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Overweight among Undergraduate Students in University of Narowal, Narowal, Pakistan: A Descriptive Cross-sectional Study

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Abstract

Obesity is common problem in both developing and under-developing countries and may often accompanied with various complications, including diabetes, hypertension and metabolic disorders. This study aims to evaluate the prevalence of obesity and overweight among undergraduate students from University of Narowal. The cross-sectional analysis was obtained from a general population (n=568) of undergraduate students enrolled between 2020-2022. The data obtained through questionnaire included demographic information and anthropometric measurements. More than a half of population (n=374, 66%) showed normal BMI= 21.1±0.01 while 96 (16.9%) students (Mean BMI= 26.7±0.1) were overweight, 20 (3.5%) students (Mean BMI=32.69±0.49) were obese, and 48 (8.5%) students (Mean BMI=17.91±0.120) were found to be underweight. This study shows a least significant prevalence of obesity in general population serving as a crucial component in the indication of a good public awareness about obesity and healthier life style.

Keywords: BMI, Obesity, Overweight, Undergraduates, Underweight

1. Introduction

Obesity is a multifactorial metabolic disorder which generally refers to the accumulation of excessive body fats that might cause impairment of several bodily functions (Kumar et al., 2021; Blüher et al., 2019). Obesity is associated with an increasing rate of various metabolic diseases including, hypertension, cardiovascular disorders, type 2 diabetes, fatty liver disease and musculoskeletal disease (Blüher et al., 2019). World Health Organization (WHO) targets a halt the rise in obesity through "Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013–2020"

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Table 1 Classification of overweight and obesity by BMI

Sr.	Categories	BMI kg/cm^2
1.	Underweight	<18.5
2.	Normal	18.5-24.9
3.	Overweight	25.0-29.9
4.	Obesity	30.0-39.9
5.	Morbid Obesity	≥ 40

and its reduction to a level it was in 2010 (World Health Organization, 2013).

The prevalence of obesity varies in different geographical regions due to the change in life styles and environmental factors under the influence of economic development, expansion of cities and innovation. The prevalence of obesity was 16.4% in adults (≥18 years) in China ((Pan et al., 2021), 5% in India (Motwani et al., 2021), 21.4% in Iran (Vaisi-Raygani et al., 2019) and 11.7% in Malaysia (Rampal et al., 2007). An extensive meta-analysis showed highest prevalence of 35.0% in Saudi Arabia, and lowest prevalence of 2% in Vietnam during COVID pandemic (Jayawardena et al., 2020). A study predicts the prevalence of obesity of 48.9% in USA by the year 2030 [9]. There are several socioeconomic factors which include work absenteeism, quality of life, transportation costs, obesity-related diseases, premature death and lower work productivity. These all factors are major contributors of obesity prevalence in a community (Anekwe et al., 2020).

Obesity holds a variety of other psychological and other health complications with itself, as there are higher rates of cardiovascular diseases (CVD), diabetes and hypertension in obese persons. Obesity may also lead individuals to have different infectious diseases (Haslam et al., 2005; Falagas et al., 2006). Higher mortality rates in obese populations in America and Africa has also been observed (Stevens et al., 2000). The incidence of cancer is significantly associated with obesity as 33% excess incidence of various cancers has been observed in obese persons (Wolk et al., 2001).

Although Body mass index (BMI) is an indirect way of estimating the obesity but still it is a good predictor of obesity as WHO states that the BMI ≥30kg/m^2 is obese. The term BMI was first used by Ancel Benjamin Keys (Cole et al., 1979) which he defined as the ratio of weight (kg) to square of height (m^2). The normal value of BMI ranges between 18.5-24.9, the lower values show underweight, and higher values indicate overweight and obesity (Gupta et al., 2009) (**Table 1**).

The change in life style, use of technology and modernization reduced the physical activity in young generation thereby making them more vulnerable to obesity and its associated comorbidities. Approximately 52% of adults of 18 years and above are overweight or obese according to a WHO report in the year 2016. The rate of obesity and overweight in undergraduates is also increasing sharply (Ha & Kim, 2017) Overweight and obesity not only affects the health, stature and way of life but also cause serious health problems and impediments in pshyco-social health (Morrison et al., 1999; Owen et al., 2009; Raghuveer et al., 2010) ultimately affecting the development of country.

This cross-sectional study aims to evaluate the prevalence of obesity among the undergraduates from rural and urban backgrounds. Moreover, it also highlights the gender-based prevalence of obesity.

2. Materials and Methods

2.1. Study Design

A survey-based questionnaire among the undergraduates enrolled between 2020-2022 was conducted in University of Narowal.

2.2. Sample Size and Selection Criteria

This study utilized a general population (n=568) with individuals from rural areas in close proximity of Narowal and nearby urban communities. Undergraduate students between the age 17 to 25 years regardless of the residence and gender were selected for sampling.

2.3. Materials/Instruments

A well-structured questionnaire in Google Forms was presented to each student to fill the demographics such as names, age, sex, residency, and anthropometric measurements such as weight (kg) and height (m) was collected for further calculation of BMI. The collected data was structured and formatted in Microsoft Excel 2019. Mean, percentages and BMI category-wise prevalence were calculated in IBM SPSS version 21.

2.4. Data Analysis

Prevalence of different BMI categories on the basis of sex was calculated using percentage and mean values through Compare Means function in SPSS. Sex and BMI categories was considered as independent variables against age and BMI values being dependent variables. Clustered boxplot was created for BMI categories against the mean BMI values while a bar chart was produced to analyze the percentage prevalence of BMI categories in males and females.

3. Results and Discussions

3.1. Mean Analysis of General Population

Mean analysis of the whole population shows the population (n=568) with females (n=363) and males (n=205) of mean age 20.7 years and 21.0 years with mean BMI values 22.0 kg/m2 and 22.6 kg/m^2 for females and males respectively as shown in **table 2**.

3.2. Percentage Prevalence Analysis

Individuals in each BMI category were analyzed using percentage (**Table 3**). 70 out of 568 students, 22 male and 48 female with their mean BMI values 18.0±0.1 and 17.9±0.1 respectively, were found to be underweight. Most of the population was having normal weight as the data indicates that 375 male and female students have their BMI in normal range (mean BMI 21.1±0.01). The prevalence of overweight was 16.9% in general population (males with 7% and females with 10% approximately). The incidence of obesity was shown to be very least in males (i.e., 1.1%) as compared to females (3.5%). Only one male student was found to be morbid obese with BMI≥40 kg/m^2.

Table 2 Characteristics of population under study and mean values

	Population size (%)	**Mean Age (kg)**	**Mean BMI (kg/m^2)**
Females	363 (63.9%)	20.7 ± 0.07	22.0 ± 0.19
Males	205 (36.1%)	21.0 ± 0.12	22.6 ± 0.27
Total	568 (100.0%)	20.9 ± 0.06	22.2 ± 0.16

Table 3 BMI

	Male			Female		
BMI Category	**N (%)**	**Mean Age (years)**	**Mean BMI (kg/m^2)**	**N (%)**	**Mean Age (years)**	**Mean BMI (kg/m^2)**
Under weight	22 (3.9)	20.7±0.3	18.0±0.1	48 (8.5)	21.0±0.2	17.9±0.1
Normal	136 (23.9)	21.07±0.1	21.5±0.2	239 (42.1)	20.5±0.1	20.9±0.1
Overweight	40 (7.0)	21.3±0.2	26.8±0.2	56 (9.9)	21.3±0.2	26.7±0.2
Obesity	6 (1.1)	20.0±0.5	34.5±1.0	20 (3.5)	21.1±0.3	32.1±0.4
Morbid Obesity	1 (0.2)	22±0.0	40±0.0	N/A	N/A	N/A

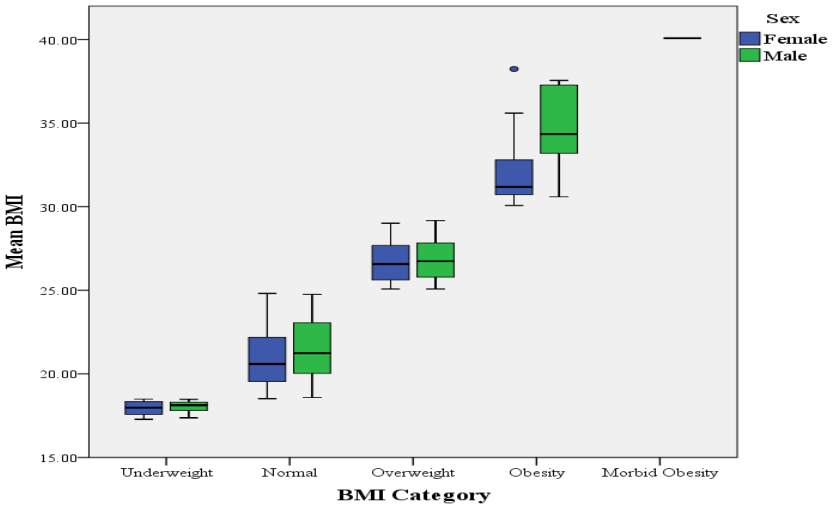

Figure 1 A cluster boxplot showing plots of different mean BMI categories with respect to sex

Overall, the results of this study have shown no significant prevalence of obesity among undergraduate students in University of Narowal. But the statistics indicate a slightly increased prevalence of underweight in male as well as female students

According to a report, an increase in physical activities and exercise with dietary restriction leads to greater weight loss as compared to change in diet (Stiegler et al., 2006). Also, there are reports which show that certain factors responsible for the overweight and obesity are more concerned with the lifestyle of the person. The most important factors that lead to obesity are the use of technologies such as computers in case of students for prolonged durations, more intake of food under stressed conditions and the intake of high fatty foods (Bakr et al.,2002). Overweight and obesity are emerging as one of the major problems in younger populations. An increase in the prevalence of overweight is observed in both developed and developing countries, notably United States, Brazil and China are most common according to a recent study (Kapil et al., 2002).

Our findings align with (Chhabra et al., 24), where 11.75% were overweight and 2% were obese among medical students. According to a survey in China, about 6.2% prevalence of overweight was studied in Chinese youth which is less than that value reported in Pakistan. The reason of lower prevalence in Narowal could be that the life style includes more physical activities, which results in low fat deposition. In 1963-1991 the National Health and Nutrition Examination Surveys in USA reported that prevalence of overweight increased in all age groups and sexes in a chronological manner (Troiano et al., 1995).

In consistency with the previous studies on overweight in China, recently the morbidity of overweight-obesity is greater in case of males than in females (Yi et al., 2012; Guo et al., 2013; Song et al., 2013). As compared to boys, girls are more likely to control their body weight and their height. According to a research, boys spend more money on junk food, beverages and spend most of their time on mobile phones, computers and games as compared to girls (Zhang et al., 2016). There is no information available on underweight in Indian urban youth, however the same prevalence was reported for Chinese and Russian youth. Our study has shown a slight greater prevalence of obesity in females as compared to males (**Figure 2**).

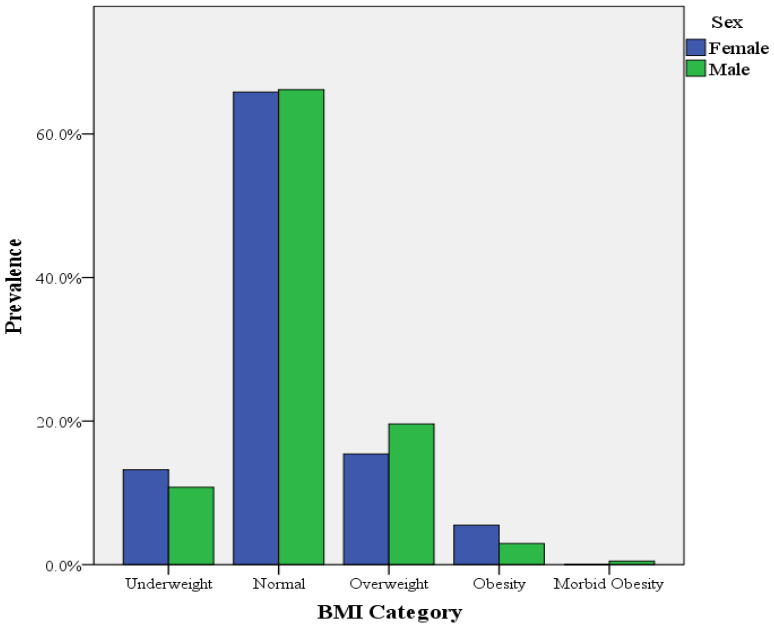

Figure 2 Bar chart showing percentage prevalence between males and females in different BMI categories.

3.3. Limitations

Our study has certain limitations that need to be acknowledged. Firstly, the use of BMI as a sole parameter to investigate the prevalence of obesity may not provide a comprehensive assessment, as factors such as waist circumference and variability across different age groups can influence BMI values. Secondly, the study's reliance on a questionnaire-based methodology introduces potential biases, including inaccuracies in self-reported weight and height. Moreover, the regional scope of the study may limit the generalizability of the findings. A larger cohort study, incorporating a more detailed questionnaire that includes additional anthropometric measurements, dietary habits, physical activity routines, smoking status, and family history, would help to address these limitations and provide more robust results.

4. Conclusion

Obesity, as a multifactorial disorder, increases complications and negatively influences daily life. Modernization and reduced physical activity, particularly among the younger generation, contribute to the rising prevalence of obesity. However, there are regions in Pakistan where obesity is less prevalent. Our study at the University of Narowal found a notably low prevalence of obesity among undergraduate students, suggesting better health outcomes within this specific population, as evidenced by their higher levels of physical activity and healthier lifestyle habits.

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Conflict of interest disclosure:

Authors have declared that there is no conflict of interest.

Data Availability

Data is available on request.

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