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Original article

The effect of age, body weight status, and sex on intuitive eating, eating disorders, and mediterranean diet adherence among younger adults in Jordan

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Abstract. *Background and Aim:* Intuitive eating (IE) is one dietary behavior that actively contributes to obesity and associated diseases. The study aims to assess the influence of age, body weight, and gender on intuitive eating, eating disorders, and adherence to the Mediterranean diet among young adults. *Methods:* A cross-sectional study enrolled 1684 participants aged 18-40 years. Face-to-face questionnaires were utilized to gather demographic information and anthropometric measurements. In addition to this, a validated Arabic version of the Mediterranean Diet Scale (MDS) questionnaire was used to assess adherence to the Mediterranean diet, the Intuitive Eating Scale-2 (IES-2) to evaluate intuitive eating, and the Eating Attitude Test (EAT-26) for assessing eating disorders were used. *Results:* The study found that Both sexes demonstrated a moderate adherence level and were mostly intuitive eaters. However, females had a significantly higher prevalence of eating disorders (48.2%) compared to males (38.2%) ($p < 0.05$). Participants' age did not significantly affect adherence to the Mediterranean diet (MDS), IES-2, or EAT-26 scores. When looking at weight status, the study found that normal-weight participants were significantly more likely to be intuitive eaters (57.3% vs. 39.9%, respectively; $p < 0.001$), whereas participants with overweight or obesity were significantly more likely to have eating disorders (51.1% vs. 41.9%; respectively; $p < 0.001$). *Conclusions:* Mediterranean diet adherence is not influenced by age, gender, or weight status. Intuitive eating is significantly higher among individuals with normal weight while eating disorders are more prevalent among females and participants with overweight or obesity. (www.actabiomedica.it)

Key words: intuitive eating, eating attitude, weight; mediterranean diet, adults, body mass index

Introduction

Obesity and overweight prevalence have been rising dramatically around the world (1). Particularly in current times, eating habits and dietary behaviors also actively contribute to the development and prevention of obesity and diseases associated with obesity (2); also, changes in eating behavior play a vital role in obesity occurrence and prevention (3). Numerous factors, including genetics, hormones, religious views, emotion, the media, and the environment, can influence an individual's eating behavior. Research has indicated a significant correlation between eating behavior and food intake (4). Intuitive and emotional eating are eating behaviors that are underlined in obesity prevention (5). Intuitive eating (IE) involves eating for physiological rather than emotional reasons. Relying on hunger and satiety cues, body-food decision congruence, and unconditional permission to eat are all components of intuitive eating (6). Its tenets are to foster a positive relationship between

the body, mind, and food, as well as an awareness of feelings and the enjoyment of eating (7). Research has demonstrated a negative correlation between IE and the symptomatology of eating disorders and a favorable correlation between IE and psychological states, including body acceptance and self-esteem (8). Moreover, several studies approved a negative correlation between body weight, body mass index (BMI), and IE (9-11). Research on male and female populations revealed that a higher IE score can lower BMI (12, 13). Unlike non-intuitive eaters, intuitive eaters consume a diet higher in nutrients and exhibit more positive eating habits (14). IE has been assessed using the Intuitive Eating Scale-2 (IES-2), which measures individuals' tendency to follow their physical hunger and satiety cues when determining what, when, and how much to eat (6). Impaired body image and eating patterns are linked to eating disorders. This health issue typically affects females and adolescents. If left untreated, it could develop into a chronic condition that leads to social, physical, and psychological issues (15). Risk factors for eating disorders include internalization of the ultra-thin ideal, negative self-beliefs, body dissatisfaction, and impaired eating attitude (15, 16). It is noteworthy that a large number of psychiatric issues, particularly those related to dangerous eating habits, are prevalent among college students and young adults (15, 17). Eating disorders have been negatively associated with diet quality, and contracting IE, which has been positively associated with diet quality (14, 18). Eating behavior among Jordanians has shifted to Westernized eating (low fruits and vegetables intake and higher fatty foods consumption), eating disorders prevalence has increased, and diet quality has been affected (19-22). This study examined the effect of age, body weight status, and sex on intuitive eating, eating disorders, and dirt quality (represented by Mediterranean diet adherence) among young, apparently healthy adults in Jordan.

Materials and Methodology

Study design

A cross-sectional study was conducted in Jordan (February and June 2024). A total of 1684 participants (18-40 years) were recruited. Admission required: being Jordanian, between the ages of 18 and 40, able to communicate, and ready to participate. Women who were nursing or pregnant were not allowed.

Data collection

The information was gathered by trained nutritionists using a face-to-face questionnaire. Demographic information, including sex, age, marital status, educational level, employment status, family members, and lifestyle information on smoking and physical activity, was also collected through the interviews. All the questionnaires used were written in Arabic as originally presented in their sources.

Anthropometric measurements and indices

Seca stadiometers (Seca, USA) were used to measure body height, and the electrical InBody H20N body fat Scale (FSA, US) was utilized for bioelectrical impedance analysis (BIA) to determine body weight (kg). The BMI was calculated (kg/m^2) and classified (underweight: <19.0 kg/m^2; normal weight:19.0-24.9kg/m^2; overweight:25.0-29.9 kg/m^2;and obesity:≥30.0 kg/m^2). Waist circumference (WC) was measured to the closest 0.1 cm.

Mediterranean diet adherence

A validated Arabic version of the Mediterranean diet scale (MDS) questionnaire was used, and the translation and validation were conducted by Aljehani et al. (23). In short, Aljehani et al. to ensure cross-cultural applicability, translated the English questionnaire into Arabic and back-translated it. Face and content validity were established through feedback from 10 healthcare providers and 10 CVD patients. The final questionnaire was then administered to 200 Saudi Arabian patients to evaluate its psychometric properties, including factor structure, internal consistency, and criterion and construct validity (Cronbach alfa=0.8). This MDS used more straightforward language and visuals to make the questions easier to understand. Thirteen items on it have yes/no choices. The products are separated into four categories: fish and seafood; fruits, vegetables,

nuts, and legumes; meats and processed foods; and olive oil and sauce. According to MDS adherence, each item is given a value of either 0 or 1. A final score of 0 to 13; < 5 indicates low adherence to the MDS, 5-9 indicates moderate adherence, and ≥10 indicates high adherence to the MDS (23).

Intuitive eating scale–2 (IES-2)

Intuitive eating was measured using a validated Arabic version of the IES-2 (23 items). The IES-2 uses a Likert scale to determine how much each individual agrees or disagrees with the 23 questions, and then the sum of all items is divided by 23. Participants were categorized as above-average intuitive eaters if they scored above the mean score of 3.37 (24).

The four IES-2 subscales were unconditional permission to eat (the sum of items 1, 2, 3, 4, 5, and 6, then divided by 6), eating for physical rather than emotional reasons subscale (the sum of items 7, 8, 9,10, 11, 12, 13, and 14; then divide by 8), reliance on hunger and satiety cues subscale (sum of items 15, 16, 17, 18, 19, and 20; then divide by 6), and body-food choice congruence subscale (sum of items 21, 22, and 23; then divide by 3) (11).

Eating attitude test (EAT-26)

EAT-26 is a valuable screening tool for eating disorder assessment. A validated Arabic version of the EAT-26 was used. The questionnaire comprises twenty-six questions, each with a response scale varying from never to always. Each item (except the 26th item) has six response options ranging in value from 0 to 3. Item 26 has a reversed score (25). The total score is calculated by summing up all answers to the questions and can vary from 0 to 78. A score of 20 or above indicates possible disordered food attitudes (26). Also, the EAT-26 subscales are dieting scale (questions 1, 6, 7, 10, 11, 12, 14, 16, 17, 22, 23, 24, and 26), bulimia and preoccupation subscale (questions 3, 4, 9, 18, 21, 25), and oral control subscale (questions 2, 5, 8, 13, 19, and 20) (27).

Ethical approval

The Helsinki Declaration served as the basis for the study protocol, which was examined and approved by the institutional review board of Hashemite University (No. 4/1/2023/2024). Every person who volunteered to participate in the study gave the researchers their informed written consent. Additionally, they received assurances that the study would be the only use of their comments and that their information would be kept private.

Statistical analysis

Data were analyzed using IBM SPSS Statistics (IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp). The Shapiro–Wilk test was used to verify the normality of variables. Normally distributed continuous variables were expressed as means with standard deviations, while non-normally distributed variables were shown as medians with interquartile ranges. However, categorical variables are presented as frequencies and percentages (%). A chi-square (χ^2) test was performed to test the differences between subjects with normal and abnormal weight. The independent-sample t-test and Mann-Whitney U test were performed to analyze differences between normally distributed and non-normally distributed variables, respectively, to compare the means of continuous variables between the two groups. Findings with a p-value of < 0.05 were statistically significant.

Results

A total of 1684 participants have been enrolled in this study; 32.5% were males and 67.5% were females, and their mean age was 23.02 (±3.96). Table 1 presents the general characteristics of the study population. Most lived in Jordan's middle regions, were single, and attended college or university. Also, more than half of the study population were from families with 3-6 family members and were physically active. While only 25.2% were non-smokers, 40.4% were current smokers, and 32.3% were passive smokers. Unfortunately, 33.6% of the population had abnormal weight status, which means that they were either overweight or with obesity. Just 5.5% of the participants adhered to the Mediterranean diet poorly, while around 71% did so moderately. Although there was

Table 1. General characteristics of the study population

Variable	Total (N (%))
Sex	
Male	547 (32.5)
Female	1137 (67.5)
Educational level	
Primary or Secondary	68 (4.0)
High school	214 (12.7)
College or university student	1176 (69.8)
B.Sc. degree	203 (12.1)
Higher education (master's or Ph.D.)	23 (1.4)
Marital Status	
Single	1402 (83.3)
Married	269 (16.0)
Widowed or divorced	13 (0.8)
Living Place	
Middle areas (Amman, Zarqa, Madaba, Mafraq)	1581 (93.9)
Northern Jordan (Irbid, Ramtha, Ajloun, Jerash)	69 (4.1)
Southern Jordan (Karak, Maan, Aqaba, Tafieleh)	34 (2.0)
Family Size (with parents)	
less than three members	85 (5.0)
3-6 members	903 (53.6)
7-10 members	656 (39.0)
More than ten members	40 (2.4)
Physical Activity	
Active	975 (57.9)
Not Active	709 (42.1)
Cigarette Smoking	
Current smoker (Cigarettes/Hookah)	681 (40.4)
Past smoker	34 (2.0)
Passive smoker	544 (32.3)
Non-smoker	425 (25.2)
Weight status (BMI)	
Normal weight	1118 (66.4)
Abnormal	566 (33.6)

Abbreviation: BMI: body mass index.

no significant difference in adherence levels between sexes, men adhered to the diet more than wo men (26.5% vs. 22.2%, respectively) (Table 2). On the other hand, more than half of the study population were

Table 2. The association of MDS adherence levels, IES-2, and EAT-26 evaluation levels based on sex and age groups*

Sex				
Variables	**Total N (%)**	**Males**	**Females**	****P-value**
MDS Adherence				
Low	93 (5.5)	34 (6.2)	59 (5.2)	0.076
Moderate	1194 (70.9)	368 (67.3)	826 (72.6)	
High	397 (23.6)	145 (26.5)	252 (22.2)	
IES-2				
Below average	817 (48.5)	257 (47.0)	560 (49.3)	0.383
Above average	867 (51.5)	290 (53.0)	577 (50.7)	
EAT-26				
Ordered	927 (55.0)	338 (61.8)	589 (51.8)	**< 0.001**
Disordered	757 (45.0)	209 (38.2)	548 (48.2)	
Age groups				
Variables	**Total N (%)**	**≤26 years**	**>26 years**	****P-value**
MDS Adherence				
Low	93 (5.5)	77 (5.4)	16 (6.1)	0.889
Moderate	1194 (70.9)	1010 (71.1)	184 (70.0)	
High	397 (23.6)	334 (23.5)	63 (24.0)	
IES-2				
Below average	817 (48.5)	684 (48.1)	133 (50.6)	0.468
Above average	867 (51.5)	737 (51.9)	130 (49.4)	
EAT-26				
Ordered	927 (55.0)	790 (55.6)	137 (52.1)	0.294
Disordered	757 (45.0)	631 (44.4)	126 (47.9)	

* Data are presented as numbers and percentages within parentheses. ** *P*-value < 0.05 is considered statistically significant (presented in bold). *Abbreviations:* MDS: Mediterranean diet scale; IES-2: Intuitive eating scale-2; and EAT-26: Eating attitude test.

intuitive eaters (51.5%), with no significant difference between sex and age groups, as shown in Table 2. Based on the EAT-26 evaluation levels, 45% of the participants had disordered eating attitudes with significant differences according to sex, whereas 48.2% of the females in the study were categorized as having disordered eating attitudes compared to only 38.2% of males (<0.001). Eating disorders were not affected by age group. Figure 1 presents the MDS adherence levels

and IES-2 and EAT-26 evaluation levels for the study population according to their weight status. There was no significant difference in Mediterranean diet adherence levels according to weight status. The group of normal-weight participants was significantly more intuitive eaters than those with increased weight (57.3% vs. 39.9%, respectively (p < 0.001). In contrast, participants with increased weight (overweight or obesity) were significantly more likely to have disordered eating attitudes compared to participants categorized as having normal weight (51.1% vs. 41.9%; respectively (p<0.001). Table 3 compares the mean scores and subscales of MDS, IES-2, and EAT-26 according to the study subject's weight status. Participants with normal weight significantly had a higher mean of intuitive eating subscales and overall intuitive eating scores

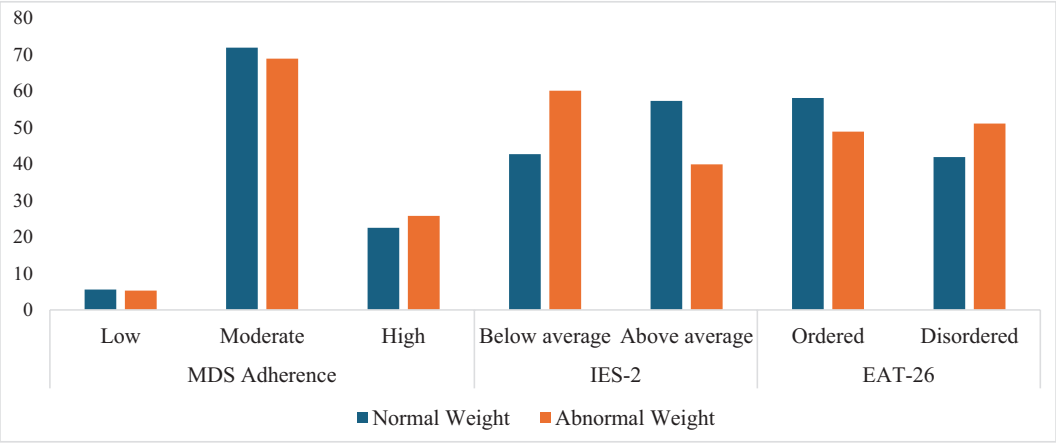

Figure 1. MDS adherence levels and IES-2 and EAT-26 evaluation levels for the study population according to weight status. (Weight status is categorized according to BMI; Normal weight indicates a BMI < 25 kg/m^2, while abnormal means a BMI≥25 kg/m^2. MDS: Me

Table 3. Comparisons of MDS, IES-2, and EAT-26 scores and subscales based on weight status*

Variables*	Total	Weight status¥		**P-value
		Normal	Abnormal	
Age	23.02 ± 3.96	22.49 ± 3.45	24.08 ± 4.64	**<0.001**
MDS score	7.97 ± 2.15	7.90 ± 2.13	8.11 ± 2.18	0.06
IES-2 score	3.371 ± 0.46	3.423 ± 0.47	3.269 ± 0.43	**<0.001**
Unconditional Permission to Eat subscale	3.29 ± 0.69	3.33 ± 0.69	3.21 ± 0.68	**0.001**
Eating for Physical Rather than Emotional Reasons subscale	3.26 ± 0.73	3.34 ± 0.71	3.11 ± 0.75	**<0.001**
Reliance on Hunger and Satiety Cues subscale	3.56 ± 0.79	3.60 ± 0.80	3.48 ± 0.76	**0.004**
Body Food Choice Congruence subscale	3.45 ± 0.875	3.48 ± 0.90	3.39 ± 0.83	0.053
EAT-26 score	20.65 ± 16.38	19.77 ± 16.47	22.39 ± 16.08	**0.002**
Dieting subscale item	11.15 ± 9.96	9.91 ± 9.74	13.60 ± 9.94	**<0.001**
Bulimia and food preoccupation subscale	3.10 ± 4.18	2.86 ± 4.21	3.58 ± 4.08	**0.001**
Oral control subscale	6.39 ± 5.33	7.00 ± 5.42	5.21 ± 4.5	**<0.001**

*Data are presented as mean±SD. **** *P*-value <0.05 is considered statistically significant (presented in bold). ¥ Weight status categorized according to BMI; normal weight indicated that BMI < 25 kg/m^2 while abnormal means BMI ≥ 25 kg/m^2. *Abbreviations:* MDS: Mediterranean diet scale; IES-2: Intuitive eating scale-2; and EAT-26: Eating attitude test.

than abnormal-weight subjects (p<0.05), except for the "Body-Food Choice Congruence subscale," which was marginally significant (p=0.053). However, abnormal-weight subjects had significantly higher mean scores of EAT-26 (22.39 ± 16.08) and in the "Dieting" (13.60 ± 9.94) and "Bulimia and preoccupation" (3.58 ± 4.08) subscales compared to normal-weight subjects (EAT-26: 19.77 ± 16.47; "Dieting": 9.91 ± 9.74; Bulimia and preoccupation: 2.86 ± 4.21). On the contrary, normal-weight subjects tended to have a significantly higher mean of the "Oral control subscale" (7.00 ± 5.42) compared with abnormal-weight subjects (5.21 ± 4.5) (p < 0.001).

Discussion

In addition to having diets that are high in calories and low in nutrients, younger adults are also more likely to have negative body images, which can lead to risky dieting practices intended to control weight. However, there is a promising alternative to dieting-intuitive eating. This approach emphasizes listening to physiological signals of hunger and fullness and offers a hopeful path towards a healthier relationship with food and body. It allows individuals to eat for overall health and satisfaction without following dietary restrictions, fostering optimism about the potential for change (18). Moreover, overweight and obesity have been linked significantly to eating disorders. The present study aimed to evaluate the effects of age, body weight status, and sex on intuitive eating, eating disorders, and adherence to the Mediterranean diet among younger adults in Jordan. The present finding indicated that most participants adhered to MD moderately. Also, men adhered to the MD more than women (26.5% vs. 22.2%, respectively), whereas the body weight status or age group did not affect MD adherence. However, about half of females in the study were categorized as having disordered eating attitudes compared to only 38.2% of males (p<0.001). Eating disorders were not affected by age group. EAT-26 total score, "Dieting" and "Bulimia and preoccupation" subscales were affected by abnormal weight (overweight and obesity); participants with increased weight were significantly more likely to have disordered eating attitudes. This was contracted relating to IES, IE-subscales, and "Oral control" subscale as the normal-weight participants were significantly more intuitive eaters than the participants with increased weight (57.3% vs. 39.9%, respectively (p<0.001). Regarding diet quality (represented by MD adherence), consistent with the present findings, a study was conducted to evaluate adult adherence to MD in the United Arab Emirates Sharjah Emirate and determine the correlation between the participants' sociodemographic, health, and lifestyle factors and the degree of adherence. They found a moderate adherence score (5.9 ± 1.9) among the study participants (28). Several studies have demonstrated limited adherence to the MD among individuals residing in various Mediterranean nations, such as Spain (29), Lebanon (30), Italy (31), and Syria (32), despite the diet's health benefits. A study conducted among college students approved that BMI was inversely correlated with MD score (r = 0.142; p < 0.001) (33). In contrast to the current findings, MD adherence was associated with female sex and age older than 62 years; however, poorer adherence was associated with male sex and obesity (34). In South Croatia, higher odds of adherence to the MD were recorded in females, older subjects, and those with higher levels of objective material status (35). Additionally, it has been found that poor Healthy Eating Index (HEI) score was significantly higher in those with higher BMI values compared to those who "needs improvement" and "good" categories (p<0.05) among female adults in Turkey (14). Furthermore, it has been found that fast food and chip intake negatively correlated with the IES-2 total score, but higher overall diet quality was positively associated. Consuming food for physiological rather than psychological reasons and body-to-food congruence. The "unconditional permission to eat" subscale showed a negative correlation with diet quality, but the IES-2 subscales showed a positive correlation (18). The total score of IES-2 was significantly inversely correlated with BMI (r= -0.282; p<0.01) and EAT-26 score in young Turkish women (r=-0.297; p<0.01) (14), and this was consistent with the current findings. As shown in the present findings, being normal weight increases the prevalence of being intuitive eaters and decreases the prevalence of having eating disorders; several recent

findings reflected this. Souto and colleagues found that intuitive eating was a protective factor during COVID-19, lowering the likelihood of obesity in the study population. Therefore, eating more intuitively may promote better weight stability and, as a result, may have lessened the pandemic's effect on weight growth. Thus, those who ate more instinctively were able to partially counteract the conditions—stress, dietary changes, and inactivity—that led to weight gain (36). Moreover, in line with present results, Yilmaz and colleagues found that the likelihood of eating disorders was 24.3% (males = 21.5%; females = 25.4%). The possibility of eating disorders was higher in people with overweight or obesity than in normal weight and underweight people (26.7%, 23.8%, and 21.6%, respectively). Underweight people's IES-2 scores (3.33±0.35 and 3.20±0.37, respectively) were considerably higher than those of people with overweight or obesity, with no significant sex differences (10). Parallel to the present results, Kuseyri and Kızıltan showed that individuals with abnormal weight had a significantly lower IES-2 score than normal/underweight. They also illustrated that the "Unconditional Permission to Eat," "Eating for Physical Rather than Emotional Reasons," and "Reliance on Hunger and Satiety Cues" subscales of IES-2 were lower in the group with obesity than in other groups, whereas " Body Food Choice Congruence" subscales were similar (p<0.05) (37). This revealed that compared to other groups, people with overweight or obesity restrict their food intake more, behave emotionally rather than physically, and are less concerned with the connection between food intake and body weight. The relationship between BMI and IE and eating attitudes has been proven. Ruzanska and Warschburger found a negative correlation between BMI and IES-2 (r = -0.15, p < 0.001) (38). In another research, a correlation was found between BMI and IES-2 total score (r=- 0.25), "Unconditional Permission to Eat" subscale (r=-0.29), "Eating for Physical Rather than Emotional Reasons" subscale (r=-0.05), and "Reliance on Hunger and Satiety Cues" subscale (r=-0.14) (38). Furthermore, Bas and colleagues found a negative correlation between the BMI and IES-2 overall score (r=-0.277, p<0.01), "Unconditional Permission to Eat" subscale (r=-0.103, p<0.05), "Eating for Physical Rather than Emotional Reasons" subscale (r=-0.274, p<0.01), "Reliance on Hunger and Satiety Cues" subscale (r=-0.089, p>0.05) and "Body Food Choice Congruence" subscale (r=-0.092, p>0.05) (39). Similarly, Yilmaz and colleagues found that the IES-2 score and its subscales correlated negatively with BMI (10). Our results demonstrated higher mean total scores on the EAT-26 ("Dieting score" and "Bulimia and food preoccupation" subscales) in individuals with abnormal BMI, and a lower mean on the "Oral control score" subscale. Reviewing more research on the relationship between BMI and the EAT-26 total score produced inconsistent findings. A positive association (r=0.172, p<0.001) was observed between the BMI and the EAT-26 score in a study including university students (40). A significant positive correlation was found between BMI and EAT-26 in female students at An-Nahjah University, Palestine (25).In contrast, different studies revealed a negative correlation (41, 42). The detailed correlations in EAT-26 subscales also has been studied; Yilmaz and Arpa Zemzemoglu found a positive significant correlation between EAT-26 overall score and BMI (r=0.134, p<0.001), also found a positive correlation between BMI and EAT-26 "Dieting score" subscale, and a negative correlation between BMI and "Bulimia and oral control score" subscales (10). Another study revealed that greater total IES-2 and all subscale scores were associated with reduced BMI in dietetic majors having a BMI of ≥ 18.5 kg/m^2 (p<0.05). Participants with a high IES-2 score had 41%, 74%, and 89% lower risk of developing an eating disorder, uncontrolled eating, and emotional eating, respectively (p<0.001) (43). This was also seen in Reynold's study, with higher IES-2 scores indicating lower BMI in college students (24).

Strengths and limitations

The main strength of this study is that we recruited large sample size and is the first study that highlights the effect of age, sex, and weight status on Jordan. One significant challenge was the uneven sex distribution of participants, with more females than males within our sample because of the lower level of cooperation. Also, the study has a cross-sectional design, which lacks a causality relationship. Moreover, data cannot be generalized for Jordanians or other Middle Eastern

countries that share the ethnicity as the small, unrepresentative sample size.

Conclusions

In summary, age did not significantly affect adherence to the Mediterranean diet, IES-2 score or EAT-26 score. Sexes had only an effect on the eating disorder where females had significantly higher prevalences compared to males. Both sexes had moderate adherence to the Mediterranean diet and were more intuitive eaters. Weight status did not affect Mediterranean diet adherence levels. However, normal-weight status was significantly associated with intuitive eating, while overweight or obesity status was significantly associated with eating disorders. In more detail, normal weights are associated considerably with intuitive eating subscales and not only overall intuitive eating scores. Abnormal weights are significantly associated with the overall EAT-26 score and in the "Dieting" and "Bulimia and preoccupation" subscales of the EAT-26 score. While normal weights tended to have a significant association with the "Oral control subscale" from the EAT-26 score. Further case-control studies that consider the matching criteria for confounding factors are necessary to define and confirm the association revealed in this study.

Ethic Approval: The study protocol was reviewed and approved by the institutional review board of Hashemite University (No.1/4/2023/2024) by the Helsinki Declaration.

Conflict of Interest: All author declares that there are no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

Authors Contribution: BA, LA: Conceptualization; IA, LA: Methodology; BA, LA, HA, IA, AA: Investigation; BA, HA, LA, IA: Data curation; BA, LA, IA: Writing – original draft preparation; BA, IA, LA: Writing – review and editing; LA, BA, IA: Visualization; BA: Supervision.

Declaration on the Use of AI: None.

Consent for Publication: All authors have read and agreed to the published version of the manuscript.

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