

Is Obesity related to Depression?

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Abstract

Objective: It is a well-known fact that obesity as well as depression are two disorders that can lead to a number of common health complications. The association of depression with Body Mass Index in the Pakistani population has not been reported previously. The following study hence aims to understand the relationship of depression with various Body Mass Index.

Design: It is a descriptive study. Duration Dec 2017 - Feb 2018

Methodology: Males and females in different Body Mass Index groups with and without depression were compared.

Results: Results show that moderate depression is most common among the population of Pakistan. Most of the obese men as well as women are depressed. There is also higher percentage of depression in underweight men. This finding is not seen in underweight women.

Conclusion: There is a strong association of extremes of Body Mass Index with depression in male population. However, women population is more prone to develop depression with higher Body Mass Index. Depression in males is largely associated with obesity and sometimes underweight Body Mass Index but in the females, depression is associated with overweight Body Mass Index and obesity but not with extreme low Body Mass Index. More detailed studies are required to assess the comorbid related to these leading health issues.

Key words: Body Mass Index, obesity, underweight, overweight, depression

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Introduction:

The two leading cause of various health issues are obesity, as well as, depression¹. Nevertheless, the findings associated to the relationship among obesity and depression are contradictory. Some reported data shows no relationship between the two, while others report a higher incidence of depression with obesity.^{2, 3, 4} There is reported data showing a higher prevalence of obesity in people suffering from major depression.⁵ In another study, more occurrence of obesity is reported in people who are more prone to develop depression.⁵ Surprisingly, there are reports showing a bidirectional relationship among them, affecting one another.^{4,6}

Depression is a global ailment. According to WHO report of 2012, it had affected 350 million of the world population. 9.5%

women and 5.8% men were found to be globally affected by the disease.⁷ Talking about various countries, 3.1-10.3% and 7.6-11.9% of population was found to be affected in USA and UK, respectively.^{8, 9} There is data reporting existence of depression from Pakistan as well. The available studies show that it is also a common ailment in Pakistan.^{10, 11} A recently published study from Karachi shows that the occurrence of the disease is found in 30% of the general population with the women being more affected than men.¹⁰ The data from the Punjab region reports that in the Urban part of Rawalpindi the disease has effected 25% females while in the rural Rawalpindi the number of affected females is almost double (57.5%).¹¹ The study also reports a higher occurrence of disease in men of rural part of Rawalpindi (25.5%) than in urban part (10%)¹¹

Obesity is yet another globally affecting disorder. On the basis of the Body Mass Index, there are 1.9 billion adults over the age 18 who are overweight, according to the figures of the WHO 2014 report. Out of these, the number of people considered to be obese are 600 million.¹² The report also shows that the global occurrence of obesity has a higher distribution in females (15%) than in males (11%).¹² Obesity is also affecting Pakistan. There have been various reports that show the prevalence of obesity and the distribution of Body Mass Index in people by the National Health Survey in Pakistan.¹³ The NHS report of the period 1990-1994 shows that more females than males of the rural areas of the country are suffering from obesity. Adults of age group 25 to 44-years of ages are having 14% of obese females and 9% of obese males, according to National Health Survey in the urban areas. While, more women (37%) than men (22%) are suffering from obesity in rural Pakistan which is higher as compared to the urban areas. Similarly, a study from DI Khan shows 19% and 11% of females and males to be obese in that area, respectively.¹⁴ A study reporting the occurrence of obesity from the mountainous areas of Pakistan report that the males and females are almost equally affected with higher Body Mass Index.¹⁵ The study shows a 14.1% women and 13.5% men to be affected with obesity in Northern areas.¹⁵

The data on the relationship of obesity with depression in the Pakistani population is not yet existing. We aimed this study to assess the relationship of the incidence of obesity, higher or lower Body Mass Index with the incidence of depression. We therefore, designed the experiment to learn and understand the prevalence of depression in different Body Mass Index groups and vice versa.

Material and Methods

The data was collected from Karachi Psychiatric Hospital (KPH). After acquiring informed and written consent from depressed patients (n=232), they were inducted in the study. Age and gender matched controls were inducted. After acquiring informed and written consent from undepressed people (n=199), they were also inducted in the study. Undepressed people were the workers and residents of University of Karachi (UoK). Each group was further assessed for their Body Mass Index and was placed in the respective group according to their Body Mass Index. Although the depressed patients were diagnosed by the

faculty of KPH, a self-administered questionnaire (PHQ-9) was used to assess the level of depression. The PHQ-9 determined the severity of depression using to the DSM-IV criteria. The data in this study is expressed in percentages.

Exclusion Criteria:

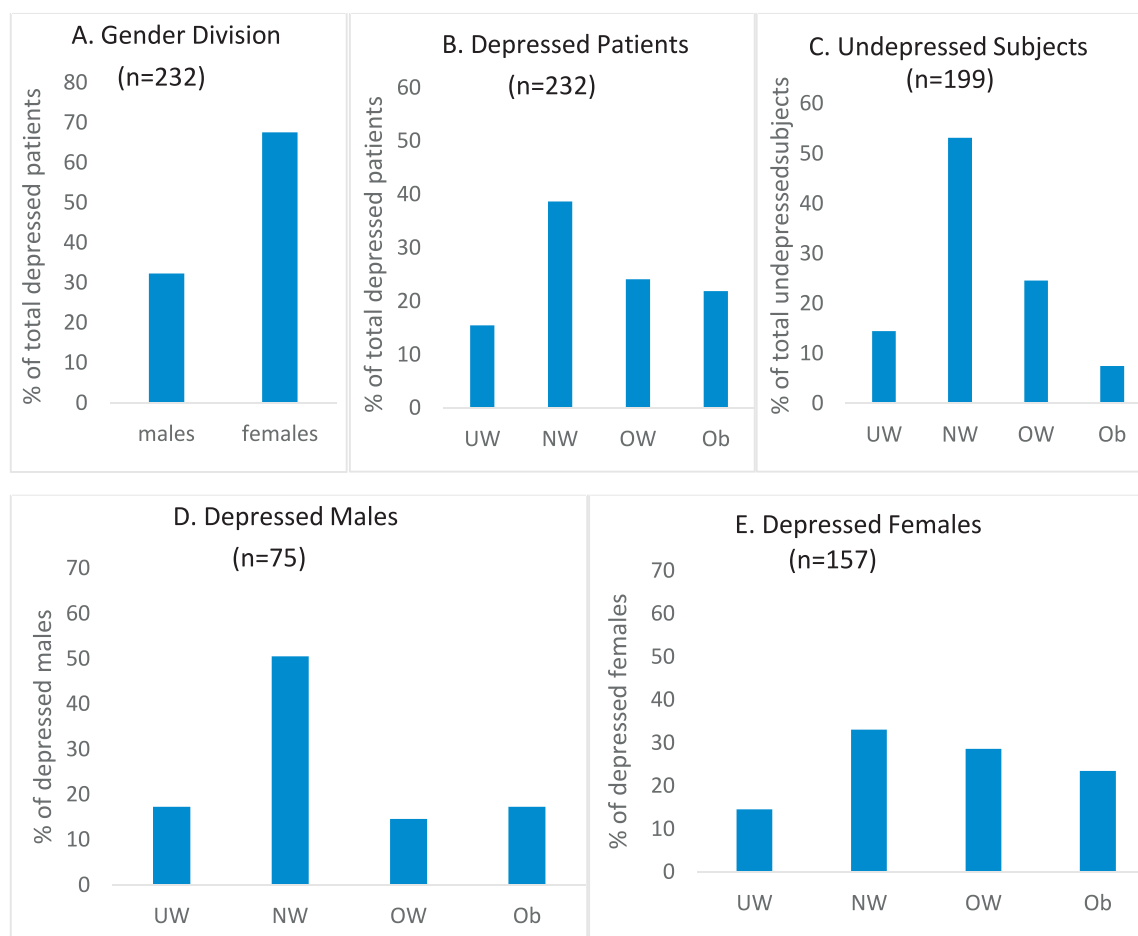
People with chronic severe diseases, prolonged hypertension, uncontrolled diabetes, other known mental health disorder, prolong use of any medicines and bereavement were not included. Pregnant and very old people were also excluded.

Results

Table 1 shows the demographic data. It shows that the mean age (in years) of females was 35.05 while that of males was 35. The mean age (in years) was found to be 37.5 of males affected with depression while, 38.2 of females affected with depression. The undepressed males were found to be 32.3-years-old while the undepressed females were 31.9-years-old. Out of the total participants (n=431) 60.78% were women and 39.2% were men. In the undepressed group, 52.76% females and 47.32% males participated. The depressed were 67.67% and depressed males were 32.2% out of the total depressed participants. This data suggests that there is a higher number of females presenting to KPH than males. (Figure 1A). Figure 1 B is showing the distribution of patients with depression according to the Body Mass Index. Out of the total depressed patients (n=232), the people with normal weight were found to be the greatest in number (38.7%). The depressed people being overweight were the group to follow with 24.1%. The depressed people who were obese were 21.9% followed by the depressed people who were underweight with a percentage of 15.5%. When the data was compared to the respective groups of undepressed people (Figure 1 C), the data showed that the highest number was of normal weight people, followed by overweight, underweight and obese in people without depression. These results show that there is a higher frequency of depression in the higher Body Mass Index suggesting that there is an important correlation of the Body Mass Index in the occurrence of the disease. (Figure 1 D & E) are showing the gender division of the Body Mass Index in the depressed patients. The data shows that there is highest percentage of normal weight males that are depressed with a percentage of 50.6%. The number of

obese and underweight depressed males is found to be equal. On the other hand, in the females, the highest number of females suffering from depression is in the overweight women followed by obese women, having 28.6% and 23.5%, respectively. This data again suggests an important role of Body Mass Index to depression in both the genders. Comparing the data of males with depression (Figure 1 D & E) with their respective group of males without depression (Figure 1 F & G) revealed a greater occurrence of depression in obese men subsequently of underweight men. 17.3% men were depressed and obese, while 5.3% men were underweight and obese. 17.3% men were depressed and underweight, while 9.5% men were underweight and underweight. Conversely, the occurrence of highest number of depressed women was found in obese women followed by overweight women. 23.5% depressed women were obese, while 9.5% underweight women were obese. 28.6% depressed women were overweight, while 23.8% underweight women were overweight. Depression in underweight women was found to be lowest.

14.6% depressed women were underweight, while 19% of underweight women were underweight. The distribution of the severity of depression is depicted in Figure 2. 42.4% is the percentage of people suffering from moderate depression. The people with moderately severe depression were 27.1%. Out of total patients with depression (n=232), 16.8% were found to be having mild depression and 12.5% people had severe depression. Out of the total patients with depression (n=232) only 1.2% had minimal depression. The gender differences are evident in the results. (Figure 2 B) shows that out of total males, 46.6% men have a moderate level of depression which is followed by moderately severe depression which is affecting 22.6% men. Mild level of depression follows with 18.6% of men being affected followed by severe level of depression (10.6%) and minimal level of depression (1.3%). When the data on females (Figure 2 C) was studied, we found moderate depression to be affecting most of the women (40.1%) followed by moderately severe depression (29.2%), mild depression (15.9%), severe depression (13.3%) and minimal depression (1.2%).



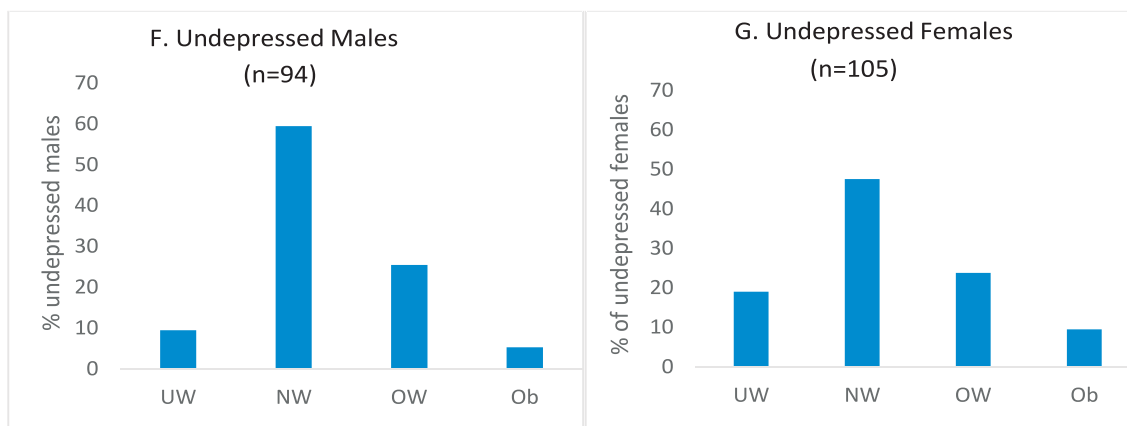


Figure 1 Gender difference in the existence of depression compared to Body Mass Index (% are of respective total).

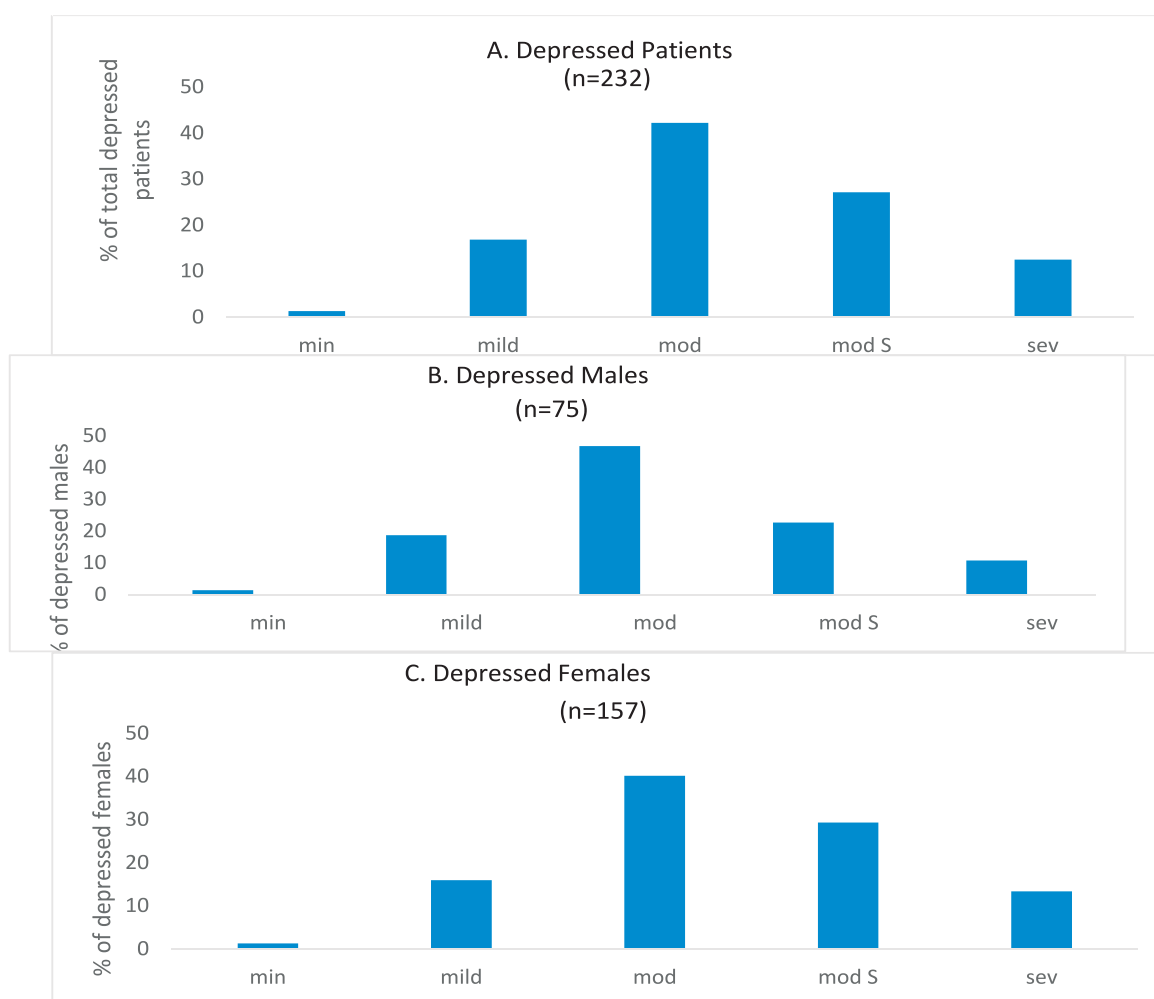


Figure 2 Gender difference in the existence of the levels of depression(% are of respective total).
Table 1 Demographic details

| | Variables | Total (n=431) | Depressed (n=232) | Undepressed (n=199) |
|--------------------|-----------|---------------|-------------------|---------------------|
| Gender | Male | 39.21% | 32.32% | 47.23% |
| | Female | 60.78% | 67.67% | 52.76% |
| Age (years) | Male | 35 | 37.5 | 32.36 |
| | Female | 35.05 | 38.2 | 31.9 |

Discussion:

That there is an association of Body Mass Index with depression in the genders is presented for the first time from Pakistan. We report that there is higher number of females registering themselves for treatment of depression than males. We also report that the existence of depression is greater in the female population of Pakistan when compared to the male population. The same has been reported previously.¹⁶ The previous study showed that there is a higher occurrence of depression in females (41.9%) than males (29.3%).¹⁶ A different study showed a much higher existence of depression in women showing a 65% women being depressed.¹⁷ Similarly, we also report a higher percentage of women being depressed, as reported previously (Table 1). However, we also report that this depression is found to be correlated with a higher Body Mass Index more in females than males. Male depression is also reported to have a link with underweight Body Mass Index in our study. Previous data shows that there is a relationship of depression and obesity in both directions.¹⁷ People with obesity have a more than a 50% chance to become depressed in comparison to normal weight individuals.⁶ A similar figure was reported for the depressed people to become obese when compared to their undepressed controls.⁶ A U-shaped association of Body Mass Index with the occurrence of depression was also reported.¹⁸ We report that highest number of depressed individuals are normal weight but an association with obesity is evident (Figure 1). We also endorse the two-way relationship in depression with obesity and vice versa.

Previously reported data reports that there is higher levels of depression in obese and underweight males as well as females.¹⁸ However, similar to our study, a previously published study reports higher levels of depression in underweight males.¹⁹ The study also reports a higher occurrence of depression in obese females similar to our study.¹⁹ The results show that there is a relationship of extreme Body Mass Index with depression in male populations of Pakistan. The depression is not only related to obesity but also with anorexia. Increased Body Mass Index can be a reason of stress and problems with body satisfaction. As reported, that the media and social circles promote thinner body.²⁰ Unsuccessful maintenance of thinner body can lead to stress, binge eating and depression.

The studies on the occurrence of severity of depression from different parts of the world are not very steady. One study reports that the highest number of depression is mild followed by moderate and severe level of depression in the people living in Ethiopia.²¹ While, another study from India reports that maximum number of people with depression are affected with minimal to mild depression.²² Higher occurrence of mild depression was reported from Karachi.²³ On the other hand, we report that the moderate level of depression is found in both males as well as females. We have also conducted the research according to the PHQ-9 which show the occurrence of depression in 5 different groups namely, minimal depression, mild depression, moderate depression, moderately severe depression and severe depression.

Conclusion:

We conclude that there is generally a higher occurrence of depression in females. Obesity is positively related to depression in both the women and men. Males with anorexia are also prone to develop depression. Women with more Body Mass Index are more affected with depression. Moderate level of depression is the most prevalent depression found in the people of Pakistan. A study with higher number of samples and more parameters are required to assess the causes of the gender dimorphism found in the current study.

Ethical Approval:

The study was conducted after the approval of the Independent Ethical Committee (IEC) of Dr. Panjwani Centre for Molecular Medicine and Drug Research (PCMD), ICCBS, University of Karachi.

Conflict of Interest: All authors declared no conflict of interest.

Authors' Contribution: Dr. Sumera Gul collected the data, analysed it and wrote the manuscript. Dr. Darakhshan Jabeen Haleem critically analysed the data, supervised the whole study and proof-read the manuscript.

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