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Prevalence of Eating Disorders Among Adolescents in the Northwest of Iran

Maryam Rauof [1]; Hossein Ebrahimi [1,*]; Mohammad Asghari Jafarabadi [2]; Ayyoub Malek [3]; Jalil Babapour Kheiroddin [4]

[1]Department of Psychiatric Nursing, Faculty of Nursing and Midwifery, Tabriz University of Medical Sciences, Tabriz, IR Iran
[2]Health Services Management Research Center, Department of Biostatistics and Epidemiology, Tabriz University of Medical Sciences, Tabriz, IR Iran
[3]Research Center of Psychiatry and Behavioral Sciences, Department of Psychiatry, Tabriz University of Medical Sciences, Tabriz, IR Iran
[4]Department of Psychology, Faculty of Educational Sciences and Psychology, Tabriz University, Tabriz, IR Iran

*Corresponding Author: Hossein Ebrahimi, Department of Psychiatric Nursing, Faculty of Nursing and Midwifery, Tabriz University of Medical Sciences Tabriz, IR Iran. Tel: +98-4114751709, Fax: +98-4114796969, E-mail: Ebrahimih@tbzmed.ac.ir

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Background: Perceived sociocultural pressure to be thin has an important impact on disordered eating during early and middle adolescence, but less is known about late adolescence. Adolescents face special problems that are less common during childhood. Several studies indicate that the prevalence of eating disorders has been increased among adolescents.

Objectives: The aim of the present study was to investigate the occurrence, prevalence and correlates of eating disorders (ED) among adolescents in two cities of Iran, Urmia and Tabriz.

Patients and Methods: This was a cross-sectional survey in which 1990 adolescent boys and girls were selected through multistage random sampling. The study was based on self-report questionnaires including eating attitudes test (EAT-26) and DSM-IV criteria for the presence of eating disorders. To analyze the obtained data we calculated measures of central tendency and dispersion, linear and logistic regression and Fisher's exact test.

Results: According to diagnostic criteria of EAT-26, 492 students (24.2%) were at risk of ED and scored above the recommended cut-off point on EAT-26. Among 1990 students, a total of 51 cases (0.25%) of eating disorder (14 anorexia nervosa, 18 bulimia nervosa, and 19 eating disorder not otherwise specified) were diagnosed.

Conclusions: The obtained prevalence of ED in our study was higher than previous studies in Iran. We found high numbers of boys with ED. Overweight adolescents were shown to be more susceptible to strict dieting than normal-weight adolescents. These results suggest that it is necessary to provide screening and treatment services for Iranian adolescents. Further research is needed to develop intervention programs to control eating disorders among Iranian adolescents.

Keywords: Eating Disorders; Prevalence; Adolescents; Iran

1. Background

Adolescence is characterized by peak growth and physical maturation. Healthy diet helps teenagers reach complete growth potentials, increases health and wellbeing and decreases the risk of chronic diseases in senior ages (1). Studies have shown that adolescents are prone to a number of health problems, such as obesity and eating disorders, which are attributed to their lifestyle that influences their eating habits (2). Poor eating habits in children and teenagers can be related to puberty development, overweight, and body satisfaction as well as family and peers effects (3). Social and cultural variables, economic status, westernized weight loosing programs of the media and peer pressure increase eating disorders (4). Eating disorders are one of the most common mental health issues, along with depression and anxiety disorders (5). Sedentary lifestyle and changes in eating patterns, together with other social and cultural factors, explain the increase of these disorders worldwide (6).

Treating eating disorders can take long and is a difficult process, which is likely to recur. 50% of anorexic patients recover, whereas 20% of them die due to the illness effects. In bulimia, patients heal up at a little higher rate. Besides, eating disorders have a high range of physical, mental and social consequences (7). There is unanimity about the importance of early diagnosis. In case of performing the most suitable treatment, early treatment can lead to a decrease in frequency of physical and mental effects and even death. Following rapid cross cultural social changes occurred in many Arabian countries, the attitudes and behaviors of the new generation have borrowed western values (8). Adolescence is a stage in which individuals are more affected by fitness ideals hence more prone to eating disorders (9). Considerable evidences show that eating disorder and obesity is growing throughout the world (3). Overweight teenagers are more exposed to keep or develop eating disorder symptoms (10). A num-

ber of studies showed a correlation between the risks of increased symptoms of eating disorders, overweight, body image concerns, and improper behaviors toward losing weight in teenagers (11).

Many women show more frequent and severe symptoms and behaviors that may progress to full-syndrome eating disorders (12). Despite the fact that eating disorder is more prevalent in women (13), men are also vulnerable to develop eating disorders (14). The prevalence of eating disorder has changed over time. The spread of eating disorder in boys (15) has been increased. Previous studies show that based on DSM-IV-TR standards, the outbreak of eating disorder is less in boys but non-specified eating disorder is relatively widespread and common among them (16). However, most studies about eating disorders have been performed on girls and studies performed on boys are rather scarce (17). It has been reasoned that in non-western countries that overweight is not a disgrace, eating disorders are rare (18). However, there are studies that show considerable prevalence of eating disorders in developing and Arabian countries (13, 19).

Assessing abnormal nutritional attitudes in normal population is essential to supervise and follow up the change trend for preventive planning and healthcare. Epidemiologic studies about eating disorder and its types among teenagers have been performed mainly in southern Europe and the northern American populations and fewer studies performed in other areas as Greece, Turkey, Israel and South America (20) and further study on different populations is needed to fill the present scientific gap. Findings of the present study would provide researchers with fundamental information about eating disorders in Iran. Probing new researches performed in the Middle East (21), the only one in Iran was that of Nobakht and Dezhkam (22), which was performed only on Iranian girls of Tehran in 2000. Besides, given the increase of prevalence in the recent decade, no study has been performed to investigate changes in the prevalence since 2000. Thus, performing new studies is inevitable since there is a scarce data from Iran compared to other Middle Eastern countries. In addition, the association of gender and eating disorders is unknown and no study has yet been performed on Iranian boys to explore eating disorders.

2. Objectives

The present study aimed to investigate eating disorders in a healthy teenage group living in Eastern and Western Azerbaijan provinces and exploring its relation to individual and social factors.

3. Patients and Methods

In this cross-sectional (and descriptive analytical) study, the prevalence of eating disorder and its relation with individual variables was explored in male and female middle school students of Urmia and Tabriz in 2012. Sample size was calculated as 1850 with the following equation (Equation 1) considering the prevalence of eating disorder as the primary outcome with a P = 24.16% (22), d = 1.95%, and $\alpha = 0.05$.

1) $$N = Z^2_{1-\frac{\alpha}{2}} \times \frac{P(1-P)}{d^2}$$

Finally, sample size increased to 2000 predicting 10% attrition rate. The high school students were selected from centers of two provinces of Western Azerbaijan (Urmia) and Eastern Azerbaijan (Tabriz). In 2012, 36337 students in Urmia and 75166 students in Tabriz were studying in high school. In proportion to the population of the cities, 695 students were selected from Urmia and 1295 from Tabriz. District 5 of Tabriz and district 2 of Urmia were the clusters of the present study. A multistage sampling was used in this study; in the first step, the list of all high schools was provided and the high schools of these districts were selected randomly. In the next step, the grades 1, 2, 3, and 4 in each school were selected randomly and students from each grade were randomly selected from class lists. A sample size for each school, grade and class was determined proportionately. After permission from the regional committee of research ethics of Tabriz university of medical sciences (Letter code: 5/4/4412, date: 9/13/2012) and initial introduction, we explained our objectives to the research units and asked their willingness to participate in our research. Then, we distributed the questionnaires and explained that the obtained information would be kept confidential.

This study was performed in two stages to assess eating disorders and adolescents prone to them. In the first stage, we used eating attitude test (EAT-26). The EAT-26 measures symptoms of eating disorders. Higher scores suggest more disordered eating, with scores of 20 or above representing the clinical cut-off point. It has high internal consistency ($\alpha = 0.90$) and acceptable criterion-related validity, being highly accurate in classifying eating disordered and non-eating disordered individuals (23). EAT-26 is widely used to identify those at risk of developing an eating disorder (anorexia nervosa and bulimia nervosa) and in similar studies in non-clinical populations designed to identify respondents at risk of eating disorders. This questionnaire has been translated and validated in Iran (22). In the second stage, to obtain more accurate diagnosis, individuals who scored at least 20 (482 students) were interviewed using the structured clinical interview for DSM-IV (SCID). SCID has been used more than any other standard diagnostic interviews in psychiatric research. To assess the criteria for a current eating disorder, we used the structured clinical interview for DSM-IV-patient edition (SCID) (24) and determined diagnoses of anorexia nervosa (AN) bulimia nervosa (BN) and eating disorder not otherwise specified (EDNOS). A

number of studies used the SCID as the "gold standard" for determining the accuracy of clinical diagnoses (25) and exhibiting strong inter-rater reliability (e.g. 0.77 for any eating disorder) (26). SCID is translated and validated in Iran (22).

Next, a demographic questionnaire filled by participants and height and weight of them were measured by one researcher using a beam balance scale. Height was measured with no shoes and light clothing and was recorded to the nearest millimeter. Weight was measured with no shoes and light clothing and recorded to the nearest 0.1 kilogram. The participant was asked to stand straight ahead unassisted in the center of the platform in which the scale was checked for zero balance before each measurement. The obtained data was analyzed using SPSS (Version 13.0, Chicago, IL, USA). To determine BMI, modes of eating disorders, anorexia, bulimia, and EDNOS we reported frequencies and percentages for the occurrence of the mentioned conditions with 95% confidence interval. We used T-test to determine sex differences in BMI. In addition, to determine the relation between personal and social factors with BMI, modes of eating disorders, anorexia, bulimia, and EDNOS, we used linear and logistic regression (with adjustments on possible confounding variables), considering the significant level of $P < 0.05$. Normal distribution of data was assessed using both K-S normality tests and descriptive assumptions like skewness and kurtosis. Considering the normality, parametric tests were used accordingly.

4. Results

In the present study, 2000 students were selected, from whom 10 were removed for the following reasons: 4 were not between the ages of 13 to 18 years and 6 did not fill out the questionnaires. Finally, 1990 students participated in this study including 951 male adolescents (47.8%) and 1039 (52.2%) females. According to the proportion of student in two provinces, 695 students were selected from Urmia and 1295 from Tabriz. The mean age of all students was 15.8 (SD = 1.24) with the minimum age of 13 and maximum of 18 years. 723 of students (36.3%) were in the 9th grade, 480 (24.1%) in the 10th grade, 395 (19.8%) in the 11th grade and 392 (19.7%) in the 12th grade. Among 1990 students, a total of 51 cases (0.25%) of eating disorder were diagnosed (14 cases anorexia nervosa, 18 cases bulimia nervosa and 19 cases eating disorder not otherwise specified). The relative frequency of ED based on gender is shown in Figure 1. According to diagnostic criteria of EAT-26, 492 students (24.2%) were at risk of ED. Among them 173 cases (18.2%) were male and 309 cases (29.7%) female. Figure 2 shows the risk of ED with the EAT-26 criteria regarding age. In addition, in Table 1, the mean of body mass index (BMI) is shown based on gender. According to linear regression, there was a significant association between gender and ED diagnosed by EAT-26 ($P < 0.001$), AN ($P < 0.001$), BN ($P < 0.05$), and EDNOS ($P < 0.001$). According to multiple logistic regression analysis, income, being female, age, and BMI significantly predicted eating disorders. According to linear regression, there was no significant relation between risks of ED with parent's education and occupation, number of siblings and birth order. Details of two mentioned analysis are shown in Table 2.

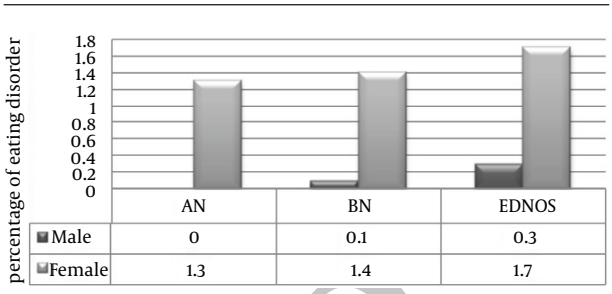

Figure 1. Results of Eating Disorders Analyses Based on Gender.

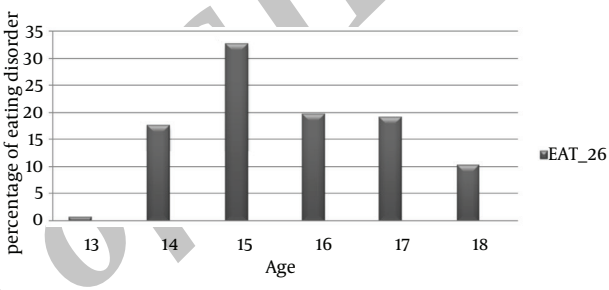

Figure 2. Eating disorders Occurrence by Age Groups for the Population Sample.

Table 1. Body Mass Index Score [a]

BMI	N	Values [b]	T	P Value
Gender			0.119	0.9
Male	951	21.0311 ± 4.15581		
Female	1039	21.0113 ± 3.47055		

[a] No significant differences were found among male and female BMI.
[b] Data are presented as mean ± SD.

Table 2. Relationships Between Eating Disorder and Demographic Variables

Variables	OR	P Value	Lower	Upper
Adjusted				
BMI	0.93	P < 0.0001	0.90	0.95
Age	1.09	0.036	1.00	
Gender, female	0.50	P < 0.0001	0.0	0.62
Income	1.17	0.029	1.01	1.35
Unadjusted				
BMI	0.93	P < 0.0001	0.90	0.96
Age	1.08	0.07	0.99	1.17
Gender, female	2.52	P < 0.0001	0.42	0.65
Income	1.12	0.07	0.84	1.49

5. Discussion

Adolescence is a period when specific types of problems including body dissatisfaction are more likely to arise than other periods of development. These problems may result in eating disorders. On the eating attitude test, 24.2% of Iranian teenagers (29.7% females and 18.2% males) showed a propensity for eating disorder behavior. Similar studies were performed in different continents which can be compared with the present study. The reported percentage of girls at risk of eating disorders in Saudi Arabia was 24.6% (19), 29.4% in Oman (27), 23.4% in the UAE (4), and 15.76% in Brazil (28). The reported percentage of boys at risk of eating disorders in Spain was 8% (29) and in Oman 36.4% (27).

Although eating disorders are notably more common among girls, we found fairly high prevalence of ED in boys. This result indicates the increase in the prevalence of ED in the recent decades. American Psychiatric Association declared that 1 - 3% of females have bulimia nervosa (BN). The present study indicates that 1.4% of Iranian female adolescents have BN, which is in the range mentioned by APA and similar to the results from Egypt (1.2%) (18) and Norway (1.6%) (30). However, our estimate of BN in Iran is higher than that of Pakistan (0.2%) (31) and the UAE (0.2%) (4). In addition, it is lower than the only previous study in Iran that estimated the prevalence of BN as 3.2% (22). 1.3% incidence of anorexia nervosa in females of the present study is consistent with the results from other studies (32). There were significant differences between the prevalence of EDNOS in Iranian females (1.7%) and those of some countries including Norway (33) and Jordan (21), but there were no significant differences with Spain (34, 35).

In a previous study in Iran (22), the prevalence of EDNOS in females was 6.6%, which is significantly different from 1.7% in the present study. The difference might be due to either inaccuracy of the results of the previous study, given inconsistency of its results with data from other Asian countries, or the fact that previous study used narrower age range. The prevalence of BN in boys of the present study was 0.01%, which is similar to the results from other studies (34). In addition, we did not find any case of anorexia nervosa (AN) in males of our study, which is near to clinical estimate of AN (0.05 - 0.1%). The prevalence of EDNOS in this study was 0.3%, which is similar to the results from Spain (0.6%) (29). Although the prevalence of eating disorders varies between different studies, the common point is the fact that EDNOS is more common that the two other kinds of ED. Several reasons may account for the differences of results from various countries. The most important factors include influences of foreign cultures, racial characteristics, class and social status, level of social development, extensive advertising, and following the fashions and customs (36). Like other research results (4, 21, 35), our findings indicate that age, gender, and BMI are predictors of ED. In our study, 15-year-old students were more vulnerable to ED. In addition, in consistency with other studies (9, 37), this study showed that social and economic status can predict ED. Considering the complicated role of individual, familial and social factors, and interaction between these factors in incidence of different kinds of ED with their various physical and psychological symptoms, prevention and early diagnosis of ED should be considered by all members of medical team including nurses. All persons who have direct contact with students, especially parents and teachers, should be trained by nurses or healthcare providers in schools about issues related to ED. This training can include basic nutritional needs, effects of restrictive diets, side effects of purging methods, the symptoms of ED, people at risk of ED and boosting self-esteem, because self-esteem can prevent body image distortion. Routinely, screening for ED is not performed in Iran, but the high percentage of students having ED shows the necessity of screening programs. One of the limitations of our study was the fact that we used self-report questionnaires and we did not use complimentary psychiatric interview to confirm our diagnosis and assess probable presence of other mental disorders. To do this, we only used medical records. In addition, absent students during the time of sampling may affect our results. Despite these limitations, this study provided key information concerning the epidemiology of eating disorders in the Iranian adolescents. More epidemiological studies on ED in Iran are recommended due to scarce performed investigations. In addition, preventive school-based studies are needed.

In our study population from Iran, the prevalence of ED was similar to other countries. Our study showed that in comparison with a previous study in Iran, the prevalence of ED has not been changed dramatically during the past 13 years. In addition, in Iran males are at risk of ED and we need screening programs for both adolescent boys and girls.

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Authors' Contributions

Study concept and design: Maryam Rauof, Ayub Malek. Analysis and interpretation of qualitative data: Maryam Rauof, Hossein Ebrahimi, Mohammad Asghari Jafarabadi. Statistical analysis and interpretation of quantitative data: Maryam Rauof, Hossein Ebrahimi, Mohammad Asghari Jafarabadi. Drafting of the manuscript: Maryam Rauof. Critical revision of the manuscript: Jalil Babapour Kheiroddin, Hossein Ebrahimi.

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