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Obesity-Related Knowledge And Its Relationship To Body Mass Index And Demographic Attributes In Obese Jordanian Adults

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ABSTRACT: Background: Obesity is a growing global public health challenge, and obesity-related knowledge (OK) is crucial in lessening its burden and developing management strategies. **Objectives**: To investigate OK levels in obese adults and their association with demographics and body mass index (BMI) categories. **Methods:** A cross-sectional study included 1000 obese Jordanian adult males (54.8%) and females (45.2%) aged 19 to 69. We used a pre-validated questionnaire containing 14 questions to test OK. Following a standard protocol, we conducted face-to-face interviews with each participant to obtain anthropometric measures, demographic attributes, and OK data. **Results:** Participants had a mean age (40.2±3.1 years) and BMI (33.0±3.2 kg/m^2) with no sex differences. The majority were married (78.1%), had a university education (59.4%), and were employed (67.3%), while 40.6% were smokers and 56.7% were sedentary. There were significant sex-based disparities in marital status (p<0.022), education, employment, smoking, and sedentary lifestyle (p<0.001). Participants scored high OK levels (3.99±0.94), with significant sex differences (males vs. females) regarding cardiovascular disease (4.84±0.52 vs. 4.74±0.65, p<0.009), diabetes (4.72±0.55 vs. 4.52±0.77, p<0.001), aerobic exercise (4.93±0.34 vs. 4.87±0.42, p<0.01), and osteoarthritis (3.62±1.25 vs. 3.82±1.17, p<0.01). Moderate to low OK levels showed significant sex differences regarding anti-obesity medications (2.50±1.19 vs. 2.88±1.11, p<0.001), meal replacements (2.05±1.02 vs. 2.42±1.09, p<0.001), fasting misconceptions (1.45±0.85 vs. 1.69±1.03, p<0.001), and chronic stress (2.75±1.05 vs. 3.09±1.11, p<0.001). Education (p<0.031) and sex (p<0.004) were significant predictors of OK, with no significant (p<0.963) differences in OK scores across obesity categories. **Conclusion:** The study demonstrates that participants showed generally good OK levels, with sex and education acting as significant predictors, while obesity categories exhibited no relevance.

Keywords: *Obesity, Body Mass Index, Nutrition knowledge, Obesity-related complications, Demographic Attributes*

INTRODUCTION

Obesity is a multifaceted global health concern that continues to rise in prevalence globally and in Jordan, posing substantial burdens on healthcare systems and individual well-being (1,2). Rates of overweight and obesity increased globally, regionally, and across all countries between 1990 and 2021. In 2021, an estimated 100 billion males and 1.11 billion females were overweight or obese. The fastest increase in obesity prevalence was in the Middle East and North Africa region, where age-standardized prevalence rates more than tripled for males and more than doubled for females (3). The epidemic rises above geographic and socioeconomic boundaries, with marked variations due to demographic characteristics particularly age, sex, education, gross domestic product, and environmental and psycho-social factors (1-3). For healthier eating habits, populations need to know enough about food and nutrition, especially those related to obesity, better food choices, and nutritional recommendations (4-6). Nutritional knowledge is critical in shaping dietary habits and ultimately influencing weight status (4-6). Evidence suggests that greater nutrition knowledge is associated with healthier choices, improved food quality, and reduced risk of obesity-related difficulties (7,8). However, disproportions in nutrition knowledge remain, particularly among people with lower socioeconomic status, such as less-educated populations (9-11). Gender differences in nutrition knowledge and behavior further complicate this picture. Several studies have shown that women are generally more health-conscious, possess greater nutrition knowledge, and are likelier to engage in weight management behaviors than men (12-14). These differences may stem from culturally influenced attitudes toward health and body weight image and differential exposure to health information (13,15). Moreover, emerging research from Saudi Arabia and Jordan highlights that men and women may differ significantly in how they perceive, manage, and respond to obesity-related health issues, including their engagement with dietary interventions (14,16). Although previous research has explored the relationship between nutrition knowledge and general demographic factors, few studies have examined how this knowledge varies across obesity severity classifications based on BMI categories. Understanding these distinctions is essential for developing stage-specific educational and behavioral interventions that are more effective and responsive to the needs of different subpopulations. Therefore, this study aims to assess obesity-related knowledge among obese adults and to examine how it varies by gender, between obesity categories, and various demographic attributes.

METHODS

Study design

A cross-sectional study was conducted to assess the obesity-related knowledge of a sample of obese men and women with a body mass index (BMI) of ≥30 (kg/m^2) using a pre-validated questionnaire as described elsewhere (17). The questionnaire (Table 1) was self-administered and completed under the direct supervision of the researcher; it comprised 14 questions focusing on participants' understanding of obesity-related risk factors and complications. The questionnaire was translated into Arabic and pretested with a pilot group of 20 obese individuals to ensure clarity and cultural relevance. The internal consistency of the knowledge scale was assessed using Cronbach's alpha, yielding a reliability coefficient of 0.750 across the 14 questions. This value indicates an acceptable level of reliability and demonstrates adequate internal consistency (18).

Each question in the study questionnaire included five response options, rated as follows: (a = definitely, b = probably, c = probably not, d= not definitely, and e = do not know) using a five-point Likert scale. Responses to all questions on this scale were then scored from 1 (do not know) to 5 (definitely), except for questions 6, 13, and 14, where the rating was reversed. The maximum possible score was 70. Interpreting Likert scale responses into categories, such as low, medium, and high, based on dividing the scale means into three equal intervals across the total score range, follows the approach outlined by Joshi et al. (19).

Subjects

The study population consisted of 1000 men and women aged 19 to 69, recruited randomly (18) from different Ministry of Health's comprehensive health centers in Amman, Jordan. Subjects were included in the study if they had a BMI of ≥30 kg/m^2, were healthy, and had completed the entire survey. Participants were excluded if they had incomplete questionnaires, were outside the specified age or BMI range, were pregnant or lactating, or had a known history or current diagnosis of main medical conditions, including type 1 or type 2 diabetes, cancer, or any mental or physical disabilities.

Data collection

Face-to-face interviews were conducted with each participant to obtain information regarding personal, social, educational status, and health history according to the above inclusion and exclusion criteria. The included information was age, sex, marital status, employment, education, physical activity (light, moderate, heavy), smoking, history of obesity, hypertension, cardiovascular disease, hyperlipidemia, and menopausal status of women. Anthropometric indicators were measured in duplicates with subjects lightly clothed and without shoes (20). Height was measured to the nearest 1.0 mm using a wall-mounted stadiometer and weight to the nearest 0.1 Kg using an electronic scale (20). BMI was calculated as weight in kilograms divided by height in meters squared following the WHO classification of obesity (Category I: BMI 30.0–34.9, Category II: BMI 35.0–39.9, Category III: BMI ≥40) (21).

Table 1: Obesity-Related Knowledge Questionnaire as described elsewhere (17).

No	Obesity-related knowledge questions
1.	Obesity can be assessed by an entity called BMI ?
2.	More fat over abdomen is dangerous than overall increase in the distribution of fat in terms of causing increased cardiovascular problems?
3.	Obesity is associated with heart diseases, such as heart attack, increased blood pressure, increased cholesterol levels, etc.?
4.	Obesity is associated with diabetes?
5.	Obesity is associated with osteoarthritis (joint problems)?
6.	Fasting/skipping meals is a good way to lose weight?
7.	Excess sugar consumption in the form of sweets; additional sugars in coffee/tea/milk etc., is an important risk factor which leads to overweight/obesity?
8.	Frequent consumption of sugar-sweetened beverages (Pepsi/Coca-Cola/sweetened juices, etc.) leads to weight gain?
9.	Frequent fried food consumption leads to weight gain?
10.	Excessive consumption of refined foods (bread/biscuits/momos, etc.) leads to weight gain?
11.	Constant stress is a risk factor which leads to weight gain?
12.	Regular aerobic exercises, such as running, jogging, swimming, playing outdoor sports, etc., is an important way of losing weight?
13.	Anti-obesity drugs are the preferred way of reducing weight?
14.	Meal replacers/supplements are a healthy way to lose weight?

Each question had five response options labeled (a) through (e). Responses were scored on a five-point scale, with the most accurate response receiving a score of 5 and the least accurate a score of 1. Thus, for questions 1–5 and 7–12, the scoring was as follows: a = 5, b = 4, c = 3, d = 2, e = 1. While for questions 6, 13, and 14, the scoring was reversed: a = 1, b = 2, c = 3, d = 4, e = 5.

Ethical approval

All participants were asked to sign a consent form before their participation. Ethical approval for the study was obtained from the Scientific Research Ethics Committee in the Ministry of Health in Jordan (No. MOH/REC/2024/120, Amman, Jordan) according to the ethical guidelines stipulated in the Declaration of Helsinki. All data were also collected, retrieved, and confidentially reported.

Statistical analysis: Statistical analyses were conducted using SPSS software (version 28) for Windows. Based on the distribution of the data, a combination of nonparametric and parametric tests was applied. Differences among groups were examined using analysis of variance (ANOVA) for continuous variables and - chi-square test for categorical variables. Results were presented as means ± standard deviations and frequency distributions. The Mann–Whitney U test assessed differences in obesity-related knowledge between males and females, while the Kruskal–Wallis H test examined differences across obesity categories (I, II, III). Multiple linear regression analysis was also performed to evaluate the relationship between obesity-related knowledge and relevant predictors.

RESULTS

Demographic Characteristics of Participants

The study included 1,000 participants, 548 of whom were male (54.8%) and 452 of whom were female (45.2%). The demographic distribution showed statistically significant sex differences across all attributes, as shown in Table 2.

Table 2: Sex-Based Distribution of Demographic Characteristics of the Study Participants.

Variable	Demographic attributes	Total, N=1000 n (%)	Males, N=548 n (%)	Females, N=452 n (%)	p- value
Marital Status	Married	781 (78.1%)	423[a] (77.2%)	359[a] (79.4%)	0.022
	Single	219 (21.1%)	125[b] (22.8%)	94[b] (20.6%)	0.036
Education Level	Primary school	82 (8.2%)	62[a] (11.3%)	20[a] (4.4%)	<0.001
	High school	324 (32.4%)	205[b] (37.4%)	120[b] (26.5%)	<0.001
	Diploma	15 (1.5%)	3[c] (0.5%)	12[c] (2.7%)	0.020
	Bachelor	508 (50.8%)	234[d] (42.7%)	274[d] (60.6%)	0.076
	Postgraduate	71 (7.1%)	44[e] (8.0%)	27[e] (6.0%)	0.044
Employment	Employed	673 (67.3%)	481[a] (87.8%)	192[a] (42.5%)	<0.001
	Unemployed	327 (32.7%)	67[b] (12.2%)	261[b] (57.7%)	<0.001
Smoking	Smoker	406 (40.6%)	320[a] (58.4%)	86[a] (19.2%)	<0.001
	Non-smoker	594 (59.4%)	228[b] (41.6%)	366[b] (80.8%)	<0.001
Physical Activity	Sedentary	567 56.7%)	332[a] (60.6%)	236[a] (52.1%)	<0.001
	Moderate	387 (38.7%)	193[b] (35.2%)	194[b] (42.8%)	0.959
	Active	46 (4.6%)	23[c] (4.2%)	22[c] (5.1%)	1.000

CVD = cardiovascular diseases, n= number of participants, % = percentage of participants out of total, males, or females, data with different superscript within each category are significantly different (p<0.05).

The majority of participants were married (78.1%), with a slightly higher proportion of married females (79.4%) compared to males (77.2%), *p*=0.022 (Table 2). Conversely, the proportion of single individuals was higher in males (22.8%) than females (20.6%), *p*=0.036. Educational attainment also showed significant gender-based differences. Males were more likely to have completed only primary (11.3% vs. 4.4%, *p*<0.001) or high school education (37.4% vs. 26.5%, *p*<0.001), while females were significantly more likely to hold a bachelor's degree (60.6% vs. 42.7%, *p*=0.076). Although not statistically significant, a higher percentage of females reported diploma-level education than males (2.7% vs. 0.5%, *p*=0.020). Postgraduate qualifications were slightly more common among males (8.0%) than females (6.0%), *p*=0.044.

Employment status revealed stark disparities between genders (Table 2). Employment was reported by 87.8% of males, compared to only 42.5% of females, with the difference being highly significant (*p*<0.001). Correspondingly, unemployment was more prevalent among females (57.7%) than males (12.2%), *p*<0.001. Smoking behavior varied markedly by gender. The proportion of smokers was significantly higher among males (58.4%) compared to females (19.2%), *p*<0.001. Conversely, females were more likely to be non-smokers (80.8%) than males (41.6%), *p*<0.001. Regarding physical activity levels, a sedentary lifestyle was reported more frequently among males (60.6%) than females (52.1%), *p*<0.001. Moderate physical activity was similar between genders (35.2% in males vs. 42.8% in females), with no statistically significant difference (*p*=0.959). The proportion of physically active individuals was low overall, with comparable rates in males (4.2%) and females (5.1%), *p*=1.000.

Table 3 presents the sex-based mean values and distribution of age groups and body mass index obesity categories of the study participants. The overall mean age of the sample was 40.23 ± 3.01 years. Males had a significantly higher (*p*<0.001) mean age (42.00 ± 12.29) compared to females (38.72 ± 12.13). Within specific age groups, there were significant sex differences in the 30–39 (*p*=0.025) and 50–59 (*p*=0.014) categories, where males exhibited slightly higher mean ages. Sex differences in the 19–29, 40–49, and 60–69 age groups were insignificant. Regarding age group distribution, the foremost proportion (26.8%) of participants were in the 40–49 group, followed by 30–39 (24.9%), 50–59 (21.6%), and 19–29 (21.1%) age groups, while only 5.6% were in the 60–69 group. Each age group showed a relatively balanced gender distribution, although males were more represented in the 40–49 and 50–59 groups.

Table 3. Sex-Based Mean Values and Distribution of Age and Obesity Categories of the Study Participants.

Variable	Category	Total Mean ± SD n (%)	Males Mean ± SD n (%)	Females Mean ± SD n (%)	*p*-value
Age (years)	19–29	24.01 ± 3.20 211 (21.1%)	23.98 ± 3.13 91 (43.1%)	24.02 ± 3.25 120 (56.9%)	0.931
	30–39	34.62 ± 2.97 249 (24.9%)	35.03 ± 2.74 128 (51.4%)	34.19 ± 3.14 121 (48.6%)	0.025
	40–49	44.20 ± 3.02 268 (26.8%)	44.12 ± 2.92 166 (61.7%)	44.30 ± 3.18 102 (38.3%)	0.634
	50–59	53.46 ± 2.88 216 (21.6%)	53.88 ± 2.92 122 (56.5%)	52.90 ± 2.74 94 (43.5%)	0.014
	60–69	63.14 ± 2.73 56 (5.6%)	63.34 ± 2.84 32 (57.1%)	62.60 ± 2.44 24 (42.9%)	0.375
	Total	40.23 ± 3.01 1000 (100%)	42.00 ± 12.29 548 (54.8%)	38.72 ± 12.13 452 (45.2%)	< 0.001
Body mass index (kg/m^2)	I 30.0 to 34.9	31.74 ± 1.33 808 (80.8%)	31.69 ± 1.29 450 (55.6%)	31.80 ± 1.38 358 (44.4%)	0.362
	II 35.0 to 39.9	36.79 ± 1.25 152 (15.2%)	36.87 ± 1.28 79 (52.0%)	36.71 ± 1.21 73 (48.0%)	0.433
	III ≥ 40	43.92 ± 3.71 40 (4.0%)	43.63 ± 3.68 19 (47.5%)	44.18 ± 3.81 21 (52.5%)	0.645
	Total	33.00 ± 3.23 1000 (100%)	32.87 ± 3.09 548 (54.8%)	33.17 ± 3.40 452 (45.2%)	0.150

n= number of participants, % = percentage of participants out of total, males, or females, $p<0.05$, SD = standard deviation.

For BMI categories, most participants (80.8%) fell within obesity category I (BMI 30.0–34.9), with 55.6% males and 44.4% females. Category II (BMI 35.0–39.9) included 15.2% of participants, while only 4.0% were classified under III (BMI ≥ 40). Mean BMI values showed no statistically significant sex-based differences across all three obesity categories. Specifically, the mean BMI in obesity category I was 31.74 ± 1.33 overall, 31.69 ± 1.29 in males, and 31.80 ± 1.38 in females (p=0.362). Similarly, no significant differences were observed in II (p = 0.433) or III (p=0.645). The overall mean BMI was 33.00 ± 3.23, with males averaging 32.87 ± 3.09 and females 33.17 ± 3.40 (p=0.150).

Obesity-Related Knowledge of Participants

The assessment of participants' obesity-related knowledge across various test questions revealed differing levels of understanding. Table 4 summarizes the mean obesity-related knowledge scores between males and females. Overall, statistically significant sex differences were observed in 9 questions, notably the associations of obesity with heart disease, diabetes, osteoarthritis, stress, fasting, aerobic exercise, anti-obesity drugs, and meal replacers (p<0.05), with females generally exhibiting slightly higher knowledge scores. The mean scores indicated a high level of Obesity-related knowledge regarding the obesity assessment by BMI, with males scoring 3.94 ± 1.49 and females 3.98 ± 1.49 (p=0.752). Similarly, both sexes demonstrated high awareness that abdominal fat poses a greater cardiovascular risk than general fat distribution, with means of 4.55 ± 0.78 for males and 4.48 ± 0.89 for females (p=0.153). Participants also exhibited a high level of knowledge concerning the association of obesity with heart disease (males: 4.84 ± 0.52, females: 4.74 ± 0.65; p=0.009) and diabetes (males: 4.72 ± 0.55, females: 4.52 ± 0.77; p<0.001). Moderate knowledge levels were observed regarding the link between obesity and osteoarthritis (males: 3.62 ± 1.25, females: 3.82 ± 1.17; p=0.010) and the impact of constant stress on weight gain (males: 2.75 ± 1.05, females: 3.09 ± 1.11; p<0.001).

Table 4: Test Question-Based Scores and Levels of Obesity-Related Knowledge Among Obese Male and Female Participants.

No.	Males (Mean ± SD)	Females (Mean ± SD)	p-value	Level
1	3.94 ± 1.49	3.98 ± 1.49	0.752	High
2	4.55 ± 0.78	4.48 ± 0.89	0.153	High
3	4.84 ± 0.52	4.74 ± 0.65	0.009**	High
4	4.72 ± 0.55	4.52 ± 0.77	0.000**	High
5	3.62 ± 1.25	3.82 ± 1.17	0.010*	Moderate
6	1.45 ± 0.85	1.69 ± 1.03	0.000**	Low
7	4.78 ± 0.52	4.80 ± 0.44	0.454	High
8	4.68 ± 0.54	4.71 ± 0.61	0.426	High
9	4.63 ± 0.57	4.71 ± 0.54	0.030*	High
10	4.63 ± 0.60	4.70 ± 0.58	0.100	High
11	2.75 ± 1.05	3.09 ± 1.11	0.000**	Moderate
12	4.93 ± 0.34	4.87 ± 0.42	0.014*	High
13	2.50 ± 1.19	2.88 ± 1.11	0.000**	Moderate
14	2.05 ± 1.02	2.42 ± 1.09	0.000**	low

SD = standard deviation, * statistical difference (P>0.05), ** statistical difference (P>0.001),

Conversely, obesity-related knowledge (Table 4) was low concerning the misconception that fasting or skipping meals is an effective weight-loss strategy (males: 1.45 ± 0.85, females: 1.69 ± 1.03; p<0.001), as well as regarding the healthfulness of meal replacers and supplements for weight loss (males: 2.05 ± 1.02, females: 2.42 ± 1.09; p<0.001). High levels of awareness were reported for the role of excessive sugar consumption (males: 4.78 ± 0.52, females: 4.80 ± 0.44; p=0.454), frequent intake of sugar-sweetened beverages (males: 4.68 ± 0.54, females: 4.71 ± 0.61; p=0.426), fried foods (males: 4.63 ± 0.57, females: 4.71 ± 0.54; p=0.030), and refined foods (males: 4.63 ± 0.60, females: 4.70 ± 0.58; p=0.100) as contributors to weight gain. Additionally, participants showed a high level of knowledge regarding the importance of regular aerobic exercise in weight management (males: 4.93 ± 0.34, females: 4.87 ± 0.42; p=0.014). Obesity-related knowledge about anti-obesity medications as the preferred weight loss method was moderate (males: 2.50 ± 1.19, females: 2.88 ± 1.11; p<0.001). Mean scores and standard deviations for each question, categorized by sex (males in blue, females in green) and the total population (in red), are shown in a line chart as shown in Figure 1.

Female participants demonstrated significantly higher mean scores in the following areas: awareness of the link between obesity and cardiovascular diseases (question 3; p=0.009), association between obesity and diabetes (question 4; p<0.001), misconceptions about fasting or skipping meals as a weight-loss strategy (question 6; p<0.001), understanding the role of chronic stress in weight gain (question 11; p<0.001), knowledge of the benefits of aerobic exercise for weight loss (question 12; p=0.014), perception of anti-obesity medications (question 13; p<0.001), belief in the effectiveness of meal replacements and dietary supplements (question 14; p<0.001). While male participants scored significantly higher on knowledge of the association between obesity and osteoarthritis (question 5; p=0.010), understanding the impact of fried food consumption on weight gain (question 9; p=0.030), Sex differences for the remaining five questions (questions 1, 2, 7, 8, and 10) were insignificant.

Figure 1: Line Chart of Sex-Based Obesity-Related Knowledge of Obese Participants (Mean ± SD) Across the Test Questions.

BMI Category-Based Obesity-Related Knowledge of Participants

Table 5 exhibits the participants' BMI category-based obesity-related knowledge. There were no significant differences in mean scores across all test questions among the three obesity categories. Overall, obesity-related knowledge scores were high and comparable across all BMI groups: Category I (3.89± 0.89), category II (4.01 ± 0.90), and category III (3.98 ±0.92) (p=0.471).

Table 5: BMI Category-Based Obesity-Related Knowledge of Participants.

No.	Obesity category I BMI (30.0 - 34.9)		Obesity category II BMI (35.0 – 39.9)		Obesity category III BMI (40.0 and above)		p- value
	Mean score	±SD	Mean score	±SD	Mean score	±SD	
1	3.91	1.515	4.18	1.378	4.05	1.377	0.106
2	4.5	0.848	4.57	0.811	4.63	0.49	0.441
3	4.79	0.574	4.83	0.628	4.78	0.577	0.693
4	4.63	0.66	4.63	0.668	4.63	0.838	0.994
5	3.69	1.225	3.89	1.113	3.43	1.357	0.059
6	1.52	0.889	1.74	1.149	1.70	1.068	0.103
7	4.78	0.493	4.8	0.475	4.83	0.385	0.770
8	4.69	0.583	4.72	0.53	4.7	0.608	0.754
9	4.67	0.559	4.66	0.575	4.73	0.506	0.805
10	4.67	0.551	4.61	0.782	4.75	0.439	0.307
11	2.89	1.071	2.93	1.163	3.1	1.172	0.455
12	4.9	0.391	4.91	0.363	4.98	0.158	0.400
13	2.64	1.159	2.78	1.184	2.88	1.264	0.222
14	2.21	1.060	2.83	1.049	2.50	1.34	0.478
Overall	3.89	0.89	4.01	0.90	3.98	0.92	0.471

Potential Demographic Attributes Influencing Obesity-Related Knowledge

A multiple linear regression analysis examined the influence of selected demographic attributes, sex, education levels, and obesity category on participants' obesity-related knowledge scores. The overall regression model was statistically significant (F (3, N) = 16.234, $p<0.001$), with an R^2 value of 0.555, indicating that approximately 55.5% of the variance in obesity-related knowledge could be explained by the included demographic factors as shown in Table 6.

Table 6: Multiple Linear Regression Analysis: Obesity-Related Knowledge

Variables	Pearson Correlation Coefficient	Beta	Standard Error	T-Value	95%CI (Lower) 95%CI (Upper)	Significance ($\alpha \leq 0.05$)	VIF
Gender	0.197	0.106	0.021	4.857	[-0.060, 0.024]	0.031*	1.021
Obesity category	0.052	0.022	0.028	1.1	[-0.017, 0.061]	0.272	1.032
Education	0.231	0.115	0.018	6.389	[0.080, 0.150]	0.004**	1.019
R Square			0.555				
F-Value			16.234				
Significance Level			0.000				

VIF: variance Inflation Factor, CI :Confidence intervals, Beta is the regression coefficients, * Statistical difference ($p>0.05$), ** Statistical difference ($p>0.001$)

The analysis showed that gender (β = 0.106, p=0.031) and education level (β = 0.115, p = 0.004) significantly affected obesity-related knowledge, while obesity categories were not significant (p=0.272). The model showed that education level has the potential effect (Beta = 0.115) and explained 55.5% of the variance in knowledge (R^2 = 0.555), indicating an acceptable quality of the model.

DISCUSSION

This study assessed nutrition knowledge related to obesity among a Jordanian obese adult population and revealed a generally high level of awareness among participants, with mean scores consistently above the midpoint for most knowledge test questions, ranging from 1.45 ± 0.85 to 4.93 ± 0.34, indicating strong obesity-related knowledge among respondents.

Participants demonstrated good obesity-related knowledge about dietary risk factors, including the impact of excess sugar, sugar-sweetened beverages, fried foods, and refined carbohydrates on weight gain. This result is encouraging, as diet quality remains a critical modifiable factor in obesity prevention and management (21). Also, high scores on questions related to the assessment of obesity using BMI, cardiovascular risk, and the association of obesity with heart disease and diabetes reflect a solid understanding of fundamental obesity concepts among participants. These findings align with previous research indicating better knowledge of obesity as a crucial health concern and its associations with chronic diseases (22-24).

Despite high overall knowledge, notable misconceptions persevered, suggesting that awareness may be less widespread in these areas. Similarly, questions addressing weight loss methods showed varied responses, indicating mixed perceptions or uncertainty. In this study, many participants believed that skipping meals or unstructured fasting leads to weight loss, a misconception contradicted by evidence linking such behaviors to increased cravings and poor dietary choices (25).

There was also limited awareness of the relationship between chronic stress and weight gain, as many participants did not recognize stress as a significant risk factor for obesity despite well-established links through the hypothalamic-pituitary-adrenal axis and cortisol (26,27). We also noted misunderstandings regarding the effectiveness and safety of dietary supplements, medications, and meal replacements for weight management, consistent with findings reported elsewhere (28). Moreover, the moderate knowledge regarding the link between obesity and osteoarthritis aligns with existing literature that the general population often underestimates the impact of obesity on joint health (29,30) despite clear evidence that excess body weight contributes to joint stress and inflammation (31). These findings highlight the need for clearer public health messaging about effective, evidence-based weight management strategies and caution against potentially harmful practices like unsupervised fasting or overreliance on pharmacological interventions without lifestyle modification (32,33).

Notably, this study revealed significant sex differences in most obesity-related knowledge scores, with males scoring high and females scoring low to moderate. Female participants generally scored higher than males, particularly regarding the links between obesity and chronic diseases, such as cardiovascular disease and diabetes. They also scored higher in understanding effective weight-loss strategies, like physical activity and regular aerobic exercise. This result is consistent with the findings that women exhibited fewer desirable behaviors and participated in less physical activity than men (34). Nevertheless, female participants showed better awareness of the limitations of pharmacological interventions, such as the use of anti-obesity medications and meal replacements/supplements. These findings parallel previous research suggesting women tend to have greater health knowledge and are more proactive in seeking information and engaging with health services (14,35).

In essence, men and women showed generally different levels of health literacy, which critically influences their health behaviors and knowledge acquisition (36). Cultural and societal factors, such as an increased emphasis on women's physical appearance, may contribute to this difference (16,37). Conversely, men's lower knowledge scores may reflect lower engagement with nutrition education and underrepresentation in targeted health programs (11). Muscogiuri et al. (38) emphasized sex is a critical variable in obesity analysis, while Oguoma et al. (39) concluded that sex-specific approaches are necessary for influential education and intervention. In addition, other research on obesity-related knowledge highlighted that disparities are often due to social background, cultural norms, and access to resources rather than sex alone (40). Current findings indicate that sex and education level substantially and reliably influence obesity-related knowledge, with education having a higher association than sex.

Moreover, across all obesity categories, participants demonstrated a high obesity-related knowledge level. Notably, no statistically significant differences were observed between obesity categories, as indicated by BMI classes, suggesting that the degree of obesity, as classified by BMI, does not significantly influence knowledge levels. These findings are particularly noteworthy, as some research suggested a link between obesity and poor obesity-related knowledge (41,42), other research found no significant relationship (43,44), while Valmórbida et al. (45) reported a negative relationship between obesity-related knowledge and BMI. However, it is essential to realize that this relationship is multifaceted. Moreover, Henriques et al. (46) showed that correct obesity-related knowledge does not necessarily translate into a healthier BMI in Portuguese adults. The absence of significant differences in knowledge across obesity categories may suggest that educational exposure or health information access is relatively uniform among individuals regardless of obesity severity. Alternatively, it may indicate that obesity-related knowledge alone is inadequate to influence obesity outcomes, underscoring the complex interplay of behavioral, environmental, and physiological factors in weight management. Such discrepancies may also reflect differences in health concerns or access to information among individuals with varying obesity severity (47). These results suggest that individuals with greater obesity severity may have less nutritional knowledge, potentially due to differences in socioeconomic status and environmental conditions (41-47).

It is vital to highlight that obesity-related knowledge varies by socio-demographic status, such as sex, education, employment, and socioeconomic status (48,49). In this context, the findings of this study contextualize those of McMaughan et al. (50), who confirmed the correlation between higher socioeconomic status and improved health knowledge and outcomes. Kutner et al. (51) also reported that people with advanced education have advanced critical thinking skills and better access to health information, which leads to outstanding health outcomes. Moreover, individuals with higher socioeconomic tend to possess greater obesity-related knowledge, improved awareness, and healthier dietary behaviors, likely due to better access to education, health resources, and information (52,53).

In this study, more than half of the participants were middle-aged, over two-thirds were employed, and over three-quarters were married; the vast majority were males who showed good obesity-related knowledge. Noteworthy, age is among several demographic attributes that affect adults' positive nutritional behaviors as more health-conscious behaviors they adapt due to increased awareness of chronic disease risks or accumulated life experience that encourages healthier eating (54) Employment often reflects economic stability and access to healthier food options; however, unemployed individuals may experience increased stress, reduced income, and social isolation, all of which can negatively impact their eating habits (55). Domingos et al. (56) found that individuals with a partner demonstrated different patterns of self-care, social support, and shared responsibility compared to those without, while another study indicated that married individuals may be at greater risk of overweight or obesity, likely due to shared lifestyle factors and social eating (57). Therefore, public health intervention designs should emphasize considering sociodemographic contexts.

It is crucial to highlight that some research emphasizes that higher obesity-related nutrition knowledge alone does not fully account for differences in dietary behavior, as many individuals do not consistently translate this knowledge into practice (7,58). These findings highlight the need for targeted educational strategies that address specific misconceptions about weight management, the role of stress, and the safe use of interventions, and also consider sex-specific barriers and the underrepresentation of men in nutrition education. Noteworthy, such strategies are of particular importance in Jordan, given the alarming high prevalence of obesity and metabolic syndrome in the country (1, 59-61).

CONCLUSION:

This study revealed that Jordanian obese adults generally have a high level of obesity-related knowledge, especially regarding dietary risk factors, obesity assessment, and its links to chronic illnesses. However, misconceptions remain about effective weight loss methods, the role of stress, and the safety of supplements and medications, highlighting the need for clearer public health education. Women showed higher obesity-related knowledge levels than men, indicating a requirement for sex-sensitive interventions to engage males more effectively. Knowledge did not differ significantly across obesity severity, suggesting that education alone may not be enough to influence obesity consequences, which are shaped by multiple factors. Socio-demographic elements also affect nutrition knowledge, and translating this knowledge into healthy behaviors remains challenging. Overall, education programs addressing misconceptions and sex variances, combined with broader behavioral strategies, are essential to advance obesity management in Jordan.

Conflict of Interest

The authors declare no conflict of interest.

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Author Contributions

All authors contributed equally to this work.

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