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Association between Depression Levels and Body Weight and Dietary Habits in a Sample of the Saudi Population: A Cross-Sectional Study

REEMA ABDULRAHMAN SAAD ALYAMANI, JAWAHER AHMED ABDULLAH ALHUSSIENI, MURUJ MATUQ MANSI ALGHASH-MARI, RAGHAD MUSLIM SALEM ALKHOZAI, RENAD AYYAD OWAID ALSULAMI, SHAIMA ZAKI MAHMOUD SAB, REHAM ABDULLAH ALI ALAMRI, AREEJ ABDULHAMID HAMDAN ALMURAEE, EL-SAYED HAMED ALI BAKR*, ALAA HATIM HASSAN QADHI, WALAA ESSAM MOHAMMED ALHASSANI, SARAH OMAR FATHI ALKHOLY, FIRAS SULTAN IBRAHIM AZZEH, AWATIF MUSALLAM SALEM ALMEHMADI and OHAAD FAHD ABDULAZIZ AWLYA

Department of Clinical Nutrition, College of Applied Medical Sciences, Umm Al-Qura University, Makkah 24381, Saudi Arabia.

Abstract

Depression is a pervasive mental health concern that can negatively affect individuals' physical and emotional well-being. This study aimed to explore the link be-tween depression levels and body weight, and to evaluate the impact of an individual's nutri-tional status. A cross-sectional study with a random sampling tech-nique employed (n =710 people from the Saudi population). The data were collected via an online survey in November 2022. Data were collected using a self-administered questionnaire, including sociodemographic data, dietary habits, weight data, and some food items associated with stressful eating. Depression, Anxiety, and Stress Scale (DASS-21) were applied to assess depression levels among participants (n = 710). Data indicated that depression is wide-spread among the Saudi population, with varying degrees of severity. Moderate levels of de-pression represent 28.59% of Saudi society, while the Saudi population that suffered from severe depression levels reached 14.23% of our total sample population. Depression was positively and significantly correlated with eating behaviors and body mass index. Depression significantly in-creased with age. The

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CONTACT El-Sayed Hamed Ali Bakr ehbakr@uqu.edu.sa Department of Clinical Nutrition, College of Applied Medical Sciences, Umm Al-Qura University, Makkah 24381, Saudi Arabia.

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findings indicate a significant correlation between depres-sion, eating behavior, body mass index, and diet. The evidence supported a connection between higher body weight and depression. This suggests the need for interventions to reduce depres-sion and obesity rates and promote a healthier society.

Introduction

Depression is a critical public health problem that has a negative influence on a person's quality of life and significantly increases the global disease burden.[1] Depression, anxiety, and stress are crucial compo-nents of mental health and serve as important indicators that require proper treatment to mitigate their negative impact on individuals' well-being.[2] However, Research suggests that individuals with depression have a hyperactive Hypothalamic-Pituitary-Adrenocortical (HPA) axis, which can increase the risk of car-diovascular disease and other physical illnesses.[3] The primary goal of the HPA response is to help organ-isms overcome challenging situations by stimulating metabolic and neurobiological changes.[4] Prolonged stress can lead to adverse physiological and behavioral changes.[5]

Frequent exposure to stress can cause depression. Depression and stress are also closely associated. Stress is any endogenous or exogenous stimulation that causes a physiological reaction. The impact of stress on the body can lead to changes in homeostasis in life-threatening situations, and even death. Stress associated with nutritional habits and behaviors can trigger or worsen many diseases and pathological conditions.[6] The Depression, Anxiety, and Stress Scale (DASS-21) is one of the most commonly used screening measures for depression, and the Patient Health Questionnaire (9-, 8-, and 2-item versions) was initially developed by the University of New South Wales, Australia, and has been used across different cultures and populations.[7] A person with depression exhibits emotions of sadness, emptiness, or irritation, along with physical and mental changes that last for at least two weeks and have a major impact on their ability to function.[8] Furthermore, various compounds are involved in the physiological responses to men-tal and physical stress; therefore, one of the most common objective measures of stress is the study of hormone levels. Cortisol is often used as a biomarker of stress; when measured in urine or serum, it is a short-term measure of hormones.[9] According to the World Health Organization in 2019, depression af-fects 5–7% of the world's population. Moreover, according to the Saudi National Mental Health Survey Technical Report.[10]

Depression is linked to HPA axis dysregulation (as illustrated in Fig. 1), which is crucial for the stress response.[11] The HPA axis, which consists of the hypothalamus, pituitary gland, and adrenal cortex, is reg-ulated by intricate interactions.[12] The maintenance of systems governing stress reactivity requires strict control of the HPA axis.[13]

The hypothalamus releases Corticotropin-Releasing Hormone (CRH) in response to stress, causing the pituitary gland to release Adreno-Cortico-Tropic Hormone (ACTH).[14] The adrenal cortex then produces cortisol and other glucocorticoids as a result of ACTH.[15] The negative feedback of glucocorticoids regu-lates the HPA axis by obstructing the production of CRH and ACTH.[16] Vasopressin and oxytocin can boost CRH and ACTH secretions.[17]

Maintaining both physical and mental health requires balanced HPA activity.[18] Chronic HPA axis over activity and elevated cortisol can have negative health effects, whereas acute stress responses that ac-tivate the HPA axis are adaptive.[19] When the HPA axis is functioning normally, it acts as a homeostatic mechanism, whereas when it is dysregulated, depression and other mental illnesses may result.[20] Weight gain and obesity have been associated with stress, depression, and anxiety.[21] Depression is linked to changes in appetite, diet, and eating habits – resulting in weight gain.[22] Different symptoms of depression might appear, and they can affect physiological functions, such as hunger and sleep, which can further affect mood.[23] Exercise influences the HPA axis.[24] Additionally, experimental research has demonstrated that individuals with higher physical activity levels exhibit reduced cortisol

responses to psychosocial stress.[25] Weight loss interventions have been found to reduce depression symptoms in peo-ple with obesity, suggesting that addressing Body Mass Index (BMI) can improve mental health outcomes.[26-27] However, in a cross-sectional study a positive association was found between being overweight or obese and the presence of depression or depression-like symptoms in individuals of both sexes.[28]

Brain undergoes adaptive plasticity in response to acute and chronic stressors, through dendrite retraction and synaptic loss. Chronic stress can lead to pathological conditions by causing the brain to "get stuck".[29] A summary of studies and their findings on the impact of nutrition on mental health and depression are summarized in Table 1. Healthy nutrition has improved mental health and decrease depression 30-36. Brain function is affected by diet-induced changes in the gastrointestinal microbiome. Diet can af-fect mood and development of psychiatric disorders. A high-fat diet causes mood disorders because fats are known to interfere with the synthesis of serotonin, a key brain neurotransmitter implicated in the de-velopment of depression.[37] A study was conducted to determine the effects of a Mediterranean diet on mental health. The study revealed that the Mediterranean diet was associated with a reduction in symp-toms of depression and improved mental health quality of life (QoL). A positive association has been found between increased consumption of omega-3, decreased consumption of omega-6, and improved mental health.[38]

A significant correlation was observed in a study on Korean adults between the consumption of probi-otic foods and a reduction in the prevalence and severity of depressio.[39] A study was conducted to investigate the relationship between different types of fruits and vegetables intake and depression among healthy women indicating an increased intake of citrus fruits, berries, melons, other fruits, green leafy vegetables, yellow vegetables, and other vegetables was associated with a lower risk of developing depres-sion.[40] Existing scientific evidence suggests that consuming coffee, tea, and dietary caffeine-containing polyphenols and phenolic compounds may exert protective effects against depression and lower the risk of developing it, likely due to their antioxidant properties.[41]

Accordingly, this study aimed to explore the link between depression levels and body weight, and to evaluate the impact of an individual's nutritional status.

Material and Methods

Study Design, Participants, and Sample Size

Participants in this cross-sectional study were chosen from the Saudi population in the Kingdom of Saudi Arabia aged 15 years and over from five selected regions (Western, Central, Eastern, South, and North) by a simple random technique. The data were collected in November 2022 for 4 months. A sample of 899 people who might suffer from stress, depression, or anxiety was contacted online. Out of these, only 710 answered yes to the first qualifying question (if you suffer from any symptoms of stress, anxiety, or depression to complete the survey and if you do not have any symptoms to drop out); hence, 710 said yes and completed the survey (79%) and 189 participants said no (21%) - so they were excluded. The targeted sample for the study consisted of 710 people: 493 were female and 217 were male. Participants who showed no signs of stress or exhibited stress 189 and those who provided an incomplete response were not included in the sample.

Data Collection and the Study Questionnaire

A closed-ended validated questionnaire was collected from November 8 to February 12, 2023, during the academic year 2022–2023. The questionnaire was developed based on several studies that formatted and evaluated the questionnaire in this regard and included risk factors in addition to basic information consisting of three main sections: personal, anthropometric, and lifestyle information; information related to a medical condition; and family medical history. The personal information included age, gender, educa-tional level, income, and city of residence. The second section of the questionnaire assessed dietary and behavioral elements. Information on lifestyle and dietary aspects included eating patterns, the number of daily meals, adherence to a particular diet (such as the Mediterranean diet) and eating behaviors (from healthy to unhealthy). When under stress or distress, eating habits, the amount consumed (tea, coffee, wa-ter, soft drinks, dairy, milk products, honey, and fish), and the use of specific spices when under

stress. The third section evaluates Saudi society's stress, anxiety, and depression levels.

Depression, anxiety, and stress were assessed using the DASS 21 (Depression, Anxiety, and Stress Scale validated in Portuguese). This 21-item short scale allows a simultaneous assessment of the three emotional states of depression, anxiety, and stress, is easy to apply in both clinical and non-clinical settings and is suitable for use in different age groups. To validate this questionnaire, it was reviewed first by the team and then by an expert specializing in the field of nutrition in the Department of Clinical Nutrition, College of Applied Medical Sciences, Umm Al-Qura University, Makkah. The final version was used after it was approved and distributed through so-cial media to reach many regions in the Kingdom of Saudi Arabia. This approach has been taken online. The first page was a consent form for the participant to agree to take part in the project and that all their data would be confidential. Finally, they had the right to withdraw from completing the questionnaire and participate in the study as they wished.

Statistical Analysis

Upon completion of questionnaire data collection, all data were analyzed using the computer program statistical package for social sciences (SPSS) version.[22] Socio-demographic data, through descriptive analysis using the count and percentages, were used to display categorical variables. The Chi-square test was used for the hypothesis testing in this study. The level of significance (p value) was set at 0.05.

Results

Demographic Analyses of Participant

Out of the 899 responders to the online questionnaire, 710 participants met our study criteria. Table 2 shows the sociodemographic profiles of the participants. The demographic characteristics of the study par-ticipants included age, gender, marital status, education level, and employment status. The data show that the majority of the participants were between the ages of 21-40, with 38.03% falling in the 21-30 age range and 20.7% falling in the 31-40 age range. The gender distribution was skewed towards female participants, with 69.44% being female and 30.56% being male. In terms of marital status, the majority of the partici-pants were either single (47.46%) or married (48.73%). Some participants reported being divorced (2.68%) or widowed (1.13%). In terms of education level, most participants had a university degree (64.51%), followed by a high school education (24.23%). A small percentage reported having a postgradu-ate degree (6.48%), while only a small percentage had completed elementary or intermediate school. Regarding employment status, most participants were either students (34.93%) or employed (39.30%). A small percentage of the participants reported being housewives (12.54%), retired (3.66%), or unemployed (8.31%).

The Prevalence of Depression in the Saudi Population

The study found various levels of depression severity among 710 participants in Saudi society (Fig. 2). According to the study population, depression was normal in 173 (24.37%) participants. And, a moderate level was found in 203 patients (28.59 %), which was the highest percentage. The severe group represented only 101 (14.23%) participants and the lowest group was the highly severely depressed group 85 (11.97%). This finding demonstrates that the prevalence of depression is higher among Saudi citizens if the moderate to highly severe were collected as a depressed group compared to the normal and mild only group.

The association between age and depression showed a significant relationship, with a p-value of 0.001 (Table 3). The age category of 21-30 years was the highest for each level of depression, whereas the group aged 40 years and above revealed an opposite relationship with the level of depression (Table 3). In con-trast, the gender association with depression levels is not statistically significant, yet it shows that females have a positive trend of increasing percentage with the rise of depression levels in comparison to men, whose percentage decreases as depression increases (Table 3).

Relationship between BMI and Mental Health

Chi-Square test shows a significant p-value (0.003) which indicates an association between BMI and level of depression. The rate of depression increases with a higher BMI - people with a higher BMI have an increased chance of developing depression (Table 4). Regarding the association between depression and weight change, Chi-Square test

shows a significant p-value (0.007, Table 5), which reflects an association between the level of depression and weight change distribution shown in Question 1 and Question 2 (Table 5). Chi-Square test shows a significant p-value <0.002> which reflect an association between the level of depression and weight change distribution.

Table 2. Demographic characteristics of the current study participants (total N = 710)

	Count	Percent (%)
Age (year)		
15-20	81	11.41
21-30	270	38.03
31-40	147	20.70
>40	212	29.86
Gender:		
Female	493	69.44
Male	217	30.56
Marital status:		
Single	337	47.46
Married	346	48.73
Divorce	19	2.68
Widow	8	1.13
Education level:		
Elementary school	7	0.99
Intermediate school	17	2.39
High school	172	24.23
University degree	458	64.51
Postgraduate degree	46	6.48
Other	10	1.41
Employment status:		
Students	248	34.93
Non-employment	59	8.31
Employment	279	39.30
Housewife	89	12.54
Trainee	2	0.28
Retired	26	3.66
Self-employment	7	0.99

The Impact of an Individual's Diet on Depression Levels

There was a significant association between eating habits and depression (Table 6). Consuming un-healthy foods during stress was linked to higher depression levels, whereas a healthy diet comprising beans, vegetables, and fruits was associated with lower depression levels. Additionally, a diet based on sugars and fast food was linked to higher depression levels than a balanced or carbohydrate-based diet. These findings suggest that dietary habits may affect depression levels.

A significant association was found between specific dietary behaviors and depression levels in the Saudi population (Table 7). For example, increased water consumption and consumption of certain fruits and vegetables, such as blueberries, bananas, avocados, and citrus fruits, along with almonds, dark choco-late, and spinach, were associated with lower depression levels compared to lower intake of these foods.

Discussion

The results of our study showed that depression is widely spread among the Saudi population, with varying degrees of severity. The study showed that the rate of depression at a moderate level was the highest (28.59%) in Saudi society. These results are consistent with those of previous studies that have re-ported high prevalence rates of depression in the Saudi population. For example, Alhadi *et al.* .[42] reported a 35.8% prevalence of depression in Saudi Arabia. In addition, the results of our study showed that females are considered to be in a state of depression at a higher rate, which is in line with similar study.[43] While a study by Al-Mohaimeed *et al.*[44] reported a high prevalence of stress among medical students in Saudi Arabia

Our study also found a significant association between age and depression. These findings are con-sistent with previous research suggesting that depression may be more prevalent in certain age groups.[8] Additionally, our study found a positive correlation between BMI and depression, supported by previous research linking obesity with an increased risk of depression.[45] Our findings suggest a significant associa-tion between BMI and levels of depression, with a higher BMI being associated with a higher rate of de-pression in the study population. The results also indicate that participants who were obese or overweight had higher rates of depression than those with normal or underweight BMI. These findings are consistent with previous research showing that higher BMI is associated with an increased risk of depression.[46-48]

Table 3. Association between depression levels with socio-demographic characteristics of the study participants (total N = 710)

		Depression					
Variable	**Categories**	**Normal**	**Mild**	**Moderate**	**Sever**	**Extreme severe**	**Chi-square p value**
Gender	Female	90 (60.81)	123 (71.1	144 (70.94)	71 (70.3)	65 (76.47)	
	Male	58 (39.19)	50 (28.9	59 (29.06)	30 (29.7)	20 (23.53)	0.105
	All	148 (100.00)	173 (100.00)	203 (100.00)	101 (100.00)	85 (100.00)	
Age	15-20	10 (6.76)	16 (9.25)	13 (6.4)	16 (15.84)	26 (30.59)	
	21-30	54 (36.49)	61 (35.26)	87 (42.86)	38 (37.62)	30 (35.29)	0.001
	31-40	33 (22.30)	42 (24.28)	35 (17.24)	22 (21.78)	15 (17.65)	
	>40	51 (34.46)	54 (31.21)	68 (33.50	25 (24.75)	14 (16.47)	

Table. 4 The association between depression level scores and MI groups for the study participants (total N = 710)

	Depression						
	Normal	**Mild**	**Moderate**	**Sever**	**Extreme sever**	**All**	**Chi-square p-value**
BMI							
Underweight	36 (24.32)	27 (15.61)	44 (21.67)	14 (13.86)	24 (28.24)	145 (20.42)	
Normal	50 (33.78)	73 (42.2)	62 (30.54)	27 (26.73)	20 (23.53)	232 (32.68)	
Overweight	47 (31.76)	62 (35.84)	74 (36.45)	46 (45.54)	25 (29.41`)	254 (35.77)	0.003
Obese	15 (10.14)	11 (6.36)	23 (11.33)	14 (13.86)	16 (18.82)	79 (11.13)	
All	148 (100.00)	173 (100.00)	203 (100.00)	101 (100.00)	85 (100.00)	710 (100.00)	

Several biological, psychological, and social factors may explain the association between BMI and depression. For example, obesity has been associated with inflammation and depression.[26-27] In a me-ta-analysis of eight long-term studies, it was discovered that there is a bidirectional association between depression and obesity, with obese individuals having a 55% higher lifetime risk of developing depression and depressed individuals having a 58% higher lifetime risk of obesity.[49]

The finding that weight loss interventions can reduce symptoms of depression among obese individu-als [50] suggests that addressing BMI may

be an effective strategy for improving mental health out-comes. Furthermore, our study found that unhealthy dietary habits were associated with higher levels of depression, while healthy dietary habits were associated with lower mental health outcomes. These find-ings are consistent with those of previous studies, suggesting that dietary habits play an essential role in mental health outcomes. A healthy diet characterized by high consumption of fruits, vegetables, and fish was associated with a lower risk of depression in a large cohort study.[51]

Table 5. Correlation between weight change and depression levels for the current study participants (total N = 710)

Question	Normal	Mild	Moderate	Sever	Extreme sever	All	Chi-square p-value
1. In the past six months, I have noticed a change in weight							
fixed weight	61 (41.22)	60 (34.68)	64 (31.53	28 (27.72)	16 (18.82)	229 (32.25)	
Weight gain (less than 5 kilos)	20 (13.51)	34 (19.65)	40 (19.7)	19 (18.81)	16 (18.82)	129 (18.17)	
Weight gain (5 kilos)	8 (5.41)	17 (9.83)	24 (11.82)	16 (15.84)	20 (23.53)	85 (11.97)	
Weight gain (more than 5 kilos)	11 (7.43)	22 (12.72)	27 (13.3)	6 (5.94)	5 (5.88)	71 -10	
Weight loss (less than 5 kilos)	30 (20.27)	25 (14.45)	26 (12.81)	17 (16.83)	17 (20)	115 (16.2)	0.007
Weight loss (5 kilos)	15 (10.14)	10 (5.78)	15 (7.39)	12 (11.88)	8 (9.41)	60 (8.45)	
Weight loss (more than 5 kilos)	3 (2.03)	5 (2.89)	7 (3.45)	3 (2.97)	3 (3.53)	21 (2.96)	
All	148 (100.00)	173 (100.00)	203 (100.00)	101 (100.00)	85 (100.00)	710 (100.00)	
2. Within 6 months, did anyone tell you about a significant change in your weight?							
Yes	84 (42.21)	26 (34.24)	50 (26.04)	30 (29.41)	38 (25.5)	228 (32.11)	
No	115 (57.79)	42 (61.76)	142 (73.96)	72 (70.59)	111 (74.5)	482 (67.89)	0.002
All	199 (100.00)	68 (100.00)	192 (100.00)	102 (100.00)	149 (100.00)	710 (100.00)	

Additionally, our study found that certain specific dietary behaviors were associated with lower levels of depression. Increased water consumption and consumption of certain fruits and vegetables, such as blueberries, bananas, avocados, and citrus fruits, along with almonds, dark chocolate, and spinach, affect lowering the level of depression. Our findings agree with some results of Glabska, *et al.*,[52] who mentioned that ingesting many fruits and vegetables, as well as some of their specific subgroups such as berries, cit-rus, and green leafy vegetables, may lower psychological distress and ambiguity while preventing depres-sive symptoms and promoting higher levels of optimism and self-efficacy. Moreover, consumption of fruits and vegetables may help prevent or reduce depression.[53] Finally, our study

found no significant as-sociation between gender and depression. These findings are consistent with those of previous studies that have reported similar results.[45] However, further research is needed to explore the relationship between gender and mental health outcomes in the Saudi population.

Table 6. Relationship between eating habits and depression levels for the current study participants (total N = 710)

Depression Question	Normal	mild	moderate	Severe	Extreme severe	chi-square (P-Value)
1. During times of depression, what type of food do you usually consume?						
Unhealthy food (such as sweets, French fries, chocolate, etc.)	102 (68.92)	134 (77.46)	165 (81.28)	90 (89.11)	76 (89.41)	0.001
Healthy food (such as beans, vegetables, and fruits)	46 (31.08)	39 (22.54)	38 (18.72)	11 (10.89)	9 (10.59)	
All	148 (100.00)	173 (100.00)	203 (100.00)	101 (100.00)	85 (100.00)	
2. How many meals do you typically have per day?						
Less than one meal	1 (0.68)	3 (1.73)	5 (2.46)	2 (1.98)	5 (5.88)	0.001
One meal	11 (7.43)	21 (12.14)	17 (8.37)	11 (10.89)	20 (23.53)	
Two meals	65 (43.92)	91 (52.6)	115 (56.65)	58 (57.43)	32 (37.65)	
Three meals	59 (39.86)	52 (30.06)	51 (25.12)	22 (21.78)	18 (21.18)	
More than three meals	12 (8.11)	6 (3.47)	15 (7.39)	8 (7.92)	10 (11.76)	
All	148 (100.00)	173 (100.00)	203 (100.00)	101 (100.00)	85 (100.00)	
3. Which diet is most similar to your usual eating habits?						
A diet based on sugar and fast food.	23 (15.54)	32 (18.5)	62 (30.54)	30 (29.7)	45 (52.94)	0.001
Balanced diet	70 (47.3)	70 (40.46)	58 (28.57)	30 (29.7)	18 (21.18)	
Carbohydrate-based diet	55 (37.16)	71 (41.04)	83 (40.89)	41 (40.59)	22 (25.88)	
All	148 (100.00)	173 (100.00)	203 (100.00)	101 (100.00)	85 (100.00)	

Table 7. Relationship between eating behaviors and depression levels for the study participants (total N = 710)

	Depression					
Question	**Normal**	**Mild**	**Moderate**	**Severe**	**Extreme severe**	**chi-square (P-Value)**
1. What is your daily water consumption in cups?						
2-4 cups per day	51 (34.46)	72 (41.62)	90 (44.33)	49 (48.51)	35 (41.18)	0.001
5-8 cups per day	68 (45.95)	71 (41.04)	69 (33.99)	28 (27.72)	25 (29.41)	
More than 9 cups per day	21 (14.19)	19 (10.98)	21 (10.34)	10 (9.9)	5 (5.88)	
One cup or less per day	8 (5.41)	11 (6.36)	23 (11.33)	14 (13.86)	20 (23.53)	
All	148 (100.00)	173 (100.00)	203 (100.00)	101 (100.00)	85 (100.00)	
2. How many glasses of milk do you drink daily?						
Less than one glass	40 (27.03)	60 (34.68)	56 (27.59)	26 (25.74)	21 (24.71)	0.017
One glass or more	48 (32.43)	34 (19.65)	36 (17.73)	23 (22.77)	15 (17.65)	
I do not drink milk.	60 (40.54)	79 (45.66)	111 (54.68)	52 (51.49)	49 (57.65)	
All	148 (100.00)	173 (100.00)	203 (100.00)	101 (100.00)	85 (100.00)	
3. Do you include any fruits (blueberries, bananas, avocados, citrus fruits such as oranges, grapes, pineapple, and pomegranate) daily?						
No	44 (29.73)	58 (33.53)	100 (49.26)	51 (50.5)	47 (55.29)	0.001
Yes	104 (70.27)	115 (66.47)	103 (50.74)	50 (49.5)	38 (44.71)	
All	148 (100.00)	173 (100.00)	203 (100.00)	101 (100.00)	85 (100.00)	
4. Do you eat (almonds, dark chocolate, spinach) three or more times a week?						
No	80 (54.05)	109 (63.01)	120 (59.11)	69 (68.32)	62 (72.94)	0.029
Yes	68 (45.95)	64 (36.99)	83 (40.89)	32 (31.68)	23 (27.06)	
All	148 (100.00)	173 (100.00)	203 (100.00)	101 (100.00)	85 (100.00)	

5. Do you use honey for your food or meals?						
No	66 (44.59)	86 (49.71)	115 (56.65)	76 (75.25)	47 (55.29)	0.001
Yes	82 (55.41)	87 (50.29)	88 (43.35)	25 (24.75)	38 (44.71)	
All	148 (100.00)	173 (100.00)	203 (100.00)	101 (100.00)	85 (100.00)	

The study has some main strengths. First, it provides important information about the prevalence and severity of depression issues among the Saudi population, which can inform public health interventions to improve depression outcomes. Second, the study used standardized standards to assess depression out-comes, thereby enhancing the validity of the results, focusing on the potential role of diet in depression outcomes, and provides valuable insights into the complex relationship between diet and depression. However, our study had some limitations. First, the cross-sectional design limits the ability to establish causality between depression outcomes, BMI, and dietary habits. Second, we were unable to obtain blood samples to measure hormone levels. Third, the number of participants in this study was small. Lastly, there may be an underestimation of weight and BMI due to biases in self-reporting. In conclusion, our study provides further evidence of the prevalence and severity of depression among the Saudi population and its association with various factors, such as age, BMI, and dietary habits. These findings are consistent with previous research and highlight the need for effective interventions to improve depression outcomes in this population. Therefore, future research should explore the complex interactions between different factors that contribute to depression outcomes and develop targeted interventions to improve depression outcomes in the Saudi population.

Conclusion

The study found a strong link between depression, eating habits, body mass index, and diet. It also provided evidence supporting the connection between higher body weight and depression. This suggests that interventions targeting depression and obesity could lead to a healthier society.

Recommendations

Our findings suggested that future research further investigates the linkages between diet, depression, and body weight, especially with the rise of unhealthy food consumption in our societies. Additionally, suggesting that qualitative research methods might uncover the underlying mechanisms of this relationship by, for example, exploring the lived experiences of individuals who have experienced depression and changes in body weight.

Significant Statement

Depression is a critical public health problem that has a negative influence on a person's quality of life and significantly increases the global disease burden. Results highlighted the critical need for early detection and intervention measures for depression to manage weight and dietary habits better, moreover, providing evidence for an association between higher body weight and depression.

Conflicts of Interest

The authors have no conflicts of interest to declare

Author Contributions

Study design: Reema Alyamani; Data acquisition: Reema Alyamani, Jawaher Alhussieni, Muruj Alghashmari, Raghad Alkhozai; Data analysis: Reema Alyamani, Areej Almuraee, El-Sayed Bakr, Renad Alsulami, Shaima Sab, Reham Alamri; result interpret; Alaa Qadhi, Walaa Alhassani, Sarah Alkholy, Firas Azzeh, Awatif Almehmadi, Ohaad Awlya; Manuscript writing: Jawaher Alhussieni, Muruj Alghashmari, Raghad Alkhozai, Renad Alsulami, Shaima Sab, Reema Alyamani; Manuscript re-view: Reema Alyamani.

Data Accessibility

Data acquired for this project are available upon request to Dr. Reema Alyamani.

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