Prevalence of Eating Disorders Among Nutritional Sciences Students and Dietitians in Saudi Arabia

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Research Article

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Abstract

Background: Eating disorders (EDs) involve persistent disturbed eating and related behaviors that result in altered consumption or absorption of food with potential physical or psychological function impairment. EDs have four major types: anorexia nervosa, bulimia nervosa, binge eating disorder, and eating disorder not otherwise specified. The investigation aimed to study the prevalence of EDs by assessing nutritional status for nutrition students and dietitians from multiple provinces in Saudi Arabia.

Methods: A cross-sectional study comprising 175 male and female nutrition students or dietitians. EDs were diagnosed using EAT-26 and DSM5. Dietary intake was estimated by repeated 24-hr recall records. Diet was analyzed using food processor nutrition and fitness software. Intakes were compared with the recommended dietary allowances.

Results: According to EAT-26 diagnostic criteria, the prevalence of EDs was 15.4%. The mean age was 24.96 ± 4 years. ED subjects had normal BMIs. The diet analysis showed that these subjects had a lower intake of energy, macronutrients, and some micronutrients, and other micronutrients were high as compared to the RDA.

Conclusion: EDs were more prevalent among dietitians than students. The EDs comprised a high number of OSFED and UNFED cases. Subjects with an ED had an unbalanced diet with poor nutrition.

Plain English Summary:

The article presents the prevalence of male and female nutrition students and dietitians with eating disorders from different provinces in Saudi Arabia. Eating disorders are defined by two diagnostic criteria. Prevalence of eating disorders was 15.4% among nutrition students and dietitians. Some types of eating disorders were more prevalent than other types. eating disorders were more prevalent in some Saudi provinces. Also, the article shows the energy, macronutrient, and micronutrients intake that was low for some micronutrients, and other micronutrients were high compared to the recommended dietary allowances. This is the first study in Saudi Arabia that investigate the prevalence of eating disorder among nutrition students and dietitians.

1.0 Introduction

1.1 Background

Eating disorders (ED) are illnesses that are defined as persistent disturbed eating and eating-related behaviors that result in altered consumption or absorption of food and potential physical or psychological function disruption. EDs have four major types as described by The Diagnostic and Statistical Manual of Mental Disorders (DSM-5): anorexia nervosa (AN), bulimia nervosa (BN), binge eating disorder (BED), and eating disorder not otherwise specified (EDNOS) [1].

AN is defined as a psychological illness or syndrome. It is characterized by an intense fear of fatness or seeking low body weight. The body mass index (BMI) is reported to be very low at less than 17.5 kg/m^2 . Affected individuals restrict their high-fat food intake and participate in excessive exercise [2].

BN is the second type of ED and is a life-threatening psychiatric illness, characterized by overeating by eating high caloric food in a short time with self-induced vomiting, laxative and diuretic use, fasting, or over-exercising to avoid weight gain [3].

BED is considered the third ED type and is characterized by eating a large amount of food in a short time compared to normal individuals. Sufferers also feel guilty or depressed after eating, consume food alone to avoid embarrassment, and eat food even when not hungry. To diagnose BED, the binge episodes must occur once/week for 3 months or more, and the syndrome must not be influenced by any normal compensating behavior [4].

EDNOS is defined in DSM-5 as those who have an ED but have not satisfied the diagnostic criteria for any of the previous ED types. The most recent DSM-5 update renamed this type as other specified feeding or eating disorder (OSFED), which includes several illnesses such as purging disorder, atypical AN, subthreshold BN, and subthreshold BED [5].

Unspecified feeding or eating disorder (UFED) is applied to those who have an ED but have not achieved the diagnostic criteria for any of the previous types or for OSFED.

1.2 Nutritional status of eating disorders

Nutrition plays a major role among ED individuals. Malnutrition is common because of the low consumption of macro- and micronutrients in AN and BN. Moreover, the restricting behavior can affect micronutrient availability, resulting in compromised immunity, loss of lean body mass, fatigue, altered brain function, and deficiencies in vitamin D, calcium, folate, cobalamin, zinc, magnesium, thiamine, riboflavin, niacin, pyridoxine, C, E, K, and iron, leading to anemia. Replacing these nutrients is an important part of nutrition therapy to enhance recovery [6, 7].

1.3 Health consequences of eating disorders

EDs can affect multiple organ systems and are potentially life threatening. These disorders can lead to changes in the gastrointestinal system. Food restriction and vomiting can cause digestion and normal stomach functions to be interrupted, thus leading to nausea, bloating, gastroparesis, constipation, anemia, and blood sugar fluctuations. EDs can also affect the cardiovascular system [8].

AN has specific health consequences due to caloric restriction. Symptoms include hypokalemia, hypoglycemia, abdominal discomfort, and loss of bone mineral density [9]. BN is associated with subsequent xerosis, an electrolyte imbalance leading to arrhythmias, early satiety, gastroparesis, constipation related to laxative abuse, gastroesophageal reflux, and malnutrition [10]. BED also has its own particular complications, such as diabetes, dysphagia, diarrhea, bloating, nutrient deficiencies, and increased risk of cancer, hypertension, and obstructive sleep apnea [11].

1.4 Epidemiology of eating disorders

The epidemiological incidence of EDs in the United Kingdom was reported to be AN 7.4%; BN 0.8%, BED 3.6%, and OSFED 2.4%. In Finland, the prevalence of AN among females was 3.6%, and OSFED 0.6%. In Holland, ED among females was 3.7%, AN 1.2%, BN 0.6%, BED 1.6%, and OSFED 0.3%, and among males EDs were 0.5%,

AN and BN each 0.1%, and BED 0.3. In Switzerland, among females, AN was 1.9%, and among males 0.2%. In Germany, AN was found to be 0.3%, BN 0.4%, and BED 0.5%. In Sweden, for females, BN was 1.6% and BED 0.4%. In Australia, ED was reported to be 16.3%, AN 0.46%, BN 0.66%, and BED 5.58%. In the United States, AN among females was found to be 1.37% and BED 1.7%, and BED among males was 0.8%. In Canada, female EDs were reported to be at a level of 4.46%, AN 0.06%, BN 2.01%, and BED 0.68%; among males, ED was 2.21%, BN 1.31%, and BED 0.16% [12].

The prevalence of EDs in the Middle East and North Africa (MENA) region was found to be 16.9% in the UAE (for BED, specifically). Egypt had a 65.0% prevalence of EDs. In Saudi Arabia (Dammam), 29.4% of females had an ED, whereas this figure was 35% and 23.3% for Taif and Arar cities, respectively [13, 14, 15, 16]

2.0 Literature Review

2.1 Literature review

Another study aimed to determine the frequency of AN and EDs among dietitians. The study was performed with a 2500 sample size. Participants were asked to complete two types of questionnaires—the Orthorexia Nervosa Questionnaire (ORTO-15) and the Eating Disorder Examination Questionnaire (EDE-Q)—and their anthropometrics were measured. The authors reported that 49.5% of participants were at high risk for AN and 12.9% at high risk for ED. 8.2% of the participants reported that they had been previously treated for an ED, and 44.6% had been treated for AN. The limitation of this study was that the response rate was only 26%, the sample size was low relative to the total, and those at high risk could be recovering from any illness that made them at risk for an ED [17].

In another study, the objective was to assess ED behavior and addiction to food among nutrition and non-nutrition students. There were 967 participants included. The study was performed by sending questionnaires by e-mail to the students, enquiring about demographic data such as age, sex, race, height, and weight. For ED screening, the Eating Attitude Test (EAT-26) was used; as a self-assessment tool to measure three dimensions of eating behaviors, the Three-Factor Eating Questionnaire (TFEQ-R18) was employed, and the Yale Food Addiction Scale (YFAS) was used as a tool to model to DSM-5. 10% of the participants were found to be of high concern regarding an ED, and 10.3% had a food addiction. According to the observed EAT-26 scores, 8.8% of respondents were underweight or normal, and 12.9% were overweight or obese. The limitations of this study were that it was biased because of the self-report approach; the authors did not assess for general psychopathology, they only included undergraduate students, and they excluded graduate students [18].

The previous two studies were conducted in the United States. In a study performed in Brazil, the authors aimed to determine the number of risk behaviors of EDs and body image satisfaction among nutrition students and dietitians; 743 female participants were analyzed. Data were collated using an online questionnaire—the Body Shape Questionnaire (BSQ)—to evaluate individuals' satisfaction with their own body; EAT-26 was also used. 10.1% of undergraduate students reported having an ED, whereas among dietitians, this figure was 7.9%. 5% of dietitians were underweight, 72.3% normal, 16.4% overweight, and 6.3% obese. For undergraduate students, 11% were underweight, 73.3% normal, 10.5% overweight, and 5.2 obese. The limitations of this study are that

the participants were all female, the authors only used EAT-26 to diagnose EDs, and the research was biased due to the use of the self-report online questionnaire [19].

Accordingly, our investigation aimed to study the prevalence of EDs by assessing nutritional status for nutrition students and dietitians from multiple provinces in Saudi Arabia.

2.2 Research hypothesis

Eating disorder tendencies are prevalent in both the nutrition students and dietitians. However, nutrition students will score higher on the EAT-26, that because they are gaining new knowledge about diets and food that could affect them in terms of losing or gaining weight potentially indicating higher level of ED tendencies.

3.0 Methodology

3.1 Study type and duration

An epidemiological, descriptive, cross-sectional study was conducted in Saudi Arabia between October 2020 and March 2021.

3.2 Study setting and sampling

Nutrition students and dietitians from different nutrition colleges and hospitals aged 18 to 55 years were the target group. Subjects with chronic diseases such as diabetes, hypertension, hypo/hyperthyroidism, as well as pregnant and lactating woman were excluded from the study. Only subjects in a dietetic school at any academic level and dietitians were eligible for inclusion.

3.3 Data collection

Participants were screened using a form translated into the Arabic language of the Eating Attitude Test (EAT-26). EAT-26 is a widely used tool for screening EDs following a 6-point Likert scale (always, usually, often, sometimes, rarely, never). The original version of the EAT-26 was published in 1982. A score of above 20 is indicative of a possible ED. Table (1) shows the scoring system for EAT-26. Scores between 20–24 indicate mild ED, 25–30 moderate to severe ED, and more than 31 very severe ED [20].

Table (1): Scoring system for EAT-26.

	Questions 1–25	Question 26
Always	3 points	0 points
Usually	2 points	0 points
Often	1 point	0 points
Sometimes	0 points	1 point
Rarely	0 points	2 points
Never	0 points	3 points

The questionnaire was distributed to the participants in the form of an electronic online questionnaire using Google forms distributed via social media consisting of three parts: 1) consent form, 2) personal information—name, age, gender, province, college, academic level, weight, and height, and 3) the translated EAT-26. All participants whose scores indicated possible EDs were included, and they underwent further diagnosis by DSM-5.

3.3.1 Diagnostic criteria

DSM-5 was used to identify the types of ED (pica, rumination disorder, avoidance\restriction disorder, AN, BN, BED, OSFED and UFED) by telephone-calling the participants with ED, asking whether they had symptoms recorded in the DSM-5 to identify its type [21].

3.3.2 Anthropometric Measurements

Weight and height were asked in the electronic questionnaire as a self-reported measurement. BMI was

calculated using the Quetelet equation:

$$BMI = \frac{\text{weight (kg)}}{\text{height (m}^2\text{)}}.$$

3.3.3 Dietary assessment

Dietary intake was estimated using twice-repeated 24-hour recall records focusing on energy. In addition, the following nutrients and macronutrients were recorded: [carbohydrates (gm), protein(gm), fat(gm)] and micronutrients: [vitamin A(μg), thiamin(mg), riboflavin(mg), niacin(mg), pantothenic acid(mg), pyridoxine(mg), biotin(μg) folate(μg), cobalamin(μg), vitamin C(mg), vitamin D(μg) , vitamin E(mg), vitamin K(μg), calcium(mg), chromium(μg), copper(mg), fluoride(mg), iodine(μg), iron(mg), magnesium(mg), manganese(mg), phosphorus(mg) potassium(mg), sodium(mg), selenium(μg), and zinc(mg)].

3.4 Ethical considerations

Ethical permission to conduct the current study was obtained from the local committee for bio-medical ethics to conduct scientific research at Umm Al-Qura University. Participants had provided their consent prior to the beginning of the project, and they were assured that all their information would be treated with privacy and that they had the right to withdraw from the study at any time without any problem.

3.5 Pretesting of questionnaires

The data collection tools were pretested on 5 subjects not included in the study to confirm the clarity of the questions and any necessary changes before the main project was conducted.

3.6 Data analysis

Microsoft Excel was used to initially enter and analyze the data. The recall records were analyzed using food processor nutrition and fitness software by ESHA research version 11.9.13. Intake values were compared with the recommended dietary allowance (RDA) for energy, macronutrients, and micronutrients and were obtained from the National Institutes of Health (NIH) [22]. Descriptive and inferential data were analyzed using statistical

for social science software (IBM SPSS statistics version 26). A P-value of ≤ 0.05 was set as the significance level.

4.0 Results

4.1 Background information

A total of 186 participants (14 males and 172 females) were recruited from different provinces in Saudi Arabia. Two participants were excluded because they were not nutrition students or dietitians, and for 9 participants, contact was lost. The final total number of participants included in the study was, therefore, 175; thus, the completion rate was 94%. The mean age of participants was 24.62 ± 4.7 years, the minimum age was 19 years, and the maximum age was 53 years. Participants who had been previously treated for an ED accounted for 3.4% ($n=6$), and 96.6% had never been treated for an ED ($n=169$).

4.2 EAT-26 and DSM-5

According to EAT-26, participants scoring ≥ 20 are classified with an ED. According to the results, 27 participants (15.4%)—2 males and 25 females—had an ED, as shown in Figure (1). 26.9% ($n=8$) of the cases had a mild ED, 26.9% ($n=8$) a moderate to severe ED, and 40.7% ($n=11$) had a very severe ED. The mean age for cases with EDs was 24.96 ± 4 years.

One participant (3.7%) had AN, 1 (3.7%) BN, 2 (7.4%) BED, 7 (25.9%) OSFED, and 16 (59.3%) had UFED, as shown in Figure (2).

Regarding those with an ED, according to their place of residency, 6 cases (22.2%) were from Eastern Province, 1 case (3.7%) from Hail province, 1 case (3.7%) from Jizan province, 5 cases (18.5%) from Mecca province, 11 cases (40.7%) from Medina province, and 3 cases (11.1) were from Riyadh province, as shown in Figure (3).

Regarding participants' academic level, 5 subjects (18.5%) were in the fifth academic level, 1 (3.7%) in seventh, 2 (7.4%) in eighth, 1 (3.7%) was an intern, and 18 (66.7%) had graduated.

4.3Anthropometric measurements

Subjects' anthropometric measurements with ED mean values are listed in Table (2). The mean height was 159 ± 6.8 cm, mean weight 59.6 ± 8.7 kg, and the mean BMI was 23.6 ± 3.47 for participants with an ED. Hence, there were significant differences regarding weight and BMI—the p . value was 0.036 and 0.016, respectively—within those with ED as compared to participants without ED.

Moreover, the reference data of BMI categories indicated a higher prevalence of normal weight among ED cases rather than underweight, overweight, and obesity, as noted in Table (3).

Table (2): Anthropometric measurements of subjects with an eating disorder.

Anthropometrics	Mean±SD	<i>p</i> . value
Height (cm)	159±6.8	0.843
Weight (kg)	59.6± 8.7	0.036
BMI (kg/m ²)	23.6±3.47	0.016

Table (3): BMI categories for subjects with eating disorders.

BMI Category		
Category	No.	Percentage (%)
Underweight	1	3.7
Normal weight	19	70.4
Overweight	5	18.5
Obesity I	2	7.4

4.4 Dietary assessment

Participants with an ED declared either high or low intakes of macronutrients and/or micronutrients based on their twice-repeated 24-h dietary recall records. The consumption was less than the RDA for energy, carbohydrate, protein, fat, vitamins including A, D, E, C, B₁, B₂, B₃, B₅, B₇, B₉, and B₁₂ as well as minerals including calcium, chromium, copper, fluoride, iodine, potassium, magnesium, phosphorus, and zinc; moreover, there was a slight reduction from the RDA for vitamin B₆, K, and selenium. However, the consumption of iron, manganese, and sodium was higher than the RDA, as illustrated in Table (4 & 5).

Table (4): Macronutrient and vitamin intake of participants with eating disorders.

Nutrient	Mean ± SD	RDA	% Of RDA
Energy (kcal)	1358.2 ±661.6	2044	66.4
Carbohydrate (gm)	169.2 ±85.6	280.48	60.67
Protein (gm)	59.25 ±21.4	76.7	77.5
Fat (gm)	55.62 ±36.5	68.48	80.5
Vitamin A (µg)	245.24 ±182.5	714.81	34.2
Vitamin B ₁ (mg)	0.68 ±0.39	1.1	62.12
Vitamin B ₂ (mg)	0.86 ±0.44	1.1	78
Vitamin B ₃ (mg)	12.54 ±6.15	14.15	88.8
Vitamin B ₅ (mg)	1.19 ±0.93	5	23.9
Vitamin B ₆ (mg)	1.17 ±0.87	1.3	90.14
Vitamin B ₇ (µg)	2.9 ±2.57	30	9.67
Vitamin B ₉ (µg)	178.5 ±111.8	400	44.63
Vitamin B ₁₂ (µg)	1.72 ±1.31	2.4	71.68
Vitamin C (mg)	57.5 ±72.3	76.1	75.5
Vitamin D (µg)	1.8 ±2.3	15	12
Vitamin E (mg)	3.8 ±3.1	15	25.33
Vitamin K (µg)	83 ±192.6	92.2	91.7

Results from 24-hr recall records. Mean ± SD, RDA, and % of RDA.

Table (5): Mineral intake of participants with eating disorders.

Nutrient	Mean $\pm$ SD	RDA	% Of RDA
Calcium (mg)	683.9 $\pm$ 475	1000	68.4
Chromium (μ g)	0.78 $\pm$ 0.82	25.74	3
Copper (mg)	0.53 $\pm$ 0.28	900	59
Fluoride (mg)	0.04 $\pm$ 0.08	3.07	1.36
Iodine (μ g)	1.8 $\pm$ 1.6	150	0.8
Iron (mg)	38 $\pm$ 154	17.26	216
Magnesium (mg)	137.37 $\pm$ 74.3	317.78	43.56
Manganese (mg)	4.42 $\pm$ 17.4	1.8	244.9
Phosphorus (mg)	617.4 $\pm$ 323.4	700	88.2
Potassium (mg)	1543 $\pm$ 620.6	2659.26	58.2
Sodium (mg)	2421.3 $\pm$ 995.6	1500	161.4
Selenium (μ g)	52 $\pm$ 21.8	55	94.5
Zinc (mg)	4.6 $\pm$ 2.2	8.22	56.5

Results from 24-hr recall records. Mean $\pm$ SD, RDA, and % of RDA.

4.5 Correlation between EAT-26 and nutrient intake

The obtained data showed significant correlations for ED parameters according Eat-26 scores. There was a significant correlation between EAT-26 and energy consumption (P . value= 0.005), carbohydrate (P . value= 0.009), vitamin B₂ (P . value= 0.025), vitamin B₁₂ (P . value= 0.001), vitamin D (P . value= 0.003), calcium (P . value= 0.032), iron (P . value= 0.000), magnesium (P . value= 0.005), phosphorus (P . value= 0.001), and zinc (P . value= 0.001), as listed in Table (6). Meanwhile, there was an insignificant correlation between EAT-26 and protein consumption (P . value= 0.268), fat (P . value= 0.052), vitamin B₉ (P . value =0.396), and vitamin C (P . value=0.368), as outlined in Table (6).

Table (6): Significant and insignificant correlations between EAT-26 and nutrient intake.

Parameter	Nutrient intake	<i>P</i> . value	Pearson correlation
Eating disorder EAT-26 score	Energy	0.005	.527
	Carbohydrate	0.009	.494
	Protein	0.268	0.221
	Fat	0.052	0.379
	Vitamin B ₂	0.025	.431
	Vitamin B ₉	0.396	0.170
	Vitamin B ₁₂	0.001	.584
	Vitamin C	0.368	0.181
	Vitamin D	0.003	.557
	Calcium	0.032	.414
	Iron	0.000	.737
	Magnesium	0.005	.527
	Phosphorus	0.001	.596
	Zinc	0.003	.544

Data illustrated as p-value and Pearson correlation.

5.0 Discussion

Our investigation aimed to study the prevalence of EDs by assessing the nutritional status of nutrition students and dietitians from multiple provinces in Saudi Arabia.

5.1 Prevalence of eating disorders

Our results showed that the percent was 6.9% and 93.1% of males and females, respectively, suffered from an ED. These results agreed with [18], who found that 15.6% and 84.4% of males and females, respectively, had an ED, from a total of 147 nutrition students. In the present study, EDs were more prevalent between 19 and 30 years and less prevalent in 31–50-year-olds, with only 3 participants affected by an ED, whereas the age group >50 years old recorded no ED incidence. The mean age was 24.96 years, agreeing with [19], who recorded a mean age for students of 22.5 years and, for dietitians, 31.2 years. Meanwhile, those who have been treated previously from ED in the current study count for 3.4%, and 8.2% of 636 participants were found to be treated from an ED in [17].

In our study, the prevalence of ED (15.4%) was high for OSFED and UNFED compared to other EDs. A similar study conducted in Brazil that included 745 female participants showed an ED prevalence of 9.10%; the study included only females due to Brazilian female dietitians comprising more than 90% of the total [19]. [18] included 147 participants only as students in the United States and found an ED prevalence of

9.5%. Meanwhile, [23] analyzed 97 participants in Australia and reported an ED prevalence of 14.5% for nutrition students. [24] also carried out research in Australia that included 137 nutrition students and dietitians and found this prevalence to be 13.25%. [15] investigated 35 participants in Wisconsin, United States, reporting this value for nutrition students and dietitians to be 22.2%. Furthermore, the ED rate variance between studies reflected the difference of ED prevalence among nutrition students and dietitians with respect to geographic regions worldwide; the variation might have been due to differences in socioeconomic status, and knowledge about EDs could affect and lead to an ED. Notably, all studies have used EAT-26 to measure EDs.

According to our data, EDs were more prevalent (40.7%) in Medina province despite the percent of participants from Medina and Mecca provinces being equal. Moreover, ED was high (22.2%) in the Eastern province as compared to the number of participants included. Some provinces did not declare an ED because the participants were few in number when compared to the total population in other provinces. Two of the provinces (Al- Jowf and Najran) were not included in the study because no participants completed the questionnaire in these provinces, and only one participant was included from Asser province. In other provinces, the study did not detect ED, and the number of participants who completed the questionnaire was slightly low. Further research is required to include more participants from those provinces with low sample numbers.

For the current study, students (n=9) compared to dietitians (n=18) had less incidence of EDs. A study in Brazil disagreed with these findings; students with an ED comprised 43 participants and dietitians 25 participants [19]. In the present study, for those with an ED, 5 participants were in their third academic year, 4 in their fourth, and no participants were reported in their first/second academic year. In another study, 4 participants were in their first/second academic year, and 10 participants were in their third/fourth academic year [18]. However, with a small sample size, it is difficult to make a definitive conclusion.

Our data demonstrated an AN level of 3.7%, BN 3.7%, BED 7.4%, OSFED 25.9%, and UNFED 59.3% from a total of 27 cases. Another study from Jordan found that 31.8% of 421 subjects reported suffering from an AN [26]. A Greek study investigating 215 undergraduate students found this AN incidence to be 68.2% [27]. In the United States, 44.6% of 636 subjects had AN [17], indicating that most of them included only AN of the ED types. In Australia, a 23% BN prevalence was found [23], and in Brazil, using 179 nutrition students, the BN rate was reported as 6.1%, with BED being 2.8% [28]. Unfortunately, no study included OSFED and UNFED among nutrition students and dietitians.

5.2 Anthropometric measurements

Our research demonstrated that participants with ED had a normal BMI (average 23.6 kg/m²). Only one case was underweight, 19 were normal, five were overweight, and two were obese (Table 3). A study in the United States revealed that, on average, the BMI was within underweight/normal classification eleven cases, and two cases were overweight/ obese [18]. According to a study conducted in Australia, the average BMI was normal (22.7 kg/m²) [24].

In the current study average height 159 cm, and weight 59.6 kg; there was a significant difference for weight and BMI within those with ED and an insignificant difference for height.

5.3 Dietary assessment

EDs patients were more susceptible to nutrient deficiencies. The present study revealed that most participants had an inadequate diet, and the average intake of energy, macronutrients (carbohydrate, protein, and fat), energy, and macronutrients were below the RDA (energy intake 1358.2 kcal, carbohydrate 169.2 g, protein 59.25 g, and fat 55.62 g). [27] found intake for AN respondent for energy to be 25.5 kcal/kg, carbohydrate 195.3 g, protein 66.8 g, and fat 69.7 g; these values are below the RDA for energy, carbohydrate, and protein and within the RDA for fat.

They also included one micro nutrient the sodium and the intake were 2260.4 mg (i.e., higher than the RDA). In our study, sodium intake was 2421.3 mg (i.e., higher than the RDA). Unfortunately, no study has investigated other nutrients, and research has yet to be performed to include all types of ED and macro-micronutrient intake among nutrition students and dietitians. There were significant differences between EAT-26 and intake of energy and carbohydrates, whereas there was an insignificant difference between EAT-26 and protein and fat intake.

5.4 Strength and limits

This study has some limitations because it used a self-report online questionnaire and had a low number of participants. However, due to limited time and resources, it was not possible to include larger numbers of nutrition students and dietitians. Biomarkers would have given strong inferences to the results of the current study. Further studies are necessary to conduct biochemical analyses.

Strength points our study is the first in Saudi Arabia to investigate the prevalence of EDs among nutrition students and dietitians.

6.0 Conclusion And Recommendation

6.1 Conclusion

Our investigation may conclude that the prevalence of eating disorders in Saudi Arabia to be 15.4% among nutrition students and dietitians. The EDs comprised a high number of OSFED and UNFED cases. Moreover, eating disorders were more prevalent in some Saudi provinces. Energy, macronutrient, and some micronutrients were low, and other micronutrients were high compared to the recommended dietary allowances (RDA).

6.2 Recommendations

According to the findings of this study, the following recommendations are suggested:

1. Further research with a larger sample size must be performed to support the study's findings and investigate other types of ED that this study did not include.
2. Assessment of people with EDs should be comprehensive and include physical, psychological, and social needs. Analysis of various biochemicals must be carried out in future research because they are surrogate measures for dietary intake.
3. Education and counseling should be provided for those with an ED regarding the impact of these disorders on their health, nutritional behavior, and nutrition misinformation. This approach could involve conducting nutrition campaigns, providing education to participants.

4. Pamphlets with information about the seriousness of EDs and health consequences should be distributed to limit the prevalence of EDs among this group.

Declarations

What is already known on this subject

The prevalence of EDs among nutrition students and dietitians in different countries worldwide, and the dietary intake of those with EDs. The study needs to be done to investigate the number of dietitians and nutrition students with EDs in Saudi Arabia.

What your study adds

The percentage of dietitian and nutrition students with EDs in Saudi Arabia from different provinces and their dietary intake.

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Competing Interests

The authors have no relevant financial or non-financial interests to disclose.

Author Contributions

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Renad Tarawah and El-Sayed Bakr. The first draft of the manuscript was written by Renad Tarawah and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Data Availability

The datasets generated during and analyzed during the current study are available from the corresponding author on reasonable request.

Ethics approval

This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the local committee for bio-medical ethics to conduct scientific research at Umm Al-Qura University (12/04/2021/ MUVR120421).

Consent to participate

Informed consent was obtained from all individual participants included in the study.

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Figures

Figure 1

Participants with/without eating disorders

Figure 2

Participants with ED according to DSM-5 categories

Figure 3

Participants with ED according to their provinces

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