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Evaluation of Eating Habits and Nutrient Intake in Adolescents with and without Suspected Eating Disorders in Iran

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ABSTRACT

Objective: Increasing the incidence of eating disorder (ED) attitude during adolescence may lead to inadequate nutrient intake and consequently to growth disorders. This study aimed to compare eating habits and nutrient intakes of adolescents with high risk and low risk of developing eating disorders in high schools in Tehran, Iran.

Methods: In the current cross-sectional study, the Eating Attitude Test (EAT-26) was applied to 299 students (185 females and 114 males) aged 15-18 years for the determination of ED attitudes. Food habits and nutrient intake were assessed by a self-administered questionnaire and a validated Food Frequency Questionnaire (FFQ), respectively. Nutrient adequacy ratio (NAR) and mean adequacy ratio (MAR) were calculated using nutrient's Dietary Reference Intake (DRI) for age and sex.

Results: Of all students, 17.7% were at risk of developing ED. The results showed that girls, unlike boys, consumed more energy than they needed, but this difference between the ED group in both sexes was not significant. The distribution of sweetened drinks, candy, chocolate, and fast food frequency was significantly different between the two groups of girls ($P<0.05$). In contrast, boys at risk of developing ED tended to eat healthier followed by higher vegetable intake and nutritional components. NAR scores were above 1 for all nutrients excluding potassium and vitamin D. The mean MAR in ED groups of boy and girl participants was 2.1% and 13.2% higher than non-ED subjects, respectively.

Conclusion: Eating habits and accordingly nutrient intake can be affected by eating disorder attitudes in girls and boys adolescents.

Keywords: Eating disorder (ED), Eating Habit, Dietary Intake, Adolescents

1. INTRODUCTION

Eating disorder is a public health problem that affects adolescents around the world. The new definition and criteria for diagnosing eating disorders (EDs) are based on the Fifth Diagnostic and Statistical Manual of Mental Disorders (DSM-5), which refers to different types of EDs including anorexia nervosa (AN), bulimia nervosa, binge-eating disorder (BED) and other specified feeding or eating disorders (OSFED) including atypical anorexia nervosa, purging disorder, night eating syndrome, and bulimia nervosa and binge-eating disorder of low frequency and/or limited duration. Moreover, unspecified feeding or eating disorder (UFED) is known as another type that does not meet the criteria for other eating disorders. Pica and rumination disorder, which is a preventive/restrictive eating disorder (ARFID), is a type of eating disorder related to infancy or early childhood (FDIEC) (1). Due to nutritional transition in the Iranian community, eating disorder attitudes became a significant concern in adolescents. In a recent study among adolescents in Iran, the weighted prevalence of all types of eating disorders was estimated at 0.89 (0.81–1.10) with more frequency among girl's participants in urban areas (2). One of the things that should be considered in patients with eating disorders, especially AN, is having different and obsessive eating habits, which can lead to excessive weight loss, and as a result, imbalances in the intake of macronutrients, lack of micronutrients, and specific medical consequences (3, 4). Similarly, a phenomenon related to obesity-eating disorders (binge eating) individuals is food impulsivity, a multidimensional personality trait, that cause uncontrolled and excessive food intake (5), which can cause nutritional ailments and would be alarming (6).

Few studies have demonstrated the eating habits and nutrient intake of Iranian adolescents; Azadbakht et al. (2014) evaluated the Healthy Eating Index (HEI) among 265 girls and found that it was 6.15±1.61 out of 10 points, and except for vitamin D, other nutrients were adequately consumed by the

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adolescents (7). An assessment of eating habits in another study of 3207 teenage girls revealed that more than half of students have daily intake of fruits, while only around 46 % had a consumption of vegetables each day. Dairy products were used by one-third of adolescents daily, and the most skipped meal by individuals was breakfast (15.8%) (8).

Therefore, the unbalanced diet of Iranian teenagers on the one hand, and the increasing prevalence of eating disorders in developing countries on the other hand show the necessity of conducting more research to link these two phenomena to identify possible deficiencies in time. As far as we know, although such studies have been conducted in Iran for the general adolescent population, eating disorders have not been well considered. Thus, the present study was designed to evaluate eating habits and nutrient intake in adolescents with and without suspected eating disorders by gender in Tehran.

2. METHOD

2.1. Participants and Procedure

In the present cross-sectional study, both girl and boy high school students aged 15 to 18 years were selected by random multistage stratified sampling method in Tehran, the capital city of Iran, between October 2019 and September 2020. Upon completion of the written consent form, all participants were eligible to continue. The appropriate sample size was determined by the highest available prevalence of eating disorder attitude (18.9%) in a previous study conducted in Iran (9). The following formula was used to calculate the sample size: $n=(Z1\text{-}a/2)^2pq/d^2$ (n=sample size, $Z_{1-\alpha/2}$ =1.96 (the confidence interval constant at 95 percentile confidence interval), P=the estimate of disordered eating prevalence (9), d=0.05 (determining precision value). Therefore, a total of 236 cases were determined, while a larger sample size was used to control any sample loss. Finally, 299 students` data were eligible for analysis.

2.2. Measurements

Anthropometric parameters were evaluated according to the World Health Organization (WHO) manual for collecting physical measurements (10). Height and weight were measured twice by a trained researcher using pre-calibrated equipment; including a digital scale (Seca-813) to the nearest 0.1 kg for weight and a stadiometer (Seca Model 217) to the nearest 0.1cm for height. To calculate body mass index (BMI), weight (kg) divided by squared height (m^2) and its standard deviation scores (BMI z-scores) derived using the age and sex-specific 2007 WHO percentiles reference data (11).

2.3. Questionnaires

Eating disorder behavior among adolescents was measured by Eating Attitude Test (EAT-26); this self-administered questionnaire is generally used as a screening tool for primary diagnosis of eating disorder (12). EAT-26 was previously translated and validated among Iranian students, the reliability of this test (Cronbach's Alpha) was 0.86 (13), with a cut-off point of the total score of 20 or higher for diagnosis of having eating disorder attitudes (14).

Food habits were obtained from a self-administered questionnaire to determine the frequency of intake of fruits, vegetables, soft and sweetened drinks, chips or french fries, candy/chocolate, fast food and milk, and chips per week (15). A valid 168-item questionnaire (FFQ) (16) was selected to determine the usual diet in adolescents. Data were collected by trained nutritionists through face-to-face and group interviews, all students were trained on how to fill out the questionnaires before completing them. Therefore, the consumption data of each food item in the last year was obtained and the daily intake grams were calculated using the manual of household measures. The collected data were analyzed using Nutritionist IV software and the amount of calories and nutrient intake was evaluated. To assess nutrient adequacy, the average intake of each nutrient was compared with the DRI (17). Nutrient adequacy ratio (NAR) and mean adequacy ratio (MAR) were used as two indicators to evaluate nutrient adequacy compared to the reference value (7); The MAR is based on the calculated by averaging the NAR, a measure that expresses an individual's intake of a nutrient as a ratio or percentage of the corresponding recommended allowance for that nutrient (18). These ratios are specific to age and gender and reflect a reliable explanation of the quality of the diet (19). Meanwhile, this index shows the overall nutritional adequacy of a population based on an individual's diet using a specific nutrient. One strength of MAR is focusing on a population's overall nutritional adequacy, rather than one specific nutrient alone (18).

In this work, NAR values were determined for protein, K, Ca, Mg, Zn, Fe, vitamins A, C, and D, thiamine, riboflavin, niacin, vitamin B6, folate, and vitamin B12. Then, the sum of the NAR of nutrients was divided by the number of nutrients (n=15) to calculate the mean adequacy ratio (MAR). For both NAR and MAR, a value of 1 is ideal, meaning that the intake is equal to the DRI; therefore, a value greater or less than 1 indicates less or more intake than the requirement. The total energy requirements for individuals were calculated by the following formulas (17):

Boys: 88.5 – (61.9 3 Age [yr]) + PA × (26.7 × Weight [kg] + 903 × Height [m]) + 25 kcal

Girls: 135.3 – (30.8 × Age [yr]) + PA × (10.0 × Weight [kg] + 934 × Height [m]) + 25 kcal

2.4. Data Analysis

All data were analyzed by SPSS version 25 (SPSS, Inc, Chicago, Illinois, USA). The data were presented as mean±standard deviation (SD) for continuous variables and numbers and percentages for categorical variables. The normality distribution was tested by the Kolmogorov-Smirnov test. Paired sample t-test was performed to evaluate energy consumption with their energy requirements. One sample t-test was recruited to check the adequacy of nutrient intake with their reference values. To compare the mean of nutrient intakes, NAR, and MAR values between eating disorder groups, independent samples t-test were used, and a Chi-squared test was applied for analysis of the categorical data. Statistical tests were analyzed at the significant level of $P<0.05$.

2.5. Ethical Approval

All participants filled out a written consent form, and they ensured that their information was confidential. The study protocol was approved by the Research Ethical Committee of Tehran Medical Sciences of Islamic Azad University (IR.QUMS.REC.1399.246/15.09.2020).

3. RESULTS

The mean age of students was 15.67 years (SD 0.84) with a mean BMI of 23.78 kg/m^2 (SD 5.19). Fifty-two students (17.7%) were suspected to have EDs, and the prevalence of eating disorder was not statistically significant between boys and girls (*P*=0.81) (Table 1).

Table 1. *Prevalence of disordered eating, weight status, and mean total Eating Attitude Test score of adolescents*

	Total (n=299) Mean ± SD	**Girls (n=185)** Mean ± SD	**Boys (n=114)** Mean ± SD
Age (years)	15.67±0.84	15.40±0.46	16.13±5.19
Body Mass Index (kg/m2)	23.78±5.19	23.02±4.56	24.98±5.88
BMI z-score	0.66±1.28	0.46±1.16	0.92±1.37
	n(%)	n(%)	n(%)
Eating disorder attitude Yes No	 53 (17.7) 246 (82.3)	 33 (17.8) 152 (82.2)	 20 (17.5) 94 (82.5)
Total Eat Score	12.53±9.42	12.43±8.91	12.70±10.21

Table 2. *Eating habits of two categories of adolescents with and without eating disorder by sex in the past week*

	Girls			**Boys**		
Frequency of intake	**EAT-26<20**	**EAT-26≥20**	**Test Value/p**	**EAT-26<20**	**EAT-26≥20**	**Test Value/p**
Fruit						
≤ 2 times/week	13 (8.5)	7 (21.2)	5.42/0.06	4 (4.2)	1 (5.0)	0.47/0.65
3–4 times/week	21 (13.8)	2 (6.1)		15 (16)	2 (10.0)	
≥5 times/week	118 (77.7)	24 (72.7)		75 (79.8)	17 (85.0)	
Vegetable						
≤ 2 times/week	31 (20.4)	7 (21.2)	0.87/0.66	30 (31.9)	1 (5.0)	8.24/**0.03**
3–4 times/week	34 (22.4)	5 (15.2)		16 (17.02)	2 (10.0)	
≥5 times/week	87 (57.2)	21 (63.6)		48 (51.1)	17 (85.0)	
Soft drink						
≤ 2 times/week	132 (86.9)	25 (75.8)	3.02/0.22	57 (60.6)	13 (65.0)	8.56/**0.03**
3–4 times/week	13 (8.5)	6 (18.2)		23 (24.5)	0 (0.0)	
≥5 times/week	7 (4.6)	2 (6.1)		14 (14.9)	7 (35.0)	
Sweetened drink						
≤ 2 times/week	124 (81.6)	28 (84.8)	6.27/**0.04**	70 (74.5)	13 (65.0)	3.07/0.81
3–4 times/week	25 (16.5)	2 (6.1)		14 (14.9)	2 (10.0)	
≥5 times/week	3 (1.9)	3 (9.1)		10 (10.6)	5 (25.0)	
Chips or French Fries						
≤ 2 times/week	104 (68.6)	20 (60.6)	1.45/0.47	67 (71.3)	12 (60.0)	1.60/0.62
3–4 times/week	28 (18.3)	6 (18.2)		13 (14.8)	5 (25.0)	
≥5 times/week	20 (13.1)	7 (21.2)		14 (14.9)	3 (15.0)	
Candy/Chocolate						
≤ 2 times/week	69 (45.4)	17 (51.5)	7.70/**0.02**	58 (61.7)	16 (80.0)	2.42/0.11
3–4 times/week	42 (27.6)	2 (6.1)		14 (13.8)	2 (10.0)	
≥5 times/week	41 (27)	14 (42.4)		22 (23.4)	2 (10.0)	
Fast food						
≤ 2 times/week	101 (66.5)	14 (42.5)	7.61/**0.02**	66 (70.2)	10 (50.0)	3.20/0.24
3–4 times/week	35 (23)	11 (33.3)		13 (13.8)	4 (20.0)	
≥5 times/week	16 (10.5)	8 (24.2)		15 (16)	6 (30.0)	
Milk						
≤ 2 times/week	82 (54)	8 (24.2)	11.80/**0.003**	37 (39.4)	5 (25.0)	1.89/0.49
3–4 times/week	26 (17.1)	13 (39.4)		24 (25.5)	5 (25.0)	
≥5 times/week	44 (28.9)	12 (36.4)		33 (35.1)	10 (50.0)	
Breakfast frequency						
Skippers	73 (48.1)	16 (48.5)	1.03/0.60	36 (38.3)	6 (30.0)	1.72/0.42
(0-2 days/week)	18 (11.8)	2 (6.1)		11 (11.7)	1(5.0)	
Semi-skippers	61 (40.1)	15 (45.4)		47 (50.0)	13 (65.0)	
(3-4 days/week)						
Non-skippers						
(5-7 days/week)						

Data are presented as numbers (%). Significant P values of the chi-squared test were bolded in the table, the df was 2 in all tests. EAT: Eating Attitude Test

Table 3. *Energy consumption and nutrient Intake of two categories of adolescents with and without eating disorder by sex*

	Girls			Boys		
	EAT-26<20	EAT-26≥20	Test Value/p	EAT-26<20	EAT-26≥20	Test Value/p
Total Energy Intake (kcal)	2560.85±600.76	2595.81±812.36	-0.23/0.80	2313.50±626.95[c]	2413.35±602.82[b]	-0.55/0.55
Carbohydrate (g)	334.91±78.21	328.78±92.56	0.35/0.71	300.76±77.95	325.17±85.28	-1.07/0.29
%Calorie	52.68±4.92	51.56±6.20	-	52.61±6.54	54.11±6.64	
Total Fiber	41.93±17.46[c]	37.69±12.86[c]	1.58/0.13	38.97±15.62	46.44±1685	-1.64/0.10
Total Fat (g)	104.15±32.44	110.56±48.37	-0.97/ 0.39	93.73±38.78	92.08±34.46	0.15/0.85
%Calorie	36.17±5.43	37.24±6.89	-	35.68±7.17	34.05±6.92	
Saturated Fat (g)	34.65±13.60	37.08±16.37	-0.89/0.41	30.52±15.54	26.85±13.40	0.83/0.40
%Calorie	12.04±3.53	12.54±3.52	-	11.36±3.42	9.73±3.17	-
Protein (g)	85.12±19.18[c]	87.15±21.29[c]	-0.53/0.60	82.78±20.87[c]	90.49±23.18[c]	-1.26/0.21
%Calorie	13.54±2.31	13.84±2.02	-	14.60±2.48	15.08±1.97	
NAR	1.85±0.42	1.89±0.46		1.59±0.40	1.74±0.45	
Sodium (g)	3.90±0.30[c]	3.920±1.07[c]	-0.11/ 0.91	3.87±0.82[c]	4..08±0.64[c]	-0.92/0.38
Potassium (g)	3.83±1.00[c]	4.03±1.07[c]	-1.01/0.32	4.11±1.50[b]	4.82±1.81	-1.60/0.11
NAR	0.81±0.21	0.86±0.23		0.87±0.32	1.02±0.39	
Calcium (mg)	1219.43±402.86[a]	1226.86±444.77	-0.09/0.89	1238.11±488.10	1432.17±484.48	-1.38/0.16
NAR	0.94±0.31	0.94±0.34		0.95±0.37	1.10±0.37	
Magnesium (mg)	412.29±115.00[c]	412.59±114.68[a]	-0.01/ 0.99	413.59±134.56	473.23±172.82	-1.47/0.12
NAR	1.14±0.32	1.15±0.30		1.01±0.33	1.15±0.42	
Zinc (mg)	11.95±2.83[c]	12.17±3.33[c]	-0.38/0.72	11.65±3.24	12.89±4.14	-1.27/0.16
NAR	1.33±0.31	1.35±0.37		1.06±0.29	1.17±0.38	
Iron (mg)	35.25±23.56[c]	35.93±25.02[c]	-0.15/ 0.88	37.74±28.01[c]	45.67±28.65[b]	-0.98/0.32
NAR	2.35±1.57	2.39±0.1.67		3.34±2.55	4.15±2.60	
Vitamin A (mcg)	643.38±222.99	706.54±184.40	-1.51/ 0.13	753.11±304.64	903.34±382.92	-1.64/0.07
NAR	0.92±0.32	1.01±0.26		0.83±0.34	1.00±0.42	
Vitamin D (IU)	83.87±47.82	93.82±53.16	-1.02/ 0.32	89.28±47.45	88.22±54.39	0.07/0.94
NAR	0.14±0.07	0.16±0.10		0.15±0.07	0.15±0.09	
Vitamin C (mg)	115.86±52.05[c]	127.17±48.66[c]	-1.13/ 0.26	146.02±88.22[c]	200.78±116.37[c]	-2.05/**0.048**
NAR	1.78±0.80	1.96±0.75		1.95±1.18	2.68±1.55	
Thiamin (mg)	1.98±0.67[c]	1.83±0.62[c]	-1.18/ 0.24	1.71±0.44[c]	1.92±0.61[b]	-1.20/0.18
NAR	1.98±0.67	1.83±0.62		1.43±0.37	1.60±0.51	
Riboflavin (mg)	1.96±0.45[c]	1.95±0.49[c]	0.17/0.85	1.96±0.57[c]	2.19±0.65[c]	-1.42/0.17
NAR	1.96±0.45	1.95±0.49		1.50±0.44	1.69±0.50	
Niacin (mg)	25.70±5.98[c]	25.28±5.82[c]	0.36/0.72	24.04±6.59[c]	25.03±6.61[c]	-0.52/0.62
NAR	1.83±0.43	1.81.041		1.50±0.41	1.56±0.41	
Vitamin B6 (mg)	1.95±0.36[c]	1.98±0.33[c]	-0.41/ 0.68	1.97±0.52[c]	2.23±0.58[c]	-1.68/0.11
NAR	1.63±0.30	1.65±0.28		1.51±0.40	1.71±0.44	
Folate (mcg)	562.54±145.29[c]	533.65±135.62[c]	1.04/0.29	519.19±121.63[c]	623.96±159.19[c]	-2.85/**0.005**
NAR	1.65±0.28	1.41±0.34		1.30±0.30	1.56±0.40	
Vitamin B12 (mcg)	3.89±1.62[c]	4.37±2.00[c]	-1.47/ 0.15	3.90±1.63[c]	3.87±1.91[a]	0.05/0.09
NAR	1.62±0.68	1.82±0.83		1.62±0.68	1.61±0.79	
MAR	1.44±0.28	1.47±0.32	-0.46	1.38±0.44	1.59±0.49	-1.64

An Independent sample t-test was used to compare between groups; significant p values were bolded in the table.
a P<0.05, b P<0.01, c P<0.001: Mean values were significantly different with DRI values by one sample t-test. NAR: Data are presented as mean±SD. Nutrient adequacy ratio, MAR: Mean adequacy ratio. EAT: Eating Attitude Test.

Table 2 shows adolescents' eating habits through frequencies of food or meal consumption in the past week. In girl adolescents, the differences in eating habits between the two groups of developing EDs and non-developing EDs were significant for sweetened drinks, candy/chocolate, fast foods, and milk between the two groups (*P*<0.05). Referring to the boys in the EDs group, 85% of students have eaten ≥5 times/week of vegetables, and 65% have consumed less than 2 times/week of soft drinks. There was no significant difference in other eating habits between the two groups of boys (*P>0.05*). The higher percentage of male students complying in the EDs group or non-EDs were breakfast non-skippers (50% and 65%, respectively).

The energy and nutrient intake of adolescents is demonstrated in Table 3. In terms of energy intake, both groups of girls consumed more calories than their needs, but this difference was not significant either for their needs or between the groups (*P>0.05*). Except for potassium and vitamin D, the NAR value for other nutrients was more than 1 in both girl groups (*P<0.05*). However, NAR for calcium was

less than 1 for girls with EAT<20. Regarding boy participants, no significant differences were observed in caloric and macronutrient intake between the high-risk group of EDs and low-risk participants (*P<0.05*), but boys in the two groups consumed significantly less energy than their needs (*P>0.05*). High-risk boys with disorders of eating had a higher intake of vitamin C compared to boys with EAT-26<20 (*P<0.05*). About NAR, similar to girls, all scores were above than 1 excluding potassium intake in non-disordered boys. Dietary fiber was consumed up to 16% higher in eating disordered boys than in their counterparts, but this difference was not statistically significant (*P=0.11*). Sodium intake was above the DRI values in all students (*P<0.05*). The mean MAR for students at risk of ED in both sexes was higher than the non-ED group, while the difference was not statistically significant (*P>0.05*).

4. DISCUSSION

Eating disorders recently became a health issue among adolescents in Iran (20) that can cause many changes in food consumption, eating habits, and nutrient intake of individuals. These changes may lead to a lack of nutrient storage and the appearance of chronic diet-related diseases (21). There seems to be a gap in the literature in this country, so we highlighted the eating habits and nutrient intake of Iranian adolescents with and without suspected eating disorders by gender in Tehran.

Regarding the prevalence of ED, we found a relatively equal prevalence in girls and boys (approximately 17%), whereas a previous study showed that 24.2% of their participants were at risk of ED with a higher prevalence in adolescent girls than boys. Also, the overall prevalence of eating disorders in Iranian children and adolescents was estimated to be 0.89 (0.81-1.10) by Mohammadi et al. (2020) (2). According to the different findings in the prevalence rate in Iran, this difference seems to be related to the region, ethnicity, age, and sample size.

Our results showed that in a population of Iranian adolescents, most students consumed more than five servings of vegetables and fruits per week, separately. The distribution of vegetable intake was significantly different among the two groups of boys; 85% of eating disordered boys were taken more than 5 times vegetables per week. About 76% of girls with high EDs consume milk more than 3 times a week. Similar to our results, Marashi et al. (2019) revealed that from 245 cases, 56.7% and 60.4% consumed more than 6 times per week from fresh fruit juice and vegetables, respectively (22). The frequencies of daily intake of fruits and vegetables were 60.9% and 33.5% in Iranian adolescents of the CASPIAN-V study, too (8).

Skipping breakfast was higher among girl students (about 48% in both EDs groups) than the boy participants; 65% of male participants with ED were non-skippers. Similarly, a meta-analysis including 24 studies among Iranian students (23) indicated that girls skipped breakfast more than boys (26% vs. 18%). Studies among US adolescents also specified that the decrease in consumption of breakfast usually happens in mid-adolescence, especially in girls (24). It was known that irregular and infrequent breakfast intake might be associated with poor metabolic control and increased ED pathology (25). Our results emphasize that boys with ED were less affected by breakfast skipping, and the prevalence of breakfast skipping was not significantly different among EDs and non-EDs participants. Another study has also highlighted that the omission of daily meals including breakfast considered unimportant among eating-disordered subjects (26).

According to our calculations, girls consumed more energy than they needed, while all boys received significantly less energy than their requirements. The interesting thing about our study is that, contrary to our expectations, there is no significant difference in energy consumption between the two ED groups of girls and boys, which was contrary to other studies (26, 27). Given macronutrients, boys consumed less amount of fat than girls; boys in the ED group consumed the least percentage of saturated fat (9.73±3.17) which is the nearest amount to the recommended intake for adolescents (28). All students, even those with EDs, consumed more protein than their recommended value (*P<0.001*). In contrast to our findings, Quiles-Marcos et al. (2011) showed that adolescents with EDs ate fewer meals and had more diets (26). The proportions of macronutrient intake in girl students with ED were similar to the study by Chang et al. (2011) (29).

As regards nutrient intake, it is believed that subjects with any kind of eating disorder behavior may develop nutritional deficiency (1, 30). For instance, a survey on the nutritional intake of Taiwanese adolescents reported that participants with irregular ED scores had a significantly lower intake of energy, protein, carbohydrate, zinc, and vitamins B6 and B12 compared to students with a normal score of Eat-26 (*P<0.05*); conversely, EDs participants consumed more dietary and crude fiber than their counterpart (29). Similarly, results from another study among female athlete adolescents showed that mean carbohydrate and protein intakes as well as some micronutrient intakes were below recommended levels of RDAs/DRIs (31). But, the mean intake of most micronutrients among our students, regardless of gender, was higher than the DRIs. Only potassium and vitamin D intake were not sufficiently used by the adolescents.

5. CONCLUSION

In brief, we conclude that eating habits may differ following eating disorder attitudes in girls and boys adolescents. In a representative sample of students in an urban city in Iran, there were no differences between the two EDs groups in energy intake in both genders. Suspected boys to EDs preferred healthier and nutrient-dense foods. Breakfast-skipping did not frequently take place in students with a risk of EDs in both sexes. Except for vitamin D and potassium, all other nutrients were adequately consumed by all adolescents aged 15-18 years.

We need to mention that there are some limitations in this work; first, because of the cross-sectional nature of this study, we could not express any causal inferences about the associations. Second, the use of additional questionnaires to determine the type of eating disorder in suspected teenagers could be more effective in our justification, which could not be evaluated due to the coronavirus pandemic. So, we recommend performing future longitudinal studies in different regions among girl and boy adolescents to determine the real approach to eating disorders in Iran. In addition, the potential risks and psychological aspects associated with food and dietary changes should be considered in the development of eating disorders. Last but not least, since healthy eating habits and adequate intake of nutrients are very important during adolescence, we emphasize regular dietary assessment and appropriate strategies to solve the nutritional problems of this age group.

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Data Availability Statement

The datasets used and analyzed during the current study are available from the corresponding author upon request.

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