

Weight-based Victimization and its Relation to Depression among a group of Adult Obese Egyptian Females

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Abstract

Background: During the last decades, the prevalence of weight stigmatization has substantially increased which in turn is associated with poorer outcomes as depression.

Aim: The aim of this study was to evaluate the sociodemographic and anthropometric factors affecting weight-based victimization among adult obese Egyptian Females and identifying the underlying relation between obesity, weight-based victimization and depression.

Cases and methods: an online cross-sectional study was conducted by random sampling technique, upon 462 obese adult females in the period from March 2022 to June 2022. Females were drawn through posts on social network (Facebook®), Both Weight self-stigma questionnaire (WSSQ) and Depression scale which is part of Depression Anxiety Scale (DAS) were administered online through Google forms after signing an electronic consent form to participate and share data.

Results: The multiple logistic regression analysis of different risk factors affecting WSSQ was young age group, student group, parents not being overweight, single group and high education. It was found that there was a significant relation between depression scale and WSSQ scale.

Conclusion: Research concluded that there was strong empirical evidence that experiencing weight stigma was associated with greater psychosocial impairment and increased risk of depression with increasing body mass index (BMI, Kg/m²).

Keywords: Weight stigma, depression, Egyptian females, obesity

Introduction

Overweight children endure significant stigmatization and victimization from their peers (**Richet et al. 2008**). Weight-based victimization begins in childhood with negative preconceptions about overweight friends (**Haines et al. 2008**). Teasing and bullying are more common among overweight and obese teenagers than among their average-weight classmates (**Janssen et al. 2004**). High Body Mass Index (BMI) increases the chance of verbal, relational, and physical peer victimization among adolescents. Longitudinal research shows that weight category strongly predicts future victimization, making obese adolescents especially prone to stigmatization (**Griffiths et al. 2006**).

Many teenagers, particularly obese ones, who account for 20% of the US adolescent population, have been victimized because of their weight (**Puhl et al. 2013**). Girls, as well as adolescents who are overweight or obese relative to peers with a lower body weight, report more weight-based victimization than boys (**Puhl et al. 2017**).

Weight-based victimization is not a one-time occurrence, many adolescents say that their experiences have lasted a year or longer. Friends, family members, and peers are some of the most common sources of weight-based maltreatment among teenagers, leaving them vulnerable (**Puhl et al. 2011**). Internalized weight stigma (IWS), described as "the degree to which an obese individual adopts weight-based negative stereotypes and assigns them to themselves," has recently been highlighted. As a result, the Weight Self-Stigma Questionnaire was created (WSSQ) (**Ratcliffe and Ellison, 2015**). The psychometric features of the WSSQ were investigated in a sample of 169 overweight and obese individuals from the United States. A two-factor model encompassing self-devaluation (self-depreciation and weight-related shame) and fear of enacted stigma emerged from a principal component analysis using varimax rotation (fear of enacted stigma and weight discrimination) (**Lillis et al. 2010**). Depression, like obesity, is a widespread psychological condition that contributes to morbidity and mortality. There hasn't been much research done on the link between weight and mental illnesses like depression and anxiety. Depression can have a negative impact on one's quality of life and ability to work (**Chapman et al. 2005**).

Brain metabolism is involved in the pathophysiology of both depression and obesity. where the brain chemicals that affect mood and weight gain frequently intersect. Cortisol, the so-called stress hormone, and leptin, which controls the storage of body fat, are among the hormones that may affect weight metabolism and depression. "There is proof that high-fat diets and obesity are linked to inflammatory pathways that are important for depression. Brain areas that control mood and appetite coexist in the human body. The gut bacteria, or microbiome, which is also implicated in controlling weight and mood, is still another theory. There are a number of hypotheses as to why adult obesity could result in depression. The growing physical issues and mobility limitations brought on by obesity may have a direct effect on psychological health. (**Pearl et al. 2019 ; Milano et al. 2020**)

Previous research has found a link between obesity and depression, but the results were conflicting (**Rohde et al. 2008 ; Simon et al. 2008**). Some studies have indicated a negative link between obesity and depression (**Faith et al. 2011**), while others have identified a U-shaped link, meaning that persons who are underweight or overweight are more likely to experience depression and anxiety than people who are of normal weight (**Carpenter et al. 2000 ; Milaneschi et al. 2012**). Despite this data, several studies have yet to discover a link between obesity and depression or anxiety. Furthermore, some researchers have discovered a substantial link only in men (**Lee and Pausé, 2016**), while others have discovered a significant link only in women (**Carpenter et al. 2000**). Treatment and management of obesity and depression is costly; therefore, additional research is needed to better understand the relationship between obesity and psychological disorders for better management of both (**Faith et al. 2011**).

Aim of the work

The aim of this study was to evaluate the sociodemographic and anthropometric factors affecting weight-based victimization among adult obese Egyptian Females and identifying the underlying relation between obesity, weight-based victimization and depression.

Cases and methods

Study Design:

An online cross-sectional study, females were drawn through posts on social network (Facebook®), during the period from March 2022 to June 2022. Both Weight self-stigma questionnaire (WSSQ)(*Lillis et al. 2010*) and Depression scale which is part of short version of depression, anxiety and stress scale (DASS)(*Milaneschi et al. 2012*) were administered online through Google Forms after assigning an electronic consent form to participate and share data. The inclusion criteria were those, who agreed to participate in the study and only females of overweight or obese persons. The total number of response and collected data were conducted upon 462 cases. The exclusion criteria were those who refused to participate in the study and internet non-user.

Sampling technique:

This cross-sectional study was conducted upon 462 females who were randomly drawn through posts on social network (Facebook®). The minimum sample size was 446, the sample size was increased by 5% accounting for dropout or attrition of the sample, so the sample size was 462. The sample was calculated according to the equation:

$$\text{Sample size} = \frac{Z_{1-\alpha/2}^2 p(1-p)}{d^2}$$

Where: $Z_{1-\alpha/2}$ is the standard normal variate at 5% type 1 error ($P < 0.05$) it is 1.96. p = the expected proportion based on previous studies (88 %)(*Lee and Pausé, 2016*), d = the absolute error (0.05).

Data collection:

Data collection was carried out from March 2022 to the end of June 2022 using an online questionnaire sheet. It consisted of three parts:

1st part: Sociodemographic and anthropometric characteristics

This part was composed of questions about, age, height, and weight to calculate BMI, level of education, occupation, marital status and parent history **concerning** overweight.

BMI was used to determine general obesity, BMI above 25 kg/ m² and 30 kg/ m² were used to classify overweight and obesity, respectively. Obesity is frequently subdivided into categories: Grade I: BMI = 30 to < 35, Grade II: BMI = 35 to < 40 and Grade III: BMI = 40 or higher. Grade III obesity is sometimes categorized as “severe” obesity (CDC 2021)

2nd part:

The 12-item Arabic and Valid (WSSQ) was a Likert-type assessment of weight-related self-stigmatization (appendix1). It comprises two subscales that each assess (1) self-devaluation due to weight and (2) fear of social stigma. Ratings for analyses of the WSSQ item's primary components range from 1 (totally disagree) to 5(Completely agree). For the entire scale as well as each subscale, sum scores are computed. The self-devaluation subscale (factor 2) is made up of items 1 through 6, and the dread of enacted stigma subscale (factor 2) is made up of items 7 through 12. (Factor 1) (*Lillis et al. 2010 ; Wassif et al. 2019*).

3rd part:

Depression scale, which is part of version of depression, anxiety and stress scale (DASS) Depression scale is a subjective tool, composed of 14 items and classified on 4-point Likert scale from

0 (did not apply to me at all/ never) to 3 (applied to me very much/ always) is used. Higher scores indicate more severe emotional distress. The depression level is classified as normal (0-7), mild (8-9), moderate (10-12) and severe (13-17) (*Carpenter, et al. 2000*). The valid Arabic version of stress questionnaire was used. The content and construct validity of the questionnaire were assessed by 3 academic professors (two of public health and a psychiatric one) (*Lillis et al. 2010*).

Data management:

Data was analyzed using the Statistical Package for the Social Sciences (SPSS) version 25.0, categorical data was described in the form of number and percent while numerical data was described in the form of mean \pm SD. Appropriate statistical tests were used for comparison between study groups as Chi-square test, ANOVA test used as tests of significance. Logistic Regression analysis was used for detecting the predictors. Differences will be considered as statistically significant when the P value is ≤ 0.05 (*Armitage and Berry, 1987*).

Ethical issues:

An informed written consent was obtained from all participants after clarifying of the objectives of the study, confidentiality of data, voluntary involvement and withdrawal. This study was approved by the research ethics committee of the Faculty of Medicine, Alexandria University with serial number: 0305251

Results

Table (1):
Distribution of the studied patient's group regarding sociodemographic data.

Age group	Number "n=462"	%
< 20 yrs	44	9.5
20-30	221	47.8
30-40	162	35.1
40+	35	7.6
Age range (years)	18.00-42.00	
Mean±SD	29.4±7.4	
BMI category		
Overweight	150	32.5
Class I obese	147	31.8
Class II obese	155	33.5
Class III obese	10	2.2
Education		
Secondary school	159	34.4
University	260	56.3
Master	43	9.3
Occupation		
Student	161	34.8
No work	145	31.4
Office work	156	33.8
Marital status		
Single	236	51.1
Married	133	28.8
Divorced	93	20.1
Family history of overweight		
Yes	192	41.6
No	270	58.4

Table (1) showed that the age of the studied group ranged from 18-42 years, with mean 29.4±7.4. The majority of the studied group was in age group 20-30 years, the educational level of the major group were university graduated (56.3%). Nearly half of the studied group were single (51.1%) and (58.4%) had no family history of overweight.

**Table (2):
Descriptive statistic of different items of WSSQ.**

Items of WSSQ	Mean	Std. Deviation
Item No1	3.32	1.17
Item No 2	3.35	1.16
Item No3	3.26	1.15
Item No 4	3.26	1.14
Item No 5	3.43	1.14
Item No 6	3.39	1.13
Item No 7	3.43	1.15
Item No 8	3.40	1.16
Item No 9	3.44	1.17
Item No 10	3.40	1.14
Item No 11	3.35	1.15
Item No 12	3.45	1.11
Total score	40.47	5.11

Table (2) showed that the mean total score of WSSQ was 40.47 ± 5.11

**Table (3):
Distribution of the studied group regarding DAS score.**

Depression score	Frequency	Percent
Normal	32	6.9
Mild	81	17.5
Moderate	287	62.2
Severe	62	13.4
Total	462	100.0

According to the severity of depression, table (3) showed that 62.2% of cases suffered from moderate depression, followed by 17.5% from mild depression. Only 13.4% had severe depression.

**Table (4):
Relation between WSSQ and different sociodemographic and anthropometric data.**

	Mean total score \pm S. D of WSSQ	ANOVA test P value
Age group		
< 20 yrs.	44.11 \pm 2.82	425.53 0.001*
20-30	43.76 \pm 2.71	
30-40	37.42 \pm 2.61	
40+	29.29 \pm 1.89	
BMI category		
Overweight	40.05 \pm 5.23	1.002 0.392 N.S.
Class I obese	41.05 \pm 4.49	
Class II obese	40.36 \pm 5.44	
Class III obese	40.20 \pm 6.56	
Educational level		
Secondary school	39.83 \pm 4.84	4.734 0.029*
University	41.47 \pm 5.74	
Master	40.09 \pm 4.49	
Occupation		
Student	45.60 \pm 2.15	268.34 0.001*
No work	37.58 \pm 4.12	
Office work	37.88 \pm 3.90	
Marital status		
Single	42.36 \pm 5.34	39.014 0.001*
Married	38.86 \pm 4.10	
Divorced	38.00 \pm 3.87	
Parent history of over weight		
Yes	38.62 \pm 4.00	47.619 0.001*
No	41.79 \pm 5.41	

The group of positive family history of overweight had significantly higher WSSQ score ($P \leq 0.05$).

Table (4) showed the relation between WSSQ and the different sociodemographic data. The young age group (<20 years) had a higher significantly WSSQ score than the age group above 40 years ($p < 0.01$), while the BMI category showed insignificant effect on the mean WSSQ score ($p > 0.05$). The level of education showed a highly significant increase of WSSQ among the high educated university group. The students had significantly higher WSSQ more than those who had no work and among office work group. Also, the marital status showed a highly significant WSSQ among singles more than both married and divorced group.

**Table (5):
Relation between DAS score and total score of WSSQ.**

Total score of WSSQ	Depression score			
	Severe	Moderate	Mild	Normal
Range	28.00-51.00	24.00-50.00	29.00-49.00	27.00-54.00
Mean±SD	43.88±5.13	40.96±4.22	37.85±4.20	36.12±7.98
P value ANOVA test	29.549 0.001*			

Table (5) showed that the mean values of DAS score were significantly ($p=0.001$) lower among normal females, mild and moderate female groups than those of the severe group (36.12, 37.85, 40.96 and 43.88 respectively), in relation to the total score of WSSQ.

**Table (6):
Relation between BMI category and DAS score**

BMI category	Depression score									
	Severe		Moderate		Mild		Normal		Total	
	No	%	No	%	No	%	No	%	No	%
Overweight	10	6.7	103	68.7	25	16.6	12	8.0	147	100.0
Class I obese	13	8.8	92	62.6	34	23.2	8	5.4	155	100.0
Class II obese	35	22.6	89	57.4	21	13.5	10	6.5	10	100.0
Class III obese	4	40.0	3	30.0	1	10.0	2	20.0	462	100.0
X ²	33.254									
P	0.001*									

Table (6) showed that the depression score was highly significant among obese cases Class III (40 %) as compared to other groups.

**Table (7):
Multiple logistic regression analysis of different risk factors affecting on WSSQ.**

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	53.472	.864		61.872	.0001*
Age group	-4.359	.195	-.652	-22.370	.0001*
BMI category	.024	.145	.004	.165	.869
Education	-.281	.158	-.044	-2.183	.035*
Occupation	-1.362	.207	-.221	-6.591	.0001*
Marital status	-.548	.173	-.084	-3.169	.002*
Parent over weight	1.030	.300	.099	3.438	.001*

a. Dependent Variable: Total score

Table (7) showed the predictors of risk factors affecting on WSSQ were among the young age group, students and those with the no work, single group and those with negative history of overweight and obesity ($P= .0001, .035, .0001, .002$ and $.001$ respectively).

Discussion

Victimization based on one's weight is linked to poor mental and physical health. Adolescents who have experienced severe victimization based on their weight report feeling sad, despondent, and afraid (**Puhl et al. 2017**). Victimization based on one's weight is linked to a higher likelihood of experiencing psychological distress (depression, anxiety, poor body image and suicidality) (**Lee et al. 2018**).

There was a substantial correlation between the severe cases of DAS score and high WSSQ score, which was in line with a cross-sectional study done in Wuhan. According to the results of Wuhan study, adolescents who experienced weight stigma had much greater levels of depression (**Wang et al. 2021**). Results of a meta-analysis, which was developed in collaboration with a research librarian, are also in support of the technique and build on the data from earlier reviews. The first step was to conduct systematic literature searches using the databases listed below: PsycINFO, PsycARTICLES, PubPsych, PSYINDEX, PubMed, Sociological Abstracts, Web of Science, Academic Search Premier, ProQuest Dissertation and Theses Global, and PsyArXiv. The results revealed a medium to large effect for the relationship between weight stigma and mental health, with the worse the perceived weight stigma, the worse the mental health status (**Emmer et al. 2020**).

According to this study's findings on the link between depression and BMI, women who were obese were substantially more likely to experience depression. This result supports earlier meta-analyses that found a symbiotic relationship between depression and fat. Studies published in English up to March 2008 that used the PubMed, PsycINFO, and EMBASE databases and indicated that obesity increased the risk of depression were most prominent among Americans (**Pan et al. 2012**). Additionally, longitudinal studies of female registered nurses who lived in 11 states in the United States supported this finding (**Gibson-Smith et al. 2020**). In the Reykjavik study, which tracked a group of men and women born between 1907 and 1935 in Iceland since 1967, it was found that childhood obesity was linked to a higher risk of developing severe depressive illness in adulthood (**Gatineau and Dent, 2011**). Others have demonstrated a negative substantial correlation between obesity and depression in a cross-sectional study on Iranian medical personnel that was carried out as part of the Study on the Epidemiology of Psychological Alimentary Health and Nutrition (**Heidari-Beni et al. 2021**).

In this study, there was a significant relationship found between the WSSQ and the young age group, occupation, marital status, negative family history, and higher DAS scores. In agreement with this conclusion, which was made on female, younger members who were 18 years of age or older and who resided in the USA using an online programme. The prevalence of weight prejudice internalization, also known as self-directed weight stigma, was higher among younger participants (**Spooner et al. 2018**). Telephone interviews with 120 patients who participated in a randomized clinical trial in Australia revealed that stigma associated with weight was higher among those who were unemployed (**Spooner et al. 2018**).

This study, which was conducted to design and analyze the psychometric features of a French version of the WSSQ as well as its relevance to adolescents, did not find a significant relationship between the WSSQ subscales and body mass index. 78 secondary institutions (**Maiano et al. 2019**). However, they reported that in a different cross-sectional study done on 214 Italian people

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who were overweight or obese, a significant relationship between the WSSQ subscales and body mass index was discovered (Liviaa et al. 2022).

Study limitations

The study had several limitations, the prevalence of weight self-stigma was not calculated. The causal relationship between weight self-stigma and other variables could not be established, like physical activity and another male gender.

Conclusion: Research concluded that there was strong empirical evidence that experiencing weight stigma is associated with greater psychosocial impairment and increased risk of depression and is more likely with increasing body mass index (BMI, Kg/m²).

Appendix: I (21) Arabic Translation and Validation of the Weight Self-Stigma Questionnaire: Factor Structure and Reliability (BinDhimetal. 2022)

Item in Original English Scale	Translated Arabic Item
1. I'll always go back to being overweight	دائماً سأعود للسمنة بعد خسارة بعض الوزن
2. I caused my weight problems	انا السبب في مشاكل وزني
3. I feel guilty because of my weight problems	أشعر بالذنب بسبب مشاكل وزني
4. I became overweight because I'm a weak person	أصبحت سميناً بسبب ضعف إرادتي
5. I would never have any problems with weight if I were stronger	لن أواجه أي مشاكل مع وزني لو كنت امتلاك إرادة قوية
6. I don't have enough self-control to maintain a healthy weight	ليس لدي الإرادة القوية للمحافظة على وزني المثالي
7. I feel insecure about others' opinions of me	اشعر ان الآخرين يجاملونني برأيهم تجاه وزني؟
8. People discriminate against me because I've had weight problems	يعاملني الناس بتمييز بسبب مشاكل وزني
9. It's difficult for people who haven't had weight problems to relate to me	من الصعب على الأشخاص الذين لا يعانون من مشاكل في الوزن أن يتفهموا شعوري
10. Others will think I lack self-control because of my weight problems	يرى الآخرين أن سبب زيادة وزني هو عدم قدرتي على التحكم بسلوكياتي؟
11. People think that I am to blame for my weight problems	يلومني الآخريين بأنني السبب في زيادة وزني؟
12. Others are ashamed to be around me because of my weight	يخجل الآخرون من مرافقتي بسبب وزني ؟

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الإيذاء القائم على الوزن وعلاقته بالاكتئاب لدى مجموعة من الإناث المصريات البدينات

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الملخص العربي

خلال العقود الماضية ، زاد انتشار وصمة الوزن بشكل كبير والذي يرتبط بدوره بنتائج أسوأ مثل الاكتئاب. كان الهدف من هذه الدراسة هو تقييم العوامل الاجتماعية والديموغرافية والأنثروبومترية التي تؤثر على الإيذاء القائم على الوزن بين مجموعة من الإناث المصريات البدينات وتحديد العلاقة الكامنة بين السمعة والإيذاء القائم على الوزن والاكتئاب. تم إجراء دراسة مقطعية عبر الإنترنت باستخدام تقنية أخذ العينات العشوائية ، على 462 أنثى بالغة بدينة في الفترة من مارس 2022 إلى يونيو 2022. تم التواصل مع الإناث من خلال المنشورات على الشبكة الاجتماعية (Facebook®) ، لدراسة كلا من الوزن وصمة العار الذاتية و قد تم إجراء الاستبيان (WSSQ) ومقياس الاكتئاب الذي يعد جزءاً من مقياس القلق للاكتئاب (DAS) عبر الإنترنت من خلال نماذج Google بعد التوقيع على نموذج موافقة إلكتروني للمشاركة ومشاركة البيانات. كان تحليل الانحدار اللوجستي المتعدد لعوامل الخطر المختلفة التي تؤثر على WSSQ هو الفئة العمرية الصغيرة ، ومجموعة الطلاب ، و عدم وجود تاريخ عائلي لزيادة الوزن و الإناث اللاتي يعيشون بمفردهم و كذلك الحاصلات على تعليم عالي . وجد أن هناك علاقة ذات دلالة إحصائية بين مقياس الاكتئاب ومقياس WSSQ. خلص البحث إلى أن هناك دليلاً تجريبياً قوياً على أن التعرض لوصمة العار المرتبطة بالوزن يرتبط بضعف نفسي واجتماعي أكبر وزيادة خطر الإصابة بالاكتئاب وهو أكثر احتمالاً مع زيادة مؤشر كتلة الجسم (BMI).