Gender Difference in Obesity Prevalence Among General Population of Lahore, Pakistan

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ABSTRACT

Obesity has become a pandemic problem and it is infamous for causing both physical and psychological disorders. Even though obesity is influenced by many factors which include fast food, menopause, socioeconomic status, and genetics, however, gender has paramount importance as a factor that affects obesity when we do not consider other factors. Thus, our current research study was aimed to evaluate the prevalence of obesity and influence of gender on it. Our current cross-sectional descriptive study was finished in almost 6 months from August 2020 to January 2021 among general population of Pak Aran Society Lahore, Punjab, Pakistan. 183 people were recruited in study in accordance to set criteria of exclusion and inclusion. Only those people whose age was from above 20 years to below 61 years, and who had no physical or mental illness and were willing to participate were enrolled in study. Data collection was done through one self-structured proforma and WHO Classification of Weight Status established on BMI. SPSS version 25 was applied to perform data analysis. Various statistical tests like Chi-square test, Independent Sample t-test, and One-Way ANOVA test were used to evaluate the study variables and their relationship. Overall, our current study indicates high prevalence (19.10%) of obesity among all participants, nevertheless, mean of BMI value was higher among women (26.26 SD of ± 3.70) as compared to men (25.06 with SD of ± 4.27) which shows that women had higher risk of development of obesity than men. However, relationship between obesity and gender was statistically insignificant ($p=0.262$). The difference of BMI mean value between women and men was significant statistically ($p=0.046$). Significance difference was also observed in BMI mean value of across four grades of weight status ($p=0.0001$). In summary, in general, prevalence of obesity is higher among women than among men which means female gender raises the obesity incidence among women.

Keywords: Prevalence, Gender, Difference, Obesity, General, Population, Lahore, Pakistan.

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I. INTRODUCTION

Obesity is an abnormal condition in which body weight is even higher than weight of body which is considered as overweight for body [1]. Obesity has become censorious and pandemic problem. First class countries of the world like United states of America, Russia, European Countries and Saudi Arabia have been shown peak incidence of prevalence of obesity [2]-[5].

One more interesting thing about obesity is this, that obesity is not only present in developed countries but also in developing countries like Pakistan. However, obesity is much dangerous in developing countries because developing countries do not have proper tools to diagnose obesity and that's why obesity remains undiagnosed in developing countries. Despite, the high prevalence of obesity around the

globe, obesity prevalence is still not static and obesity prevalence is even now going up [1], [6].

Obesity leads to both physical and psychological disorders in obese people. Lethal and chronic diseases which are due to obesity are related to heart, blood vessels, endocrinology, kidney, and fertility. These diseases include congestive cardiac failure, hypertension, coronary artery disease, kidney disease and infertility [7]-[10]. Furthermore, cancers of various parts of human body including colon cancer, prostate cancer, endometrial cancer, and breast cancer, are also caused by to obesity [9]. [11], [12]. Obesity related psychological disorders are because of unattractive body figure that obese persons have and then because of unlovely appearance, other normal people do not take interest in obese persons which causes mental stress among the obese persons [9].

Many factors affect obesity. One of the most important factors that play direct role in transformation of normal person into obese person is fast food. Higher the consumption of fast food higher the chance of becoming obese [13]. Obesity is also common because now a days as we do not do proper exercise, and we do not have physical activity, and active lifestyles [9], [14]. Genetic factors also critical in the obesity development [15]. Low-grade social status and poor economical class also lead to obesity [16]. In literature, various research articles have been shown that gender has also paramount importance in the causation of obesity and obesity is more prevalent among women [1], [17], [18]. Prevalence of obesity is even higher among old age population of women after menopause. After menopause among women obesity incidence extends to its peak [9], [19], [20]. As we come to a point that obesity is affected by multiple factors, we should plan different approaches to deal with obesity. But among women as obesity prevalence has been shown higher in different studies in literature, so more specific and cause-oriented actions should be taken to beat obesity among females.

Although, globally numerous research studies have been carried out to assess the impact of gender on obesity [17], [18]. However, in Pakistan insufficient amount of knowledge is present regarding the association between gender and obesity in literature and few studies are present at national level and almost no study at local level that could explain the effect of gender on obesity. Therefore, in the presence of studies at international level and presence of few studies at national level, and none at local level, about gender and obesity relationship, our study is aimed, to note the prevalence of obesity and the effect of gender on obesity development among general population of Pak Arab Society, Lahore, Pakistan. If the results of present study indicate that gender influences obesity then by implementation of proper measures and gender specific treatment of obesity, we would be capable to bring down the obesity prevalence among general population eventually, drop in the risk of other diseases related to obesity.

II. MATERIALS AND METHODS

A. Study Design and Study Population

This descriptive cross-sectional study was conducted in the duration of around 6 months from August 2020 to January 2021 at Pak Arab Society, Lahore, Punjab, Pakistan on general Population. 183 people were recruited in current study with. Participants were enrolled on the basis of exclusion and inclusion criteria. Only those people whose age was from above 20 years to below 61 years, and who had no physical or mental illness and were willing to participate were enrolled in study. Those whose age was below or above set criteria and who were not willing to participate were excluded from the study. One self-structured proforma was used to collect data. After proper explanation of aims of study informed consent was acquired from each participant. Proforma was filled via interview of all participants.

B. Assessment of Demographic Details and Menopausal Status of Study Population

A Self-structured proforma was made to get required information regarding the demographic components including, age and gender. Then Height in meters and weight in kilograms were also measured. Their values were also noted on self-structured proforma.

C. Assessment of Obesity

We applied WHO Classification of Weight Status which used body mass index (BMI), to classify participants into various four groups Underweight (BMI= less than 18.5), Normal Weight (BMI=18.5 to 24.9), Overweight (BMI=25 to 29.9), and Obese (BMI= 30 and more than 30). BMI of each participant was calculated with help of height and weight. Weight in kilograms was divided by height in meters in squared. Measuring tape and weighing machine were used to measure height and weight respectively. There measurements were noted on self-structured proforma.

D. Data Analysis

Data analysis was done, by using SPSS version 25. Chi square analysis was applied, to assess the relationship between obesity and gender. Difference in BMI across gender was assessed by applying independent sample t-test. One Way ANOVA test was used to check the difference of BMI across four grades of weight status. The value of p less than 0.05 was set statistically significant.

III. RESULTS

The study population consisted of 183 participants. 100(54.6%) were females whereas, 83(45.4%) were males. Mean age for our study population was 39.26 years with standard deviation (SD) of ± 11.46 while mean value of BMI recruited population was 25.72 with SD of ± 4.01 .

Table I indicates the percentages of various weight statuses on the basis of BMI in all participants including women and men and then one by one among women and men respectively. It manifests that obesity prevalence was higher among women in comparison to men. However, it also shows that weight status and gender have statistically, insignificant association ($p=0.262$).

Table II shows variation in mean value of BMI based on the gender of recruited population along with results of independent sample t-test and this variation was statistically significant ($p=0.046$). Women had higher mean BMI value in comparison to men, which means that they (women) had more obesity or had overweight.

Table III shows the variation in mean value of BMI among different groups of participants on the basis of their weight status. BMI mean value was highest among obese participants and it was lowest among underweight participants. This difference was also statistically significant among participants of all included weight status levels ($p=0.0001$) which was evaluated through One-Way ANOVA test.

Results of our study show overall higher Prevalence of obesity in women as comparison to men and higher prevalence of normal weight and underweight among men as compared to women.

TABLE I: POPULATION PARAMETERS ALONG WITH THEIR CROSS-TABULATION WITH STUDY VARIABLES AND CHI-SQUARE ANALYSIS

Cross-Tabulation and chi-square analysis					
Parameter	Weight Status				Chi-Square Analysis
	Underweight	Normal Weight	Overweight	Obese	
Total=183	9 (4.9%)	66 (36.1%)	73 (39.9%)	35 (19.10%)	p-value
Women	3	32 (32.0%)	44	21	
(n=100)	(3.0%)		(44.0%)	(21.0%)	
Men	6	34	29	14	
(n=83)	(7.22%)	(41.9%)	(35.0%)	(16.86%)	0.262

TABLE II: DIFFERENCE IN MEAN BMI VALUE BASED ON GENDER AND INDEPENDENT SAMPLE T-TEST ANALYSIS

Parameter		BMI Value	Independent Sample t-test
		Mean ($\pm$ SD)	p-value
Gender	Women	26.26($\pm$ 3.70)	0.046
	Men	25.06($\pm$ 4.27)	

TABLE III: DIFFERENCE IN MEAN BMI VALUE BASED ON WEIGHT STATUS ALONG WITH ONE-WAY ANOVA ANALYSIS

Parameter		BMI Value Mean $\pm$ SD	One-way ANOVA Analysis
Weight-Status	Under Weight	17.77($\pm$ 0.440)	0.0001
	Normal Weight	22.65 ($\pm$ 1.43)	
	Overweight	26.61 ($\pm$ 1.62)	
	Obese	31.65 ($\pm$ 1.83)	

IV. DISCUSSION

Obesity is a very common health problem, and it is a root cause of many chronic and lethal diseases. This current study gives information that has chief importance about the impact of gender on obesity development and prevalence of obesity among general population of Pak Arab Society Lahore, Punjab, Pakistan. In the beginning of data analysis, first we measured the prevalence of obesity among overall general population, and it was (19.10%). One more, Pakistani research study has revealed higher prevalence (27.85%) of obesity among enrolled people than our study [1]. Prevalence of obesity was higher among women (21.0%) as compared to men (16.86%). This gender difference in obesity prevalence has also been noted by different studies that were conducted in various parts of the world Including Pakistan. [1], [21]. Although gender difference in prevalence does exist between females and males, however, we noted that association between gender and Weight status was statistically insignificant ($p=0.262$). This insignificant link shows that obesity does affect by gender but also by other factors as well including fast food, lack of physical activity, genetics, socioeconomic class, and menopausal status especially in women. Various research studies have shown impact of above-mentioned factors in the development of obesity. [9], [13]-[16]. After noting prevalence difference of obesity between females and males we assessed the variation in BMI value between women (26.26SD $\pm$ 3.70) and men (25.06with SD $\pm$ 4.27) and this difference was significant ($p=0.046$) and it was evaluated by using Independent sample t-test. Mean BMI value among enrolled participants was 25.72 with SD of $\pm$ 4.01 While another Pakistani study has reported 22.9 with SD of $\pm$ 3.83 BMI [1]. Before finishing the data analysis, we used One Way ANOVA test to assess the significance of variation of BMI among four levels of weight status and it was significant($p=0.0001$). In literature, many grounds have been presented for gross high prevalence of obesity among females and two main of those grounds involve lack of

physical activity and lack of estrogen. Lack of physical activity causes obesity throughout lives of women of all ages while lack of estrogen after menopausal period of lives of women leads to variation in fat arrangement and harmful influence on metabolism which introduce more change in fat spread and due to this variation in fat distribution, obesity develops. Likewise, lack of physical activity and home chores, and other activities also reduced with increase in age of women which leads to sedentary lifestyles and ultimately obesity. Likewise, males have more physical activity that might be the reason of lower obesity prevalence [22]-[24]. What are the reasons that obesity prevalence is higher among women need more researches to explain those reasons clearly. Although, current study may have some barriers to explain things more clearly than it has explained due to cross sectional design of it, but our study has put spotlight on a crucial health affair of general population. As far as we know this is only study at Pak Arab Society Lahore, Pakistan that narrates that gender difference do exist in obesity prevalence among general population. Health department of near area must make actual attempts that could manage or prevent the increased prevalence of obesity among women. As the prevalence varies between females and males, so first we must find more causes of higher prevalence of obesity among women and then we must apply versatile strategies to deal with those causes that lead to higher obesity prevalence in females. Some measures like diet adjustment, regular physical activity and avoiding fast food, could decrease obesity occurrence in both genders while additional interventions to treat known extra causes of higher obesity prevalence in female like hormone replacement therapy could be of cardinal significance in dealing with obesity in women. By taking measures for the prevention and management of obesity we could make people physically strong along with psychological fit.

V. CONCLUSION

In a nutshell, our study indicates high prevalence obesity among general population. However, gender difference was noted in obesity prevalence, and it was higher among women as compared to men. Women had higher mean value of BMI whereas men had lower mean of BMI value and it unquestionably proposes that female gender involves in weight gain and obesity among women. Logical and proper preventive strategies and treatments are essential needs to deal with obesity and especially more specific plans among women, so that obesity prevalence could go down and then resultant drop in fatal diseases incidence could be achieved.

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