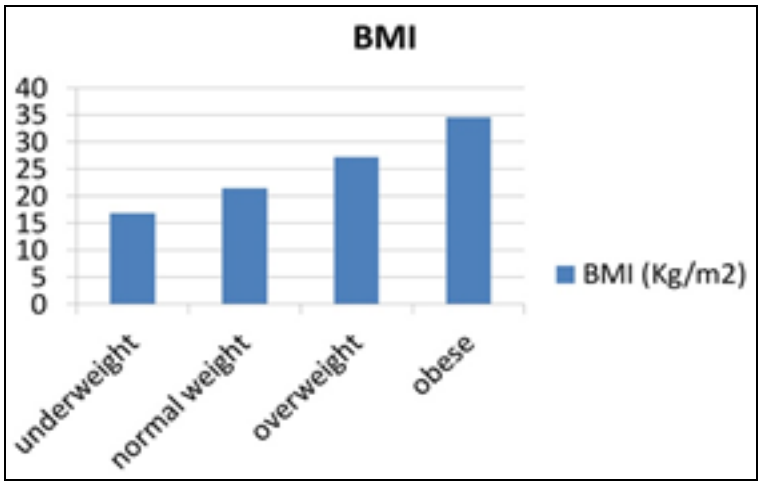

Fig 1

To assess obesity awareness, we used the ORK-10 scale, which contains 10 questions and each question contains three choices: right, wrong, and I do not know. Each question answered correctly on the ORK-10 form is equal to 1 and there were no negative scores. The minimum score was 0 and the maximum score was 10. Those who answered ≥ 5 questions correctly were considered to be aware and those who answered < 5 questions correctly were considered to be unaware.

Personal information was collected through an interview and on a self-reported questionnaire. This questionnaire was tested in one school before the data collection phase to check for errors, ambiguities, and redundancies. The researchers sat with the respondents, explained the rationale of the study and the process, and obtained verbal consent. They handed out the questionnaire, which was then completed immediately. The respondents were given adequate time to complete the questionnaire and the researchers were available to answer any related questions.

Information about related factors such as eating habits, including eating breakfast at home, eating fruit daily, the frequency of eating fast food, and physical activity were self-reported. Time spent sleeping (in hours) per night was obtained and categorized into < 6 h, 6 - 8 h, and > 8 h, and the optimal time was considered to be 6 - 8 h of sleep per night. Social-related data such as smoking, parent's education, and working and living situation were also recorded.

Data were collected and analyzed using the Statistical Package for the Social Sciences (SPSS) software version 20. The Chi-squared test was used to study the relationship between variables and the independent *t*-test was used to compare between means. We considered a P value of ≤ 0.05 to be statistically significant.

3. Results

A total of 1467 students were enrolled (mean age ± standard deviation (SD), (mean age, 14.69±3.1 years). Most participants were male and attending a governmental school, 39% were high school students, and 61% were pregraduates intermediate school students. The mean height was 1.49 ± 0.22 m, mean weight was 56.70 ± 16.75 kg, mean BMI was 21.42 ± 7.02 kg/m^2, and mean waist circumference was 81.34 ± 12.65 cm. The BMI distribution for both male and female students was as follows: 31.8% were underweight, 36.2% were normal weight, 19.3% were overweight, and 12.7% were obese.

Most students' reported living with both parents and 34.2% of the students reported that both parents were working. Overall, 35.3% of the students' fathers and 64.7% of the students' mothers were reported to have a lower level of education (high school or less).

There were 49.6% of the students who reported optimal sleeping hours per night. Additionally, 81.3% reported using electronic devices on a daily basis and 29.4% report using their devices for ≥ 6 h per day. There were 62.5% who ate breakfast daily, and 34.9% reported that they ate breakfast. There were 84.2% and 78.2% who ate lunch and dinner, respectively, with family. Additionally, 31.6% reported a sedentary life style and 19.4% participated in sports > 5hr per week. There were 26.4% of the students who walked to and from school most days.

The mean ORK-10 score was 2.95 ± 1.6 and 19.8% were considered to be aware. We divided the students based on the ORK-10 score into aware and non-aware groups. Compared to those who were non-aware, participants in the aware group were more likely to be older (P < 0.002), male (P < 0.002), attend high school (P < 0.003), eat dinner with their families (P = 0.032), eat fruit at least daily (P = 0.030), and consider obesity to be a disease (P < 0.004).

Both groups tended to have a similar BMI and waist circumference measurements. There was no statistical difference between groups for the living situation, the parents' education, sleeping habits, other eating habits, or smoking. When groups were divided based on BMI category, there was

no statistical difference in the obesity awareness level (P = 0.423) or in considering obesity to be a disease (P = 0.450) (Table 1).

Table 1: Groups Based on BMI Categories

	Under weight	Normal weight	Overweight	Obese	P value
Number of students (%)	31.8	36.2	19.3	12.7	n/a
Aware (%)	30.0	28.6	21.6	19.8	0.423
Consider obesity as a disease?	82%	86.5%	89%	86.2%	0.450

Adjusting for age, sex, school type, living situation, parents' education, eating habits, walking to and from school, and activity level showed a non-significant negative partial correlation between BMI and ORK-10 score (r = -0.027, P = 0.435) and between waist circumference and ORK-10 score (r = -0.022, P = 0.374).

4. Discussion

Our study showed that only 19.8 % of the participating students were considered to be aware about obesity according to the ORK-10 scale results. Older males who were attending high school were more likely to be aware and were more likely to consider obesity to be a disease.

There were 27.8% of the students who were either obese or overweight, which is similar to the results of a previous study [6]. The aware group in our study was more likely to eat dinner with their family. The aware students were more likely to eat breakfast daily and at home, but they were also more likely to be active smokers and eat fast food more frequently. A previous study showed that eating meals with a family every day is associated with a lower rate of obesity and maintaining a healthy lifestyle habit [16]. A study performed in England showed that the prevalence of overweight and obesity among boys aged 7 - 11 years was 17% and for girls in the same age group, the prevalence was 23.6% [4]. Previous studies among children and adolescents aged 6 - 19 years in 2001 - 2002 showed that 31.5% were at risk for overweight or were overweight, and 16.5% were obese compared with 29.9% and 15.0%, respectively in 1999 - 2000 [3]. In the United Arab Emirates, the prevalence in the age group of 5 - 17 years was 21.5% for overweight and 13.7% for obesity [5]. A study performed in Saudi Arabia in a sample of male school children 6 - 18 years of age showed that 11.7% of them were overweight and 15.8% of them were obese [6].

Viewing obesity as disease will help health care providers to diagnose and treat obesity earlier, to prevent potentially related complications. Most of the aware group in our study considered obesity to be a disease compared with the non-aware group. Recently, the medical societies that have also begun considering obesity to be a disease include the American Medical Association and the American Association of Clinical Endocrinologists.

Although a previously published study showed that the questionnaire is a valid tool to screen for obesity knowledge in this age group, we are not aware of any other study that was performed to assess the level of awareness in this age group [14]. A recent study used the ORK-10 scale to assess the obesity awareness level among nursing, dietetic, and medical students, and the results showed that the awareness level in each group is positively correlated with the year of the training, and that dietetic students scored the highest using the ORK-10 scale [17].

Our study strengths are using a validated questionnaire (ORK-10) and collecting many related variables including socioeconomic, dietary, sleep, and activity habits. Our study weaknesses include the predominance of males in the study, the small sample size, most of the sample was from governmental schools, and we included only one city.

5. Conclusion

Only 19.8 % of the participating students were considered to be aware about obesity. Those who are aware were more likely to be older male secondary school students.

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