

Original Research Article

Obesity and depression, an analytical study among adults attending primary care clinics in Bahrain

Afaf A. M. Ali^{1*}, Naseem F. Alalwan², Mona A. M. Ali², Adel S. Alsayyad³

¹Department of Community Medicine, Royal College of Surgeons in Ireland-Medical University of Bahrain, Busaiteen, Bahrain

²Department of Primary health care, Ministry of Health, Bahrain

³Department of Public health and Epidemiology, Ministry of Health, Arabian Gulf University, Bahrain

Received: 06 September 2020

Revised: 30 October 2020

Accepted: 03 November 2020

*Correspondence:

Dr. Afaf A. Monem Ali,

E-mail: AAli51@health.gov.bh

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Both depression and obesity are widely spread problems with major public health implications. Obesity is a major risk factor for several chronic diseases. However, its consequences on mental health is less certain. This study explore the association between obesity and depression among adults in Bahrain.

Methods: A cross sectional study was conducted among adults ≥ 18 years attending general practice in four primary care health centers that have been selected randomly from the four governorate in Bahrain. Self-filled questionnaire that includes demographic information, depression scale and other behavioral and clinical factors were used as the study tool. Weight and height were measured for each participant and BMI was used to assess obesity. Depression was assessed using beck depression inventory scale, with a score of more than 16 to indicate clinical depression.

Results: The prevalence of depression is 16% while the prevalence of obesity is 42% among adults in the study. The prevalence of depression among underweight, normal weight, overweight and obese adults are almost the same (around 16%). Analysis using Chi Square test and regression analysis test showed no significant association between obesity and depression.

Conclusions: The present study did not confirm any relationship between obesity and depression among adults attending primary care clinics in Bahrain.

Keywords: Adults, Bahrain, Depression, Obesity, Primary care

INTRODUCTION

Both depression and obesity are widely spread problems with major public health implications.^{1,2} Obesity is a major risk factor for a number of chronic diseases.³ However, its consequences on mental health is less certain. A crude population measure of obesity is the body mass index (BMI).³

The BMI is defined as a person's weight in kilograms divided by the square of the persons' height in meters

(kg/m²). Obesity is defined as BMI > 30 kg/m.⁴ According to the survey done by ministry of Health in Bahrain in 2007, the prevalence of obesity in Bahraini adults was 36.3% and was higher in females than males (40.3% and 32.3%) respectively.⁵ This explain why Bahrain is considered the third country with highest rates of overweight and obesity in WHO Eastern Mediterranean Region with 33% of adults aged more than 20 to be overweight of whom 36% are obese. This is higher than the global average of obesity in 2008 reaching 12%.⁶ Depression is the leading cause of disability worldwide.⁷

Chronic medical problems increase the prevalence of depression.⁸

In Bahrain, the prevalence of depression in people with many chronic diseases was studied. A study done in 2009 showed the prevalence of depression among diabetes patients attending diabetic clinics at primary care was 33.3%.⁹ another study conducted in 2011 revealed that the prevalence of mild to severe depression among sickle cell disease patients was 58.5%.¹⁰

Worldwide, many studies tried to relate the association between obesity and depression, in which some approve, and others reject the association. In China, being overweight and having abdominal obesity by wide waist circumference is linked with a high risk of depression.¹¹ However, a study conducted in Yazd health centers in Iran in 2013 did not confirm any relationship between weight and depression.¹² The association was studied in Australian General practice in 2014, but surprisingly weight and depression demonstrated a U shaped relationship with high prevalence of depression among underweight and obese patients.¹³

This is the first study to estimate the prevalence of depression in obese adults and address any association between obesity and depression in Bahrain.

METHODS

The study period was from February 2019 to January 2020. Sample size was calculated based on the expected prevalence of depression in obese patients in Bahrain that is 30% and the expected prevalence of depression in non-obese is 20%, using the power of 80% and significant level of 0.05 the sample size will be 586 (around 550-600).

A cross sectional study was conducted in four primary health care centers. One health center was selected randomly from each of the four governorates in the kingdom of Bahrain. Halat Bu Maher health Centre from Muharraq governorate, Naim Health Centre from the Capital governorate, Jidhafs Health Centre from the Northern governorate and Engineer health Centre from the Southern governorate. The aim was to get around 150 participant from each health center.

Adults aged ≥ 18 years presenting for general practice care at the above-mentioned health centers were approached. Verbal and written consent was taken from those who agreed to participate in the study. Non-Arabic-English readers and pregnant ladies were excluded.

Arabic and English versions of self-filled questionnaires were distributed to Arabic and English readers, respectively, who agreed to participate in the study. The questionnaire consists of three main sections: demographic data, clinical and behavioral characteristics and the Beck Depression Inventory Scale. Demographic

characteristics include: age, gender, marital status, educational level, financial level and employment. Clinical and behavioral characteristics include smoking status, alcohol, and history of chronic illness, history of psychiatric illness, use of medications and family history of depression.

Beck depression Scale (BDI-2) consists of 21 questions, each with four options with a score from 0 to 3. The sum of the answers gives a final score ranging from 0-63. Score of 16 was considered a cutoff point of depression as the same score was recommended to screen for depression in diabetes and in Parkinson disease, and post Myocardial infarction.^{9,14-17}

After receiving the questionnaire from the candidate, the height and weight were checked by the physician or the nurse. Weight was measured in Kilograms and height in Centimeters while wearing light clothes and no shoes using health center instrument. Body Mass Index (BMI) was calculated using weight/height/height formula and recorded in the questionnaire. A total sample of 550 were enrolled, 57 has been excluded from the study as the questionnaire were incompletely filled.

Data were analyzed using the SPSS program. Chi- Square test and logistic regression analysis were used to identify the significance of the association between depression and other factors including obesity. P-value was considered significant if ≤ 0.05 .

RESULTS

In this study 493 patients were evaluated. The ages of patients range from 18-91 years and 54% are within the age range of 18-35. Female constitute 61% of the sample. The majority were Bahraini (86.3%). Almost three quarter of the sample were married (75.5%), the other quarter were either single, divorced or widowed. Employees are around 57% and university graduates are 56% (Table 1).

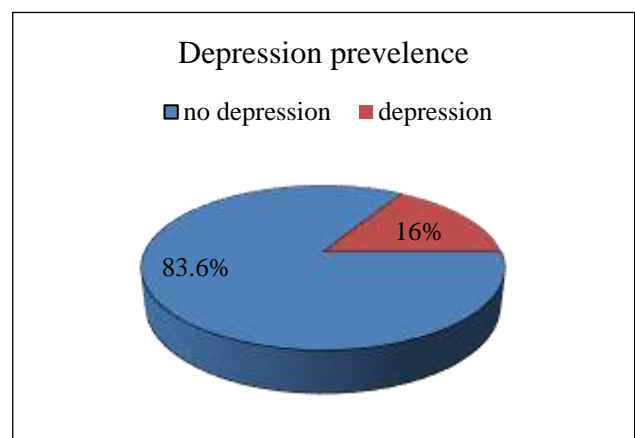


Figure 1: Depression among adults attending Primary Health Care in Bahrain using Beck Scale depression scale.

Table 1: Demographic characteristics of adults attending primary health care in Bahrain.

Characteristics	Number (n)	Percentage (%)	
Age	18-35 years	247	54
	36-50 years	167	34.80
	>50 years	67	11.20
Gender	Male	192	38.60
	Female	304	61
Nationality	Bahraini	430	86.30
	Non-Bahraini	67	13.50
Marital status	Married	376	75.50
	Not married	116	23.30
Occupation	Working	285	75.20
	Not working	207	41.60
Education	Secondary certificate or less	212	42.60
	University graduate or higher	281	56.40
Financial status	400 BD or less	124	24.90
	401-999 BD	180	36.10
	1000 BD or more	78	15.70

Table 2: Clinical and behavioral characteristics of adults attending primary health care in Bahrain.

Characteristics	Number (n)	Percentage (%)	
Smoking status	Yes	76	15.30
	No	422	84.70
Alcohol	Yes	4	0.80
	No	494	99.20
History of Chronic disease	Yes	146	29.30
	No	352	70.70
Medication	Yes	129	25.90
	No	369	74.10
History of psychiatric illness	Yes	62	12.40
	No	435	87.30
Family history of depression	yes	35	7
	No	460	92.40

The behavioral and medical characteristics of participants are shown in (Table 2). Smokers accounts for only 15% of the participants. The majority (99%) claims that they don't drink alcohol. While 29% of the sample had history of chronic disease, only 25% are on regular medication. When asking patients if they have ever been told by their physician to have a psychiatric disease including anxiety,

depression, OCD or schizophrenia, only 12% answered yes.

In this study sample, the prevalence of obesity is 42%, while over weight is 26.9%. On the other hand, the prevalence of people with normal BMI is 27.5% and underweight is 3.4% (Table 3). Among the 493 adults who answered the Beck Scale Questionnaire, 81 (16%) only scored more than 16 which is the cutoff point for clinical depression. beck scale mean was 8.6 (Figure 1).

Table 3: Body mass index characteristics of adults attending primary health care in Bahrain.

BMI	Number (n)	Frequency (%)
Underweight (<18.5)	17	3.4
Normal (18.5-24.9)	136	27.5
Overweight (25-29.9)	133	26.9
Obese (≥30)	209	42.2

On assessing the relationship between depression and demographic characteristics, we found that married people and those who have a job are less likely to have depression which was significant statistically, whereas all other parameters have not. (p-value.0.009, 0.003 respectively) (Table 4).

Likewise, among clinical and behavioral characteristics, only family history of depression (p-value.0.043) and history of psychiatric illness (p-value.0.000) were strongly associated with depression (Table 5).

The prevalence of depression among underweight, normal weight, overweight and obese adults are almost the same (around 16%) with a p-value of 0.95. although the percentage of depressed people are little higher in obese compared to normal adults (17.4% to 16.5%) this difference is not statistically significant (Table 6).

Crude and adjusted odd ratio were calculated for the association between depression and other factors. We found that marital status and positive history of psychiatric illness had a statistically significant association with depression both in univariate and multivariate analysis, while positive history of chronic disease is significant if the odd ratio is adjusted only. Moreover, the adjusted odd ratio for BMI is 0.86 CI (0.43-1.76) that confirms no significant association between obesity and depression (Table 7).

In summary, using both Chi Square test and regression analysis test, no significant association between obesity and depression was documented.

Table 4: Demographic data association with depression among adults attending primary health care in Bahrain.

Demographic data	Characteristics	No depression N (%)	Depression N (%)	P value*
Gender	Male	164 (86.3)	26 (13.7)	0.182
	female	246 (81.7)	55 (18.3)	
Nationality	Bahraini	356 (83.6)	70 (16.4)	0.793
	Non-Bahraini	56 (84.8)	10 (15.2)	
Marital status	Married	320 (75.8)	53 (14.2)	0.009
	Not married	86 (75.4)	28 (24.6)	
Occupation	Working	248 (87.6)	35 (12.4)	0.004
	Not working	159 (77.9)	45 (22.1)	
Education	Secondary or less	169 (80.1)	42 (19.9)	0.087
	University and higher education	238 (85.9)	39 (14.1)	
Financial status	400 BD or less	100 (82.6)	21 (17.4)	0.143
	401-999 BD	151 (84.4)	28 (15.6)	
	1000 BD or more	72 (92.3)	6 (7.7)	

* P value of Chi-Square test

Table 5: Clinical and behavioral characteristics association with depression among adults attending primary health care in Bahrain.

Characteristics		No depression N (%)	Depression N (%)	P value*
Smoking	Yes	60 (78.9)	16 (21.1)	0.237
	No	352 (84.4)	65 (15.6)	
Alcohol	Yes	3 (75)	1 (25)	0.642
	No	409 (83.6)	80 (16.4)	
Chronic disease	Yes	121 (82.9)	25 (17.1)	0.788
	No	291 (83.9)	56 (16.1)	
Disability	Yes	2 (33.3)	4(66.7)	0.261
	No	79 (16.2)	408 (83.8)	
Medication	Yes	104 (80.6)	25 (19.4)	0.293
	No	308 (84.6)	56 (15.4)	
Family history of depression	Yes	25 (71.4)	10 (28.6)	0.041
	No	385 (84.6)	70 (15.4)	
History of psychiatric illness	Yes	39 (62.9)	23(37.1)	0.000
	No	373(86.7)	57(13.3)	

Table 6: BMI and depression among Adults attending primary health care in Bahrain.

BMI	Depression N (%)	No depression N (%)	P value*
Underweight (<18.5)	15 (83.30)	3 (16.70)	0.955
Normal (18.5-24.9)	111 (83.50)	22 (16.50)	
Overweight (25-29.9)	113 (85)	20 (15)	
Obese (\geq 30)	171 (82.60)	36 (17.40)	

P value of chi-square test.

Table 7: Multivariate analysis.

Demographic data	Crude OR	Adjusted OR
	(95% CI)	(95% CI)
Gender (female vs. male)	1.41 (0.85-2.34)	1.78 (0.82-3.87)
Nationality (non-Bahraini vs. Bahraini)	0.90 (0.44-1.86)	0.95 (0.35-2.54)
Marital status (married versus no spouse)	0.50 (0.30-0.85)	0.42 (0.21-0.86)
Occupation (working vs. not working)	0.49 (0.30-0.81)	0.56 (0.27-1.18)
Education (university certificate or more vs. secondary certificate or less)	0.65 (0.40-1.06)	1.41 (0.62-3.20)
Financial status	0.68 (0.45-1.04)	0.74 (0.44-1.23)
Smoking (smoking vs. not smoking)	1.44 (0.78-2.66)	2.11 (0.90-4.94)
Alcohol (alcoholic vs. nonalcoholic)	1.70 (0.17-16.59)	0.98 (0.06-13.96)
Chronic disease (positive history of chronic disease vs. no history of chronic disease)	1.07 (0.64-1.80)	0.30 (0.09-0.99)
medication (history of medication use vs. no medication use)	1.32 (0.78-2.22)	2.78 (0.93-8.30)
History of psychiatric illness (history of psychiatric illness vs. no psychiatric illness)	3.85 (2.14-6.93)	3.56 (1.50-8.48)
Family history of depression (family history of depression vs. no family history of depression)	2.20 (1.01-4.78)	1.62 (0.47-5.52)
BMI (score of 25 and more vs. score of less than 25)	0.98 (0.58-1.64)	0.87 (0.43-1.76)

DISCUSSION

This study is the first study in the Gulf region to assess the association between two common conditions in primary care, obesity and depression.

The study results show that more than two-third of adults are either obese or overweight. The exact prevalence of obesity is 42.2%, overweight 26.9%, normal BMI 27.5% and underweight is 3.4%. The prevalence of depression is 16%. The prevalence of depression among underweight, normal weight, overweight and obese adults are almost the same around 16% (p-value.0.95).

The study results indicated that obesity is not related to depression. This is similar to a survey conducted by Askari et al. in adults attending health centers in Iran, in which depression rate among obese and normal weight individuals showed no significant differences.¹² It might be due to the similarity of the population characteristics between the two populations.

Our results differ from others which suggest a significant relationship between obesity and depression. This difference is mainly due to the complexity of cofactors affecting both depression and obesity as well as the cultural, social and genetic variability in different

population. Most of these surveys confirm the relationship among certain group characteristics. In instance, many of studies suggest an association between obesity and depression among women rather than men.¹⁸⁻²⁰

One descriptive analytical study in Ahvaz city confirms the relationship among female adolescents.²¹ Therefore, including the age group of less than 18 years in our study may change our findings. Furthermore, an association was identified in women with class 3 obesity and large waist circumference.¹⁹ That's why we think that if assessing abdominal obesity was used in our study by measuring waist circumference and/or waist hip ratio, an association might be documented. We found studies that suggest a strong association between obesity and depression only among those with higher socioeconomic status.^{20,22}

In this study, an association was significant between depression and marital status, unemployment, presence of other psychiatric illness and family history of depression. The same result was found in a study in United State in 2004 in which greater odds of depression were found in unmarried and those with positive family history of depression.²³ However, in a study conducted in Kazakhstan, they found a relationship between depressive

symptoms and history of chronic diseases but not with marital status or employment.²⁴ A health survey in Canada revealed that lower education and lower income were significantly related to increase risk of depression which was not positive in our study.²⁵

There are some limitations of the current study. First, the diagnosis of clinical depression is not objective, it relies on the patients themselves on determining the presence of depression through answering the Beck Scale personally. Second, categorizing depression into mild-moderate and severe was not done, this might have an association with degrees of obesity (class 1, class 2 and class 3) as seen in other studies.

Because the study is cross sectional, no causation can be tested. Hence, a longitudinal observational study might be needed to assess such relationship between obesity and depression. Putting in mind to assess obesity using scales other than BMI like waist circumference.

CONCLUSION

Awareness of the above results by all family physicians working at primary health care in Bahrain, leads to better screening for depression among all adults attending primary care clinics regardless of their weight (body mass index) in order not to miss depression among normal and underweight adults.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

- Mathers CD, Loncar D. Projections of global mortality and burden of disease from 2002 to 2030. *PLoS Med.* 2006;3(11):442.
- Murray CJ, Lopez AD. Alternative projections of mortality and disability by cause 1999-2020; global burden of disease study. *Lancet.* 1997;349(9064):1498-504.
- World Health Organization. Obesity. Available at <https://www.who.int/topics/obesity/en/>. Accessed 30 November 2019.
- World Health Organization. BMI classification. Europe. Available at www.euro.who.int/en/health-topics/disease-prevention/nutrition/a-healthy-lifestyle/body-mass-index-bmi. Accessed 30 November 2019.
- Alsayyad J, Omran A. National non-communicable diseases risk factor survey 2007 Kingdom of Bahrain. Ministry of Health. 2010:41.
- World Health Organization. Nutrition clinics help tackle obesity in Bahrain. 2014. Available at <https://www.who.int/features/2014/bahrain-tackle-obesity/en/>. Accessed on 2 December 2019.
- World Health Organization. Depression 2017 available at https://www.who.int/mental_health/management/depression/en/. Accessed 2 December 2019.
- Leon A, Olfson M, Broadhead W, Barrett JE, Blacklow RS, Keller MB, et al. Prevalence of mental disorders in primary care: implications for screening. *Arch Fam Med.* 1995;4(10):857-61.
- Nasser J, Habib F, Hasan M, Khalil N. Prevalence of depression among people with diabetes attending diabetes clinics at primary health settings. *Bahrain Medical Bulletin.* 2009;31:3.
- Hajeri A, Saleh L, Ali M, Alkowiari S, Langawi J. Prevalence of depression among patients with sickle cell disease in Bahrain. *J Bahrain Med Soc.* 2017;29(3):41-7.
- Cui J, Sun X, Li X, Ke M, Sun J, Yasmeeen N, et al. Association between different indicators of obesity and depression in adults in Qingdao, China: a cross sectional study. *Front Endocrinol.* 2018;9:549.
- Askaria J, Hassanbeigi A, Khosravi H, Malek M, Hassanbeigi D, Pourmovahed Z, et al. The relationship between obesity and depression. *Elsevier.* 2013;84:796-800.
- Carey M, Small H, Yoong S, Boyes A, Bisquera A, Fisher R. Prevalence of comorbid depression and obesity in general practice: a cross sectional study. *Br J Gen Pract.* 2014;64(620):122-7.
- Lustman PJ, Clouse RE, Griffith LS, Carney RM, Freedland KE. Screening for depression in Diabetes using the Beck Depression Inventory. *Psychosomatic Med.* 1997;59:24-31.
- Tilburg M, Georgiades A, Surwit R. Depression in type 2 Diabetes. In: Feinglos MN, Bethel MA. (Eds), *type 2 Diabetes Mellitus: an Evidence-Based approach to Practical Management*, Humana Press, USA, 2008:403-412.
- Leentjens AFG, Verhey FRJ, Luijckx GJ, Troost J. The validity of the Beck Depression Inventory as a screening and diagnostic instrument for depression in patients with Parkinsons disease. *Movement Disorder.* 2000;15(6):1221-4.
- Huffman JC, Doughty CT, Januzzi JL, Pirl WF, Smith FA, Fricchione GL. Screening for major depression in post myocardial infarction patients: operating characteristics of the Beck Depression Inventory -2. *Int J Psychiatry Med.* 2010;40:187-97.
- Wit D, Luppino L, Straten A, Penninx B, Zitman F, Cuijpers P. Depression and obesity: a meta-analysis of community based studies. *Psychiatry Res.* 2010;178:230-5.
- Keddie AM. Association between severe obesity and depression: results from the National Health and Nutrition Examination Survey, 2005-2006. *Preventing Chronic Dis.* 2011;8(3):57.
- Scott KM, Bruffaerst R, Simon GE, Alonso J, Angermeyer M, Girolamo G, et al. Obesity and mental disorders in general population: results from the world mental health surveys. *Int J Obesity.* 2008;32:192-200.

21. Tashakori A, Riahi F, Mohammadpour A. The relationship between body mass index and depression among high school girls in ahvaz. *Adv Med*. 2016;2016:3645493.
22. Simon GE, Korff M, Saunders K, Miglioretti DL, Crane PK, Belle G, et al. Association between obesity and psychiatric disorders in the US adult population. *Arch General Psychiatry*. 2006;63(7):824-30.
23. Dong C, Sanchez L, Price R. Relationship of obesity to depression: a family-based study. *Int J Obesity*. 2004;28:790-5.
24. Turgunova L, Laryushina Y, Turmukhambetova A, Koichubekov B, Sorokina M, Korshukov I. The incidence of depression among the population of central Kazakhstan and its relationship with sociodemographic characteristics. *Behavioural Neurol*. 2017;1:7-9.
25. Johnston E, Johnson S, McLeod P, Johnston M. Relationship with sociodemographic characteristics with obesity. *Canadian J Public Health* 2004;95:179-83.

Cite this article as: Ali AAM, Alalwan NF, Ali MAM, Alsayyad AS. Obesity and depression, an analytical study among adults attending primary care clinics in Bahrain. *Int J Community Med Public Health* 2020;7:4713-9.