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Link between obesity and depression among adult population in Wasit governorate/Iraq 2023

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Abstract

Background: Global public health issues including depression and obesity are major. Depression is the biggest cause of disability-adjusted life years (DALYs) lost worldwide, impacting 264 million people, according to the WHO. The aim of study is to examine the relationship between obesity and depression in the adult population.

Method: A cross-sectional study conducted in Wasit governorate from April to November 2023 included 324 participants aged 18-70. Data collected through an online questionnaire covered demographics, depression levels assessed with PHQ-9, and BMI calculated from height and weight. Participants were categorized by BMI (underweight, normal, overweight, obese) and socioeconomic status using crowding index.

Results: A study of 324 patients (59.3% female) with a mean age of 34.3 years found that the majority (62%) were aged 26-45, 64.5% were married, and 61.4% had children. Most participants (84.3%) had a college or higher education, and 46.6% had good monthly income. Chronic diseases, chronic drug use, and chronic psychiatric illness were reported by 22.5%, 29%, and 4.9% of patients, respectively. About 38.3% were overweight, 28.3% were obese, and 69.4% had a crowding index of 2 or less. The study revealed significant associations between depression and gender, chronic psychiatric illness, but not with obesity.

Conclusion: Research found significant links between depression and gender (69% of severe cases were female), chronic psychiatric illness. Other factors, including BMI, age, marital status, education, occupation, income, chronic illness, medication use, and crowding index, showed no significant association with depression.

Keywords: Obesity, depression, adult, Wasit

Introduction

Depression and obesity are two of the most significant public health challenges facing the global community today. The World Health Organization (WHO) has identified depression as a leading cause of disability-adjusted life years (DALYs) lost worldwide, affecting an estimated 264 million people ^[1]. This mental health disorder is characterized by persistent sadness, a lack of interest or pleasure in activities, and an array of physical symptoms that can severely impact an individual's quality of life and ability to function daily. On the other hand, obesity is a major health concern, affecting over 650 million adults globally ^[2]. Defined by an excess of body fat, obesity increases the risk of numerous physical health problems, including heart disease, diabetes, and certain cancers. The coexistence of depression and obesity presents a particularly challenging scenario. Research has shown that the presence of both conditions in an individual can lead to more severe health outcomes compared to each condition independently ^[3]. The interplay between these two conditions is complex and bidirectional. Obesity can lead to an increased risk of developing depression, while those with depression are at a higher risk of becoming obese ^[4]. This relationship can be partly explained through various biological, psychological, and social pathways. For example, obesity can lead to increased inflammation and changes in the body's metabolism, which in turn can affect brain function and lead to depression ^[5]. Additionally, the psychological stress of living with obesity, including societal stigma and discrimination, can increase the risk of depression ^[6]. Furthermore, certain lifestyle factors associated with obesity, such as a sedentary lifestyle or poor diet, can also contribute to the development of depression. Conversely, depression can lead to behaviors that increase the risk of obesity, such as decreased physical activity, poor dietary choices, and disrupted sleep patterns ^[7]. The global prevalence of both depression and obesity has been on the rise, making this an issue of increasing importance in public health ^[8].

This trend is concerning not only because of the individual burden of each condition but also due to the compounded health risks when they co-occur. Additionally, the economic impact of both depression and obesity is substantial, contributing to increased healthcare costs and lost productivity [9]. Given the complex nature of the relationship between depression and obesity, addressing this dual burden requires a multifaceted approach. Prevention and treatment strategies need to consider the interrelated nature of these conditions. For instance, interventions aimed at weight loss or improving physical health in obese individuals may also have benefits for mental health. Similarly, addressing the psychological needs of those with depression may have a positive impact on physical health and obesity prevention [10]. This introduction aims to set the stage for a more detailed exploration of the intricate relationship between depression and obesity, the mechanisms underlying their connection, and the implications for treatment and public health policy. Understanding the link between these two conditions is crucial for developing effective interventions and supporting the millions of individuals worldwide affected by either or both of these debilitating conditions [11]. The aim of study is to examine the relationship between obesity and depression in the adult population.

Method

This cross-sectional study was carried in Wasit governorate, Participants were male and female aged between 18-70 years living in Wasit governorate. The information was collected through an online questionnaire after obtaining informed consent. This study was conducted during the period from April 2023 to November 2023. The calculated sample size was 350 participants. Inclusion criteria were age between 18-70 years, and lived in Iraq/Wasit governorate. Data was collected through an electronic survey. Demographic data included: Age (years), Gender, Marital status, have children, Education level, Occupation, Monthly income, crowding illness, Chronic diseases, Chronic drugs

used, Chronic psychiatric disease. An Arabic version of Patient Health Questionnaire 9 (PHQ-9) was used. It consist of 9 questions (no to mild depression) 1-9, while (moderate to severe depression) 10-27 [12]. It is a valid and reliable assessment tool for depression in both clinical and research settings *.The participants were asked to mention their height in centimeters and weight in kilograms and using this information, the BMI of participants was calculated automatically via a programmed formula within the online questioner, leading to accurate results. The sample population was categorized according to the body mass index (BMI) underweight (less than 18.5), normal (18.5 to 24.9) overweight (25 to 29.9) and Obese (30 and more) [13]. Crowding index was measured in persons/room as representative for socioeconomic status (SES). The higher the crowding index (>2) the lower SES. SPSS 22 was utilized to perform the statistical analysis on the frequency and percentage of categorical data. When assessing the association between variables using the chi-square test, a P-value of 0.05 or less is deemed to indicate significance.

Results

The current study was performed on 324 patients; (59.3) of them were female, their age range was (18_70) years with mean age (34.3±11) years. The majority of the sample in age group 26-45 years old (62%). Most of patients are married (64.5%). More than half of them have children (61.4). Patients who have college and higher education constitute major proportion (84.3). Most of the patients are employer (58.3%). Patients who have good monthly income constitute 46.6 of the sample, just (22.5%, 29%, 4.9%) of patients have Chronic diseases, Chronic drugs used, Chronic psychiatric disease respectively. More than one third of patients are overweight (38.3) and about (28.3%) of them are obese. (78.4%) of patients are owner occupied. Patients living with crowding index 2 or less constitute 69.4% of the sample. As shown in table (1).

Table 1: Distribution of patients according to the study variables.

Variables		Frequency	Percentage
Age (years)	18 to 25	77	23.8
	26 to 45	201	62.0
	>45	46	14.2
Gender	Male	132	40.7
	Female	192	59.3
Marital state	Single	107	33.0
	Married	209	64.5
	Other (divorce & widow)	8	2.5
Have children	Yes	199	61.4
	No	125	38.6
Education level	Secondary and below	51	15.7
	college or higher	273	84.3
Occupation	Student	35	10.8
	Employer	189	58.3
	Un employer	100	30.9
Monthly income	Low	19	5.9
	Moderate	141	43.5
	Good	151	46.6
	Excellent	13	4.0
Chronic diseases	Yes	73	22.5
	No	251	77.5
Chronic drugs used	Yes	94	29.0
	No	230	71.0
Chronic psychiatric disease	Yes	16	4.9

	No	308	95.1
BMI	under wt (less than 18.5)	6	1.9
	normal wt (18.5 to 24.9)	102	31.5
	over wt (25 to 29.9)	124	38.3
	Obese (30 and more)	92	28.3
Crowding index	≤2	225	69.4
	>2	99	30.6

Out of the total, 166 (51.23%) of patients have normal or mild depression while 158 (48.77%) had moderate to severe

depression according to PHQ-9 screen as shown in figure (1);

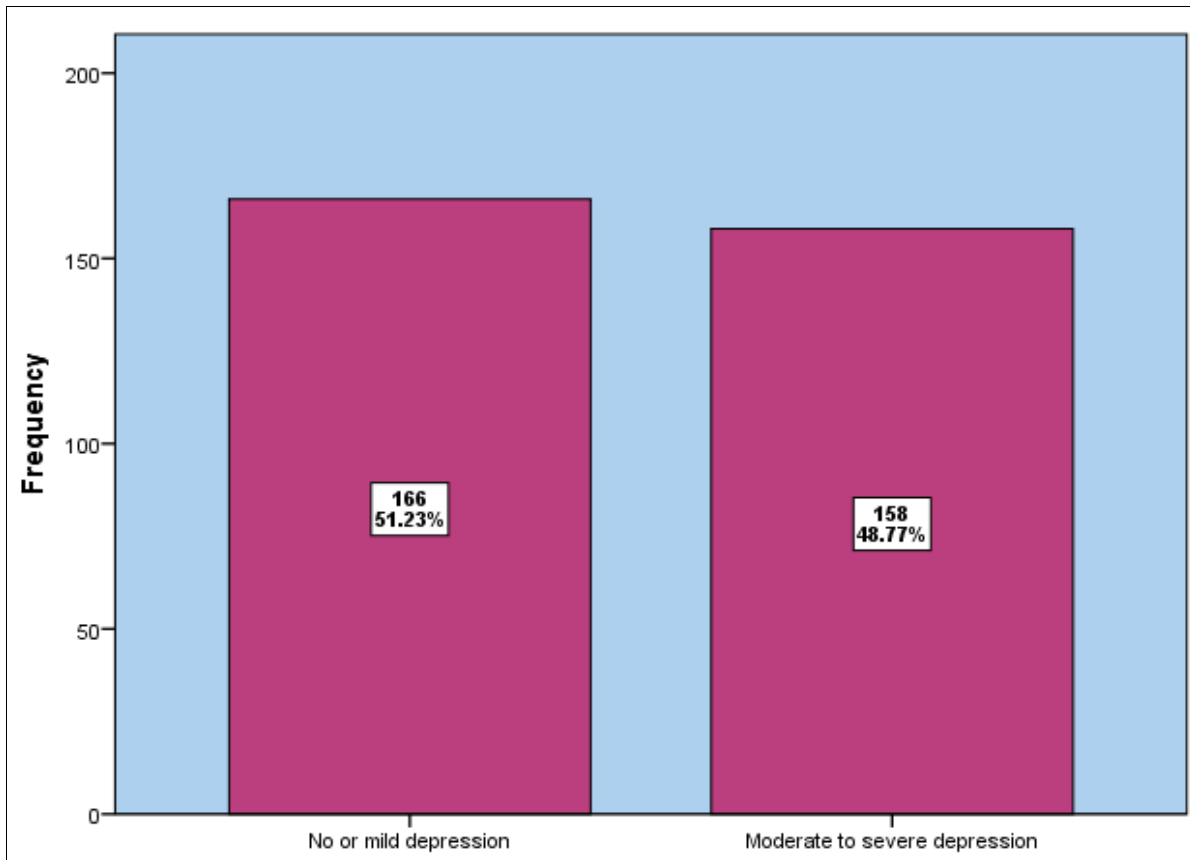


Fig 1: Distribution of patients according to PHQ-9.

Gender, Chronic Psychiatric Illness were significantly associated with depression according to PHQ-9 where (P-value =0.0001) (P-value=0.04) respectively. Interestingly, no significant association was observed among depression according to PHQ-9 screen and obesity (P-value 0.28), although more than half of the obese patients had moderate-

severe depression. No significant difference was observed between depressed patients regarding their age groups, have children, Marital Status, Education, Occupation, Monthly Income, Chronic Illness, Chronic drug Used, CI. As shown in table 2;

Table 2: Association between PHQ-9 and study variables.

Variables	PHQ				P-value	
	No-mild	%	Moderate-severe depression	%		
Age group (years)	18 to 25	37	22.3%	40	25.3%	0.5
	26 to 45	102	61.4%	99	62.7%	
	>45	27	16.3%	19	12%	
Gender	Male	83	50%	49	31%	0.0001
	Female	83	50%	109	69%	
Have Children	Yes	108	65.1%	91	57.6%	0.17
	No	58	34.9%	67	42.4%	
Marital State	Single	49	29.5%	58	36.7%	0.4
	Married	112	67.5%	97	61.4%	
	Other (divorce & widow)	5	3%	3	1.9%	
Education	Secondary and below college or higher	23	13.9%	28	17.7%	0.3
		143	86.1%	130	82.3%	

Occupation	Student	15	9%	20	12.7%	0.4
	Employer	102	61.4%	87	55.1%	
	Un employer	49	29.5%	51	32.3%	
Monthly Income	Low	10	6%	9	5.7%	0.6
	Moderate	70	42.2%	71	44.9%	
	good	77	46.4%	74	46.8%	
	Excellent	9	5.4%	4	2.5%	
Chronic illness	Yes	34	20.5%	39	24.7%	0.4
	No	132	79.5%	119	75.3%	
Chronic drug Used	Yes	48	28.9%	46	29.1%	1.000
	No	118	71.1%	112	70.9%	
Chronic psychiatric illness	Yes	4	2.4%	12	7.6%	0.04
	No	162	97.6%	146	92.4%	
BMI	Underweight	1	0.6%	5	3.2%	0.28
	Normal	55	33.1%	47	29.7%	
	Overweight	66	39.8%	58	36.7%	
	Obese	44	26.5%	48	30.4%	
CI	≤2	116	69.9%	109	69%	0.9
	>2	50	30.1%	49	31%	

P-value ≤0.05 (significant).

Discussion

As previously stated, one potential pathophysiological mechanism underlying these comorbidities is that obesity induces proinflammatory cytokines through alterations in adipose tissue. Cytokines of this nature elicit a systemic inflammatory reaction that may traverse various pathways to the brain, ultimately resulting in neuroinflammation that disrupts both neurotransmitter activity and brain functionality [12]. The predominant gender among study participants was female, constituting 59.3% of the total. This skew might be attributed to gender differences in internet usage. Generally, women engage more in social interactions online than men. They also tend to participate more in activities involving communication and the exchange of information, which could explain the higher response rate among females in online surveys [14]. Another research found significant links between depression and gender (69% of severe cases were female), chronic psychiatric illness. Other factors, including BMI, age, marital status, education, occupation, income, chronic illness, medication use, and crowding index, showed no significant association with depression [15]. Additionally, over 90% of the respondents were under the age of 45. This trend aligns with the demographic composition of Saudi Arabia, where about 72% of the population falls within the 15 to 64 age bracket [16]. Our study revealed a substantial prevalence of overweight and obesity among participants. Specifically, one-third were overweight, and over a quarter were classified as obese, aligning with findings from other research. For instance, a study by Alshahrani *et al.* in Abha, Saudi Arabia, found that among secondary school males, 44.2% were overweight and 38.4% obese [17]. In contrast, another Saudi study reported lower rates in male students, with 21.8% being overweight and 15.7% obese [18]. In the United States, Simon *et al.* noted an obesity prevalence of 33.4% among middle-aged women (40-65 years), with 17.7% having a BMI between 30 and 35 and 15.7% exceeding a BMI of 35 [19]. Regarding mental health, our findings from the PHQ-9 screenings indicated that over a third of participants experienced moderate to severe depression (48.77%), a higher rate than reported in recent Saudi primary healthcare research. In that study, 49.9% of

patients showed depressive symptoms, with mild symptoms in 31%, moderate in 13.4%, and severe in 4.4% [20]. Our study, along with several meta-analyses, examined the depression-obesity relationship using the WHO obesity definition based on BMI calculations. A key discovery in our research was that the highest depression rates were observed among underweight and obese individuals, at (83.3%) and (52.1%), respectively. This U-shaped correlation echoes a study from the United Kingdom in 2013 [21], highlighting the increased risk of depression in underweight individuals. Investigations into the obesity-depression link are critical due to their substantial global health implications. Our research found that (47.8) of obese participants had mild or no depression, while (52.1%) experienced moderate to severe symptoms. This is comparable to findings from a recent Indian study, which emphasized the need for lifestyle modifications and mental health programs for mildly depressed obese individuals [22]. For those with a moderate to severe risk, psychological counseling was recommended. Although nearly half of the obese participants were depressed, it was not significant finding ($p = 0.28$), and this may be attributed to various socioeconomic and cultural factors. Iraqi society faced and still facing difficult situations such as poverty, conflicts, bad infrastructure, and lack of simple services. Such hard environment turned people interest and concerns in a manner that made them less likely to care about their health in general and their ideal body weight in specific, in vice versa they may enjoy themselves through eating, a reality that was behind the widespread of restaurants which had become a place where families used to go for enjoyment. Also it could be due to low proportion of obese patients in a study sample (28%). In the United States, obesity was linked to higher lifetime diagnoses of major bipolar disorder and panic disorder or agoraphobia, with those having a BMI of 30 or more showing higher prevalence of mood disorders [23]. Canadian research also found a positive association between obesity and various mental health issues, though this was more pronounced in women [24].

Conclusion

Our study highlights several key findings about depression

and its associations in a diverse patient population. Notably, a significant association was found between moderate to severe depression and gender, chronic psychiatric illness. Specifically, 69% of patients with more severe depression were female, and a notable 70.9% of those with more severe symptoms were homeowners. Interestingly, no significant link was observed between depression and obesity and other factors such as age, marital status, education level, occupation, income, chronic illness, chronic medication use, or crowding index. These insights underscore the complexity of depression's and obesity's etiology and the need for tailored approaches in health care setting to improve prevention and intervention efforts.

Conflict of Interest

Not available

Financial Support

Not available

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