



## Original article

### Relation between Common Mental Disorders and Body Weight using Arabic DASS 21 scale (Depression, Anxiety and Stress Scale) among Adult Saudi Females Attending Primary Care, Eastern Saudi Arabia

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#### ABSTRACT

**Objective:** To investigate the relation between common mental disorders (depression, anxiety and stress) and body weight among Saudi females attending primary health care centers (PHCCs) in Qatif area, Eastern province, Saudi Arabia. **Material and Methods:** Cross-sectional study conducted from beginning of December 2013 till end of January 2014. Study population included adult female's  $\geq 18$  years. Data were collected using structured interviewer filled questionnaire. Anthropometric measurements (height, weight, and Waist circumference (WC) were taken for all participants. **Results:** A total of 630 females participating in the study 34.6% had normal body mass index (BMI), 29% were overweight, 30.8% were obese, and 5.6% were under weight. Only 37.5% had acceptable WC. Prevalence of depression, anxiety and stress were 33.3%, 45.1%, 43.2% respectively. Neither BMI nor WC showed significant relation to common mental disorders (depression, anxiety and stress). **Conclusion:** The results indicate that in community sample of adult females, regardless socioeconomic status, reports of depressive, anxiety and stress symptoms are not significantly higher in obese than normal-weight groups, again adding to the dilemma of inconsistent relationship between body weight and common mental disorders. This may be explained by racial, cultural and social differences among different studies.

**KEYWORDS:** Body mass index, Waist circumference, Depression, Anxiety, Stress

#### INTRODUCTION

The prevalence of overweight and obesity is increasing worldwide [1, 2]. Globally, around 35% of adults aged 20 years and over had overweight in 2008. The mean Body Mass Index (BMI) of the world's population increased dramatically between 1980 and 2008 [1-2]. WHO statistics in Saudi Arabia overweight was 36% and obesity 33% [3]. Al Nozha et al (2005) in their study concluded that Obesity and overweight are increasing with an overall obesity prevalence of 35.5%. The prevalence of overweight was 36.9%. Overweight is significantly more prevalent in males (42.4%) compared to 31.8% of females. Severe (gross) obesity was 3.2%. Females are significantly more obese with a prevalence of 44% than males 26.4%. [4]

Women are more susceptible to depression and anxiety than men [5]. In a study conducted in Al-Kharj in 2000 to measure prevalence of mental illness in primary care it was found that 18.2% of primary care patients have minor mental illnesses including depression, anxiety and

somatization and when sub-threshold cases included it reached 30.5% [6]. World health organization (WHO) reported that Up to 20% of those attending primary health care in developing countries suffer from anxiety and/or depressive disorders [7]. A study of prevalence of somatization and depression in primary care in Riyadh Saudi Arabia found that depression prevalence was 20% which is similar to that published in the USA and worldwide [8].

Depression, anxiety and obesity are wide spread problems with major public health implications. A number of mechanisms exist through which depression and anxiety with obesity may be linked or interact but Studies show inconsistent findings concerning the relationship between body weight and mental illness. Many studies show a positive association between obesity and both psychiatric disorders depression and/or anxiety [9 -11]. Other studies show positive association with severe obesity [12-13].

On other hand some studies concluded that there is no association [14-16] or even negative association (being overweight or obese protective against mental illness) [17].

Aim of this study is to investigate the relationship between body weight and depression, anxiety and stress among adult Saudi females attending primary health care centers in al Qatif, eastern province Saudi Arabia.

## MATERIALS AND METHODS

This Cross-sectional study was conducted in primary health care centers (PHCCs) in Qatif, eastern region; Saudi Arabia during the period from beginning of December 2013 till end of January 2014. Study population includes all adult ambulatory Saudi females attending PHCCs whose age is  $\geq 18$  years. Pregnant, postpartum females during their first six months of delivery and patients with chronic disabling diseases e.g. Diabetes, epilepsy and bronchial asthma were excluded. Five centers were randomly selected from a total of 29 PHCCs by systematic random sampling taking every 6<sup>th</sup> center from list provided by MOH. All females attending the selected centers were approached. A total number of 630 females accepted to participate after explanation, answering all their questions and getting their informed consent.

Data were collected using The Arabic version of Depression Anxiety Stress Scale (Arabic DASS 21) which includes 21 items. The score of each item ranges from 0 (does not apply) to 3 (almost always applies). Score of depression, anxiety and stress was calculated by summation of item scores. The total score was categorized into normal, mild, moderate, severe and extremely severe depression, anxiety or mixed neurosis (stress). The Depression Anxiety and Stress Scales (DASS) is a widely used screening tool to assess symptoms of depression, anxiety, and stress in community settings. This instrument comprises three sub-scales: (1) the Depression sub-scale which measures hopelessness, low self-esteem, and low positive affect; (2) the Anxiety scale which assesses autonomic arousal, musculo-skeletal symptoms, situational anxiety and subjective experience of anxious arousal; and (3) the Stress scale which assesses tension, agitation, and negative affect. There is evidence of

the validity of the DASS for the use in both clinical and community settings in English-speaking countries [18-20] This tool has also been translated and validated in other languages including Chinese, Malay, Italian, Spanish [21] and Arabic [22]. Both English and non-English versions have high internal consistency (Cronbach's alpha scores of  $> 0.7$ ). [21]

The data were coded, entered and analyzed in a personal computer using statistical package for social sciences (SPSS) software version 16. Data were presented using descriptive statistics in form of frequencies and percentages for qualitative variables and mean and standard deviation (SD) for quantitative variables. Chi-square test was used as to determine associated factors.

The study was approved by ethical committee of Postgraduate Saudi Board Program, Eastern Province. All questionnaires were anonymous, and collected data were kept confidential and not used except for the study purpose. All necessary approvals including ethical permissions from ministry of health were obtained before starting the research.

## RESULTS

Six hundred and thirty females participated in this study from five different primary health care centers in al Qatif area. Mean age in was 34.3 years  $\pm$  9.3 SD.

Table (1) shows socio-demographic data of females participating in the study. More than half of the participants (53.4%) were in age range 30 to 45 years, Most of the sample was married (73.7%) and most of them have no family problems (89.7%). Educational level in this study was secondary school or diploma in (43%) followed by university graduation or above in (37.6%). Almost one third of the participants had no children 32.9% while about one third of them have three to five children (32.4%). More than half of participants were unemployed (52.4%). About half of participants had no personal income (50.9%) while 29.4% had personal income range between 5000 S.R. (Saudi riyals) to less than 15000 S.R.

**Table 1: Socio-demographic characteristics of study population**

Socio-demographic characteristics	Total (n=630)	
	number	%
<b>1-Age in years:</b>		
18 $\leq$ 30	203	32.2
30 $\leq$ 45	336	53.4
45 $\leq$ 60	87	13.8
$\geq$ 60	4	0.6
<b>Mean Age in years <math>\pm</math> SD = 34.3 <math>\pm</math> 9.3</b>		
<b>2-Marital status:</b>		
Single	138	21.9
Married	464	73.7
Divorced	17	2.7
Widowed	11	1.7
<b>3-Number of Children:</b>		
No children	207	32.9
1	61	9.7
2	101	16.0

3-5	204	32.4
≥6	57	9.0
<b>4-Educational Level:</b>		
Illiterate	15	2.4
Read and write	19	3.0
Elementary school	25	4.0
Intermediate school	63	10.0
Secondary school or diploma	271	43.0
University and higher	237	37.6
<b>5-Occupation:</b>		
Unemployed	330	52.4
Student	61	9.7
Manual worker	13	2.1
Professional occupation	226	35.8
<b>6-Personal income in Saudi Riyals (S.R):</b>		
No income	321	50.9
<2000 S.R.	36	5.7
2000-<5000 S.R.	44	7.0
5000-<10,000 S.R	99	15.7
10000-<15,000 S.R	86	13.7
≥15,000 S.R	44	7.0
<b>7-Family income in Saudi Riyals (S.R) :</b>		
<2000 S.R	59	9.4
2000-<5000 S.R	151	24.0
5000-<10,000 S.R	146	23.2
10000-<15,000 S.R	81	12.8
≥15,000 S.R	92	14.6
Refuse to answer	101	16.0
<b>8-Family problems:</b>		
No	566	89.7
Marital conflict	31	4.9
Violence & addiction	2	0.4
Intellectual disability	5	0.8
Motor & sensory disability	8	1.3
Multiple wives	10	1.6
Other	8	1.3

Two hundred eighteen participants (34.6%) were within normal range weight using BMI, underweight were 5.6% , over weight were 29% while obese class I , class II and

class III were 16.8% , 8.8%, and 5.2 respectively . only around one third had acceptable waist circumference 37.5% (236). (Table 2).

**Table 2: BMI and waist circumference of study population :**

Variables	Total (n=630)	
	number	%
<b>BMI [23]</b>		
▪ Underweight ( <18.50)	35	5.6
▪ Normal range (18.50 - 24.99)	218	34.6
▪ Overweight ( 25.00 - 29.99)	183	29.0
▪ Obese class I: (30.00 - 34.99)	106	16.8
▪ Obese class II: (35.00 - 39.99)	55	8.8
▪ Obese class III: (≥40.00)	33	5.2
<b>Waist circumference: [24]</b>		
▪ Acceptable ( ≤80cm)	236	37.5
▪ Not acceptable (>80cm)	394	62.5

Distribution of females according to their distress measured by Depression, anxiety and stress (DASS) score is illustrated in (table 3) . Two thirds of participants had no depression (66.7%), while quarter of them had mild to moderate depression (25.7%). More than half of participants had no anxiety or stress ( 54.9% and 56.8% respectively) , while 27.4% had mild to moderate anxiety and 29.3% had mild to moderate stress ( Table 4). Neither BMI nor waist

circumference showed significant relation to psychological distress (depression, anxiety and stress) (Tables 5, and 6.). The study showed significant association between depression and both occupation and family problems, ( $p=0.02$  and  $p=0.00$ ) respectively). (Table 7) , also there was correlation between stress and both personal income and family problems,(  $p=0.02$  and  $p=0.00$  respectively) as shown in (Table 8 ).

**Table 3: Distribution of females according to their distress measured by Depression, anxiety and stress (DASS) score**

Variables	Total (n=630)							
	Never		Sometimes		Often		Almost/always	
	n	%	n	%	n	%	n	%
<b>Depression</b>								
I couldn't seem to experience any positive feeling at all	419	66.5	154	24.4	42	6.7	15	2.4
I found it difficult to work up the initiative to do things	371	58.9	191	30.3	56	8.9	12	1.9
I felt that I had nothing to look forward to	431	68.4	123	19.5	62	9.8	14	2.3
I felt down-hearted and blue	264	41.9	250	39.7	70	11.1	46	7.3
I was unable to become enthusiastic about anything	348	55.2	190	30.2	61	9.7	31	4.9
I felt I wasn't worth much as a person	459	72.9	106	16.8	39	6.2	26	4.1
I felt that life was meaningless	454	72.1	92	14.6	50	7.9	34	5.4
<b>Anxiety</b>								
I was aware of dryness of my mouth	340	54.0	184	29.2	63	10.0	43	6.8
I experienced breathing difficulty	337	53.5	180	28.6	71	11.2	42	6.7
I experienced trembling	454	72.1	119	18.9	33	5.2	24	3.8
I was worried about situations in which I might panic and make a fool of myself	350	55.6	192	30.5	62	9.8	26	4.1
I felt I was close to panic	451	71.5	127	20.2	32	5.1	20	3.2
I was aware of the action of my heart in the absence of physical exertion	332	52.7	198	31.4	70	11.1	30	4.8
I felt scared without any good reason	415	65.8	148	23.5	49	7.8	18	2.9
<b>Stress</b>								
I found it hard to wind down	163	25.8	287	45.6	104	16.5	76	12.1
I tended to over-react to situations	249	39.5	249	39.5	87	13.8	45	7.2
I felt that I was using a lot of nervous energy	181	28.7	216	34.3	138	21.9	95	15.1
I found myself getting agitated	182	28.9	281	44.6	117	18.6	50	7.9
I found it difficult to relax	207	32.8	265	42.1	95	15.1	63	10.0
I was intolerant of anything that kept me from getting on with what I was doing	288	45.7	212	33.7	94	14.9	46	5.7
I felt that I was rather touchy	196	31.1	242	38.4	127	20.2	65	10.3

**Table 4: level of severity of depression, anxiety, and stress among study population**

Level of severity	Total (n=630)					
	Depression		Anxiety		Stress	
	n	%	n	%	n	%
Normal	420	66.7	346	54.9	358	56.8
Mild	75	11.9	100	15.9	96	15.3
Moderate	87	13.8	72	11.5	88	14.0
Sever	24	3.8	55	8.7	60	9.5
Extremely severe	24	3.8	57	9.0	28	4.4

**Table 5: Association between level of depression, anxiety and stress with BMI of study females**

BMI	Normal		Mild		Moderate		Severe		Extremely severe		Total		Test of significance (p-value)
	n	%	n	%	n	%	n	%	n	%	n	%	
<b>Depression scale</b>													
Underweight	22	62.8	5	14.3	6	17.1	1	2.9	1	2.9	35	100	X <sup>2</sup> =4.4 (p>0.05)
Normal range	152	69.7	23	10.6	28	12.8	8	3.7	7	3.2	218	100	
Overweight	117	63.9	24	13.2	26	14.2	9	4.9	7	3.8	183	100	
Obese class I	72	67.9	12	11.3	14	13.3	3	2.8	5	4.7	106	100	
Obese class II	34	61.8	7	12.7	9	16.4	2	3.6	3	5.5	55	100	
Obese class III	23	69.8	4	12.1	4	12.1	1	3.0	1	3.0	33	100	
<b>Anxiety scale</b>													
Underweight	16	45.7	6	17.1	9	25.7	1	2.9	3	8.6	35	100	X <sup>2</sup> =21.7 (p>0.05)
Normal range	127	58.3	40	18.3	22	10.1	14	6.4	15	6.9	218	100	
Overweight	101	55.3	28	15.3	16	8.7	20	10.9	18	9.8	183	100	
Obese class I	54	50.9	17	16.0	14	13.2	9	8.6	12	11.3	106	100	
Obese class II	28	51.0	7	12.7	7	12.7	6	10.9	7	12.7	55	100	
Obese class III	20	60.5	2	6.1	4	12.1	5	15.2	2	6.1	33	100	
<b>Stress scale</b>													
Underweight	24	68.6	4	11.4	7	20.0	0	0.0	0	0.0	35	100	X <sup>2</sup> =23.4 (p>0.05)
Normal range	126	57.8	39	17.9	30	13.8	12	5.5	11	5.0	218	100	
Overweight	94	51.4	27	14.7	28	15.3	26	14.2	8	4.4	183	100	
Obese class I	65	61.3	13	12.3	11	10.4	12	11.3	5	4.7	106	100	
Obese class II	27	49.1	10	18.2	9	16.4	6	10.8	3	5.5	55	100	
Obese class III	22	66.7	3	9.1	3	9.1	4	12.1	1	3.0	33	100	

**Table 6: Association between level of depression, anxiety and stress and waist circumference of study females**

WC	Normal		Mild		Moderate		Sever		Extremely severe		Total		Test of significance (p-value)
	n.	%	n	%	n	%	n.	%	n	%	n	%	
<b>Depression scale</b>													
Acceptable	160	67.8	27	11.5	30	12.7	10	4.2	9	3.8	236	100	X <sup>2</sup> =0.7 (p>0.05)
Not acceptable	260	66.0	48	12.2	57	14.4	14	3.6	15	3.8	394	100	
<b>Anxiety scale</b>													
Acceptable	136	57.6	38	16.1	29	12.3	13	5.5	20	8.5	236	100	X <sup>2</sup> =5.4 (p>0.05)
Not acceptable	210	53.3	62	15.7	43	10.9	42	10.7	37	9.4	394	100	
<b>Stress scale</b>													
Acceptable	136	57.6	39	16.5	32	13.6	19	8.1	10	4.2	236	100	X <sup>2</sup> =1.4 (p>0.05)
Not acceptable	222	56.3	57	14.5	56	14.2	41	10.4	18	4.6	394	100	

**Table7: Association between level of depression with Socio-demographic characters of study population**

Socio-demographic characters	Normal (n=420)		Mild (n=75)		Moderate (n=87)		Sever (n=24)		Extremely severe (n=24)		Test of significance (p-value)
	n.	%	n.	%	n	%	n	%	n	%	
<b>Depression</b>											
<b>Occupation</b>											
Unemployed	173	41.2	30	40.0	39	44.8	12	50.0	15	62.5	X <sup>2</sup> =35.2 (p<0.05)
Student	33	7.9	15	20.0	8	9.2	2	8.3	3	12.6	
Manual worker	49	11.6	7	9.4	15	17.3	1	4.2	2	8.3	
Professional	165	39.3	23	30.6	25	28.7	9	37.5	4	16.6	
<b>Family Problems</b>											
No	394	93.8	66	88.0	71	81.7	18	75.0	17	70.8	X <sup>2</sup> =69.4 (p<0.001)
Yes	26	6.2	9	12.0	16	18.3	6	25.0	7	29.2	

**Table 8: Association between level of stress with Socio-demographic characters of study population**

Socio-demographic characters	Normal (n=358)		Mild (n=96)		Moderate (n=88)		Severe (n=60)		Extremely severe (n=28)		Test of significance (p-value)
	n	%	n.	%	n.	%	n	%	n	%	
<b>Stress</b>											
<b>Personal income</b>											
No income	188	52.5	41	42.7	43	48.9	39	65.0	10	35.7	X <sup>2</sup> =39.9 (p<0.05)
<2000 S.R.	16	4.5	10	10.4	4	4.5	4	6.7	2	7.1	
2000-<5000 S.R.	27	7.5	4	4.2	8	9.1	4	6.7	1	3.6	
5000-<10,000 S.R	48	13.4	24	25.0	14	15.9	5	8.3	8	28.6	
10000-<15,000 S.R	50	14.0	8	8.3	17	19.3	5	8.3	6	21.4	
≥15,000 S.R	29	8.1	9	9.4	2	2.3	3	5.0	1	3.6	
<b>Family Problems</b>											
No	338	94.4	82	85.4	76	86.4	49	81.6	21	75.0	X <sup>2</sup> =66.8 (p<0.001)
Yes	20	5.6	14	14.6	12	13.6	11	18.4	7	25.0	

## DISCUSSION

Prevalence of mental illness with different levels of severity (from mild to extremely severe) in this study was as follows: Depression: 33.3%, Anxiety: 45.1% and Stress: 43.2%. These results were higher than study conducted in Al -Kharj in 2000 to measure prevalence of mental illness in primary care in which 18.2% of primary care patients have minor mental illnesses including depression, anxiety and somatization and when sub-threshold cases included it reached 30.5% [6] It was also higher than those reported by the study of Becker et al where depression was 20 % in primary care attendees in Riyadh area [8].

Again higher compared to study conducted in Denmark in primary health care setting shows that Prevalence of somatoform disorders was 35.9%, anxiety disorders 16.4%, mood disorders 13.5% [25]. Study conducted in eighty six general practices in Belgium which shows threshold/sub threshold commonly detected disorders were mood disorders in 31.0%, anxiety disorders in 19.0% , somatoform disorders in 18.0% [26] . WHO report stated that up to 20%

of patients attending primary health care in developing countries suffer from anxiety and/or depressive disorders [7] Prevalence of obesity using BMI as a marker was 30.8% while prevalence of overweight was 29% culminating into 59.8% of our study women above normal body weight. WHO statistics in Saudi Arabia overweight was 69% with prevalence of obesity being 33% [3]. Al Nozha et al concluded that Obesity and overweight are increasing with an overall obesity prevalence of 35.5% with Overweight in 31.8% of females and prevalence of obesity of 44%. [4].

Also our result regarding obesity, over weight lower than that reported by community screening conducted 2004 among Saudi resident of eastern province which reported overall prevalence of obesity was 43.8% while 35.1% were overweight [27]. Better results in our study may be explained by regional variation between different studies. Al Qatif region is a rural area not urban). Colić-Barić et al showed that Consumption of fast food and soft drinks was more prevalent and more linked with dietary behavior in the



urban than in the rural area [28]. Regional variation was reported in Analysis of data from the National Nutrition Survey in Saudi Arabia by Al-Othaimen and Al-Nozhawho reported that prevalence of obesity ranged from 33.9% in Ha'il to 11.7% in Jizan, [29].

In the same study the prevalence of overweight was 28.4% for females which has been confirmed by almost the same result of our study [29]. Our results are comparable to U.S National Health and Nutrition Examination Survey In 2007-2008, the prevalence of obesity was 35.5% among adult women [30]. And comparable to Obesity prevalence from a European perspective: a systematic review report that, the prevalence of obesity in women ranged from 6.2% to 36.5% in Europe with considerable geographic variation [31].

Our present study revealed no significant association between BMI and common mental illness namely (depression, anxiety and stress).

The association between obesity and psychological illness (e.g. depression anxiety and stress) has been an issue of controversy for decades. While several studies suggest that obesity increases the risk of distress i.e. positive association [9 -11, 32-33], this has not been observed in all cohort studies i.e. no association and some investigators have reported that obese persons have a reduced risk of psychological distress i.e. negative association [14-15, 34-35].

Lawlor *et al.* demonstrate that both their genetic 'instruments' of obesity *-FTO* rs9939609 and *MC4R* rs17782313 – were associated with a *reduced* risk of self-reported psychological distress and antidepressant medication use in a large cohort of over 50, 000 Danish men and women. According to the best estimate of their Mendelian randomization (MR) analysis, people with normal weight had over three times greater odds of stress and anxiety compared to their obese counterparts [34]. In 2008, a meta-analysis of 15 conventional cohort studies examining the relationship between obesity and depression (total *N* = 59 000) found the opposite findings such that obesity, and to a lesser extent overweight, at baseline increased the risk of depression onset at follow-up, with summary odds ratios of 1.6 and 1.3, respectively [36]. Thus, MR seems to support a 'fat-jolly' hypothesis whereas conventional analysis has favored a 'fat-sad' hypothesis [37]. On running a standard multivariate regression analysis without genetic instruments,

Lawlor *et al* reported that the odds for antidepressant medication use, stress and anxiety were greatest among the obese.[34]. The findings from MR seem to suggest that there is a powerful 'unknown factor' that reverses the strong true protective effect of obesity identified in MR to a potentially spurious heightened risk in observational data. The analysis of Lawlor *et al.* makes a substantial contribution to this controversial field of research. However, their findings also call for more research that possibly challenges, conventional analysis of obesity and psychological distress to achieve the final verdict on the validity of the 'fat-sad' versus 'fat-jolly' hypotheses. Heightened risk in observational data. [37]

Luppino *et al* in their meta-analysis confirms a reciprocal link between depression and obesity. In addition, depression was found to be predictive of developing obesity.[36] Jorm *et al* found that Obesity has an association with anxiety, depression and lower well-being in women, but not in men. [38] A 12 years longitudinal study in Canada to investigate whether obesity was a risk factor for depression in a nationally representative sample found that obesity is a significant (negative) predictor of depression in adult men but not in women.[39]

Also study conducted in South Australia to examine the relationship between body mass index (BMI), mental health, and suicidal ideation in a general population. using two methods: face to face interviews and computer-assisted telephone interviewing (CATI) system. Results were in the face-to-face interviews, the combined obese and morbidly obese men were significantly less likely to have major depression or suicidal ideation than those of a healthy weight. For the telephone interview-derived data, the only significant finding was for overweight women to report less psychological distress than those of a healthy weight.[40]

Hach *et al* in their Survey concluded that obesity per se seems not to be associated with a higher risk for suffering from mental disorders [15]. Wardle J *et al* report that there was barely any association between obesity and depression [14]. Systemic review of epidemiological studies Concluded that there is a weak level of evidence supporting the hypothesis that obesity increases the incidence of depression outcomes. Few high-quality prospective cohort studies exist, and cross-sectional studies account for the vast body of published evidence, and therefore firm conclusions for causality cannot yet be drawn. Our finding warrants additional high-quality etiological research on this topic [35]

Again there was no relation between underweight and mental illness (Depression, anxiety and stress) which is contrast results of Korean study by Sunwoo *et al* who concluded that there was no significant association between obesity and depressive disorder in Korea, but there was a significant association between the underweight group and depressive disorder. The relationship between obesity and mental disorder in a Korean population was different from that in a Western population. These results suggest that the differences of traditional cultures and races might have an important effect on the associations between the weight status and mental disorders [29]. Other two studies conducted in USA, the first one by Zhao *et al* and The second study McCrea *et al* who concluded that there was association between (BMI) and serious psychological distress (SPD), anxiety, depression and both overweight, obesity and underweight in women the prevalence of the three psychiatric disorders was significantly higher [9-11]

The present study show no association between unaccepted WC and mental illness (Depression, anxiety and stress) which is similar to Hach I *et al*: Patients with unfavorable waist circumferences do not show a higher prevalence of depressive disorders. [41].

Our study results and inconsistent findings in the literature review may be explained by cultural and socioeconomic

variations. In Western Societies, females are overwhelmed with ideal body images and attractive appearance which gives better job chances and the likelihood to have a partner especially if they are not already in a long term stable relationship, or married. On the other hand, we live in a conservative culture where females cover their whole body by wearing body cover ( Hijab or Abaya) when they go out. In addition, most of the females in our society are in stable marriages, in our study 73.3% were married.

Our study showed significant association between depression and stress in subjects who have family problems (e.g. marital conflicts, multiple wives, violence, addiction, motor or sensory disability), significant association between depression with different severities and unemployment and significant association between stress in females who had no personal income which is similar to results of study of Montgomery et al [42] and other study in six European countries Jefferis et al [43]. Our study reveals no significant association between (depression, anxiety or stress) with other socio-demographic factors e.g. age, marital status, number of children, family income, and level of education. Our results were inconsistent with results of study by Al-Shehri et al which found association between age, marital status, monthly income and depression. [44] This can be explained by different study population, (males in their study).

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