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**Research Article**

# Eating disorders and anxiety among high school students in Western area of Turkey

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## ABSTRACT

**Background** Eating disorders (ED) are the one of the most common chronic illness among adolescents. The aim of the present study was to investigate eating disorders and it's associations between anxiety among high school students in Sivrihisar in Eskisehir, Turkey.
**Methods:** This cross-sectional study was carried out in the high school students of center of Sivrihisar between 01 January 2014 and 28 February 2014. The questionnaire prepared according to literature, consisting of 3 parts (socio-demographic characteristics, eating attitude test (EAT-40) and beck anxiety inventory (BAI)). The students completed questionnaire in the presence of a member of the research team. The data collected were self-reported by the students.
**Results:** Of the study group 64.4% (n=625) were females and 35.6% (n=345) were males. The prevalence of eating disorder was 13.0% (n=126). The mean and standard deviation of students' total score of EAT-40 were 18.80±9.88 (ranged 3 to 95). The mean and standard deviation of students' total score of BAI were 20.32±12.32 (ranged 0 to 63). The positive weak correlation was found between the total scores of EAT-40 and BAI (r=0.178; p=0.001).
**Conclusions:** ED is an important health problem for adolescents. On the studies upon epidemiology of ED towards high school students, socio-economic factors should be assessed in more detailed and more comprehensive perspective.

**Keywords:** Eating disorder, Anxiety, High school student

## INTRODUCTION

Eating disorders (ED) are the one of the most common chronic illness among adolescents particularly in women.[1,2] Individuals with ED are often diagnosed first in adolescence age.[3] Many adolescents also experience minimal ED symptoms in their lives.[4]

Adolescents are mostly diagnosed with anorexia nervosa (AN), which is characterized by extreme dietary restriction and being underweight, bulimia nervosa (BN), which is characterized by binge eating and compensatory behaviors such as purging without being underweight, and ED ‘‘not otherwise specified’’ (EDNOS), which currently includes a range of clinical presentations of AN and BN.[5,6] Lifetime prevalence estimates anorexia nervosa, bulimia nervosa, and binge eating disorder are 0.9%, 1.5%, and 3.5% among women, and 0.3%, 0.5%, and 2.0% among men.[7]

Age and gender can be two of the main risk factors when it comes to developing ED.[8-10] Preteens, teens and young adults are more risky of developing eating disorders than older people. Eating disorders occur equally in males and females before puberty with the ratio increasing to approximately 1:10 during young adulthood.[11]

Many adolescents are involved in unhealthy eating and weight control behaviors such as restricted intake, diuretics or diet pills and induced vomiting. These

behaviours due to social emphasis on appearance, image and physical attractiveness.[12] The high prevalence of these behaviours may constitute a serious health problems that associated with high levels of morbidity.

Anxiety disorders are firstly onset in childhood and adolescence and require long-term treatment and monitoring in later life.[13] EDs are often interrelated to higher social anxiety.[3] Many studies have shown associations between negative body image, abnormal eating behaviours, social anxiety symptoms or fear that one's social self will be judged negatively and EDs in female and male samples.[14-16]

Lifetime prevalence of depression and anxiety disorders is common in ED patients.[3,7,17,18] Lifetime anxiety disorders such as particularly social phobia, simple phobia and childhood overanxious disorder were diagnosed in 71% of bulimic women and 83% of anorexic women.[19,20] It has been proposed that anxiety co-occurs with ED due to neuroendocrinological disturbances induced by starvation.[21]

The aim of the present study was to investigate eating disorders and it's associations between anxiety among high school students in Sivrihisar in Eskisehir, Turkey.

## METHODS

This cross-sectional study was carried out in the high school students of center of Sivrihisar between 01 January 2014 and 28 February 2014. Sivrihisar is a town located south-east of Eskisehir, where the province located in the Middle Anatolian Region of Turkey. According to the Turkish Statistical Institute, 10.007 people were lived in town center of Sivrihisar.[22] Of the 10.007 people, 48.8% were male and 52.2% were female.[22] There were total of 1540 students in 8 high schools of Sivrihisar (Fahri Keskin Anatolian High School, Anatolian Trade Vocational High School (n=130), Religious Vocational High School (n=120), Sıdıka Hanım High School (n=80), Health Vocational High School (n=200), SEV Anatolian High School (n=190), Zübeyde Hanım Female Vocational High School (n=200) and Technical And Industrial Vocational High School (n=400). 970 students (63.0%) were consisted of our study group.

The ethical permission was received from regional management authority, the administration of schools and Medical School of Osmangazi University before the starting the collect data. The process of collecting data was conducted according to Helsinki Declaration.

The questionnaire prepared according to literature, consisting of 3 parts. First part including socio-demographic characteristics (gender, age, school type, living area, family income status, personal income status, number of siblings), habits and disorders (smoking, alcohol addiction, having physician diagnosed chronic disease having obesity, having disability, previous traumatic events) and some parents characteristics (to have mother and farther, parents' educational level, parents' working status, having obesity). The second part was including eating attitude test (EAT-40) and third part was including beck anxiety inventory (BAI).

Study dates were adjusted with school administrators. The students completed questionnaire in the presence of a member of the research team. The data collected were self-reported by the students. All subjects were told that participation in the investigation was strictly voluntary and that the data collected would not be used for anything except for this research study. Students who agreed to participate were given the questionnaire to complete. The duration for completing the questionnaire was between 20 and 25 minutes for per subject.

EAT-40, which was applied in this study and which is one of the scales used often in the screening of eating attitude disorders, it was developed by Garner and Garfinkel.[23] Turkish validity and reliability study of this scale was modified by Savasir and Erol to suit the Turkish culture and norms.[24] It has been widely used in various studies in Turkey and it has been accepted that the Turkish version of the scale has sufficient reliability and criterion-related validity, including use with school students. EAT-40 is a self-administrated questionnaire and contains 40 questions made up of six choices. As in this study, the subjects were asked to choose 1 answer from a group of 6 that best described their status. The answers the students gave are arranged as always, very often, often, sometimes, hardly ever and never. The answers to the items 1, 18, 19, 23, 27 and 39 are evaluated as: sometimes: 1 point, hardly ever: 2 points, never: 3 points and 0 point for the other choices. The answers to the other questions are evaluated as always: 3 points, very often: 2 points, often: 1 point and 0 point for the other choices. The score varies between 0-120. The ones who obtained 30 points or over are considered at high risk in terms of having Eating Disorders. Higher scores from the items indicates that the severity of pathology get worse.[23]

BAI, which consists of a list of 21 common symptoms characteristic of anxiety, the level of anxiety in our patients thus being categorized as minimum/mild or moderate/severe. BAI was developed by Beck et al in 1988 and was translated into Turkish in 1998 by Ulusoy et al.[25,26] The score varies between 0-63. Higher scores from the inventory indicates that the severity of anxiety get worse. The people who smoke at least 1 cigarette a day were accepted as smokers; the people who haven't smoked for 6 months were accepted as former smokers. The people who consume alcohol at least once a week (30 grams of ethanol) were evaluated as alcohol consumers.[27]

The participants' body mass indexes (BMIs) were calculated by measuring their heights

and weights. Each student's body weight was measured with domestic scales and height with a meter rule. Those who had a BMI of 18.0–24.9 kg/m2 were classified as normal weight, adolescents with BMI valuesthat corresponded to a BMI of 25.0–29.9 kg/$m^2$ were classified as overweight (pre-obese), adolescentswithBMI values that corresponded to an adult BMI of ‡30.0 kg/$m^2$ were classified as obese, and adolescents with BMI values that corresponded to <18.0 kg/$m^2$ as underweight.[28]

The socioeconomic status of family was evaluated as good or moderate or bad, and pocket money of students were evaluated as sufficient or insufficient according to students' perceptions. The students' parents who works in return of salary were defined as have a job. The students who have visual, auditory or orthopedic disability were determined as have physical disability.

The data were analyzed by using the computer software package Statistical Package for Social Sciences (SPSS, Chicago, Il, USA) for Windows version 15.0. The statistical analysis was carried out using the Chi Square and Spearmen Correlation analyses. A value of p≤0.05 was considered statistically significant.

## RESULTS

Of the study group 64.4% (n=625) were females and 35.6% (n=345) were males. Their mean age 16.04±1.13 years (range 13 to 20). Of the students, 356 (36.7%) were 15 years and below, 268 (27.6%) were 16 years, 247 (25.5%) were 17 years and 99 (10.2%) were 18 years and above. 553 (57.0%) students were reported their income status as moderate and 239 (24.6%) students reported their pocket money as insufficient. The prevalence of eating disorder was 13.0% (n=126). The detailed sociodemographic characteristics of the students according to have the eating disorder are presented in Table 1.

**Table 1: Some sociodemographic characteristics of students by status of eating disorder.**

| Sociodemographic characteristic | Eating disorder | | | Statistical analyses $x^2$; p |
|---|---|---|---|---|
| | No n (%)[a] | Yes n (%)[a] | Total n (%)[b] | |
| **Age group** | | | | |
| ≤15 | 310 (87.1) | 46 (12.9) | 356 (36.7) | 1.303; 0.728 |
| 16 | 234 (87.3) | 34 (12.7) | 268 (27.6) | |
| 17 | 211 (85.4) | 36 (14.6) | 247 (25.5) | |
| ≥18 | 89 (89.9) | 10 (10.1) | 99 (10.2) | |
| **Gender** | | | | |
| Male | 311 (90.1) | 34 (9.9) | 345 (35.6) | 4.655; 0.031 |
| Female | 533 (85.3) | 92 (14.7) | 625 (64.4) | |
| **Living area** | | | | |
| With family | 357 (85.6) | 60 (14.4) | 417 (43.0) | 1.266, 0.260 |
| At student resident | 487 (88.1) | 66 (11.9) | 553 (57.0) | |
| **Socioeconomic status** | | | | |
| Low | 50 (80.6) | 12 (19.4) | 62 (6.4) | 5.555; 0.062 |
| Moderate | 580 (88.7) | 74 (11.3) | 654 (67.4) | |
| High | 214 (84.3) | 40 (15.7) | 254 (26.2) | |
| **Pocket money** | | | | |
| Insufficient | 196 (82.0) | 43 (18.0) | 239 (24.6) | 7.020; 0.008 |
| Sufficient | 648 (88.6) | 83 (11.4) | 731 (75.4) | |
| **Number of siblings** | | | | |
| 0 | 121 (87.7) | 17 (12.3) | 138 (14.2) | 1.474; 0.688 |
| 1 | 349 (88.4) | 46 (11.6) | 395 (40.7) | |
| 2 | 220 (85.6) | 37 (14.4) | 257 (26.5) | |
| 3 and above | 154 (85.6) | 26 (14.4) | 180 (18.6) | |
| **Total** | 844 (87.0) | 126 (13.0) | 970 (100.0) | |

[a]Percent for the row; [b]Percent for the column.

A total of 10.8% of the study group were smokers and 4.8% alcohol consumers. The proportion of students who had disability was 7.6%, who had history of trauma. The distribution of students according to some attitudes and disorders summarized in Table 2.

**Table 2: The distribution of students according to some attitudes and disorders.**

| Some attitudes and disorders | Eating disorder | | | Statistical analyses $x^2$; p |
|---|---|---|---|---|
| | No n (%)[a] | Yes n (%)[a] | Total n (%)[b] | |
| **Smoking** | | | | |
| No | 761 (88.0) | 104 (12.0) | 865 (89.2) | 5.839; 0.016 |
| Yes | 83 (79.0) | 22 (21.0) | 105 (10.8) | |
| **Alcohol consumption** | | | | |
| No | 813 (87.9) | 112 (12.1) | 925 (95.4) | 12.081; 0.001 |
| Yes | 31 (68.9) | 14 (31.1) | 45 (4.6) | |
| **Chronical disease** | | | | |
| No | 807 (87.6) | 114 (12.4) | 921 (94.9) | 5.015; 0.025 |
| Yes | 37 (75.5) | 12 (24.5) | 49 (5.1) | |
| **Status of disability** | | | | |
| No | 782 (87.3) | 114 (12.7) | 896 (92.4) | 0.461; 0.497 |
| Yes | 62 (83.8) | 12 (16.2) | 74 (7.6) | |
| **History of trauma** | | | | |
| No | 720 (88.0) | 98 (12.0) | 818 (84.3) | 4.152; 0.042 |
| Yes | 124 (81.6) | 28 (18.4) | 152 (15.7) | |
| **Obese or overweight** | | | | |
| No | 770 (87.0) | 115 (13.0) | 885 (91.2) | 0.000, 1.000 |
| Yes | 74 (87.1) | 11 (12.9) | 85 (8.8) | |
| **Total** | 844 (87.0) | 126 (13.0) | 970 (100.0) | |

[a]Percent for the row; [b]Percent for the column.

**Table 3: The distribution of parents' characteristics of students.**

| Some parents' characteristics | Eating disorder | | | Statistical analyses $x^2$; p |
|---|---|---|---|---|
| | No n (%)[a] | Yes n (%)[a] | Total n (%)[b] | |
| **Is your mother alive?** | | | | |
| No | 9 (100.0) | 0 (0.0) | 9 (0.9) | Fisher; 0.614 |
| Yes | 835 (86.9) | 126 (13.1) | 961 (99.1) | |
| **Is your father alive?** | | | | |
| No | 29 (85.3) | 5 (14.7) | 34 (3.5) | Fisher; 0.458 |
| Yes | 815 (87.1) | 121 (12.9) | 936 (96.5) | |
| **Mothers' educational level** | | | | |
| Primary school and under | 619 (88.4) | 81 (11.6) | 700 (72.2) | 5.194; 0.074 |
| Elementary school | 124 (84.9) | 22 (15.1) | 146 (15.1) | |
| High school and upper | 101 (81.5) | 23 (18.5) | 124 (12.8) | |
| **Fathers' educational level** | | | | |
| Primary school and under | 394 (87.8) | 55 (12.2) | 449 (46.3) | 2.591; 0.274 |
| Elementary school | 180 (89.1) | 22 (10.9) | 202 (20.8) | |
| High school and upper | 270 (84.6) | 49 (15.4) | 319 (32.9) | |
| **Job status of mothers** | | | | |
| Unemployment | 722 (87.6) | 102 (12.4) | 824 (84.9) | |
| Employment | 122 (83.6) | 24 (16.4) | 146 (15.1) | 1.467; 0.226 |
| **Job status of fathers** | | | | |
| Unemployment | 225 (87.5) | 32 (12.5) | 257 (26.5) | 0.090; 0.765 |
| Employment | 619 (86.8) | 94 (13.2) | 713 (73.5) | |
| **Family history of obesity** | | | | |
| No | 739 (87.4) | 107 (12.6) | 846 (87.2) | 0.468; 0.494 |
| Yes | 105 (84.7) | 19 (15.3) | 124 (12.8) | |
| **Total** | 844 (87.0) | 126 (13.0) | 970 (100.0) | |

[a]Percent for the row; [b]Percent for the column.

Of the students, 0.9% didn't have a mother, 3.5% didn't have a father. 146 (15.1%) students reported that their mother had a job, 713 (73.5%) students reported that their father had a job. The distribution of parents' characteristics of students summarized in Table 3.

The mean and standard deviation of students' total score of EAT-40 were 18.80±9.88 (ranged 3 to 95). The mean and standard deviation of students' total score of BAI were 20.32±12.32 (ranged 0 to 63). The positive weak correlation was found between the total scores of EAT-40 and BAI (r=0.178; p=0.001). The distribution of students' total scores of EAT-40 and BAI showed in Figure 1.

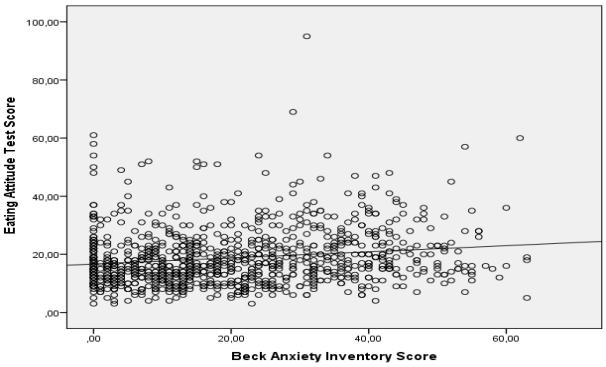


**Figure 1: The distribution of students' total scores of EAT-40 and BAI.**

## DISCUSSION

Eating Disorders (ED) are one of the most chronic health problem which are increasing all over the world and frequently monitoring on adolescents. In this study, frequency of ED suspicion is determined as 13.0%. This data is determined as 13.8% in the study of Tözün et al upon college students in our country.[29] Several studies conducted on various countries are reported that ED frequency among high school students are ranging between 3.5%-28.5%.[29-31] These differences may emerge from different measurement methods, from using of different work groups or from cultural differences.

In our study, there was no relationship between frequency of eating disorder and age groups of students. This issue can be stemming from same age-grouped participants. In the literature there are many studies reporting same result.

Frequency of ED suspicion is higher among female student's more than male students. There are many studies that EDs are higher among women similar to our study.[6,10,18,32] This issue is bound with women have serious concerns about body shape and anatomy than men. Related with -that issue, it can be founded that women have higher ED in our study, too.

It is thought that for an adolescent, multi-child families cause physiological problems related with insufficient attention.[33] In this situation, it can be expected that adolescents also have higher frequency of ED. However, in our study, there was no correlation in frequency of ED suspicion with number of child in family. Parallel to this data, there were some studies that frequency of ED suspicion and number of child in family has no correlation.[29,33]

In adolescents, living with family is an important factor on protecting from ED. Therefore, less frequent ED is expected people who living with family.[34] However, in our study, there were no differences between people who living with family or not in terms of frequency of ED suspicion. Also there are some studies that contain same results.

Insufficient pocket money and low-income family are cause the rise in anxiety level of students and frequency of psychiatric problems in these students are rising.[35] In this study, it is detected that frequency of ED suspicion is higher among students who have insufficient pocket money. This issue can result as people who have insufficient pocket money are gain unhealthy and cheap nutritional habit in school or out-of-home. On the other hand, in this study, there was no correlation between students' socio-economic condition and frequency of ED.

Same as EDs, smoking and alcohol addiction is reported higher on adolescents in some studies. On the other hand, some studies reported that smoking is for the purpose of controlling appetite and weight gain.[36] In our study, it is detected that frequency of ED suspicion is higher on students who have smoking and alcohol addiction. Whereas there are some studies report that there was no correlation between smoking and use of alcohol, some studies are reported that smoking and use of alcohol are the risk factor in terms of EDs.[37,38]

Although alcohol addiction and EDs are frequently monitoring simultaneously, common factors of their etiology are not enlightened yet.[39] In our study, frequency of ED suspicion on alcohol consumers is higher than not consumers ($p<0.05$). Also, Berry et al. reported that there are same correlation between use of alcohol and ED.[38]

It is stated that ED is related with trauma because the loop of binge eating and purging is decreasing the effect of emotion and opinion such as rage and guilt that accompanying trauma and people who have trauma are using this loop as a defense mechanism.[40] Frequency of ED is detected higher among the study group students who have trauma history. Similar/Matching with our study, according to survey data of Haresh et al, it is reported that detection of ED is higher on people who have trauma history.[41]

In our study, it is founded that students who have adverse event history have higher frequency of ED suspicion. EDs are the case that has physical and physiologic components. A study shows that frequency of ED is

increase on people who have physical and physiologic trauma on their history.[42]

It is reported that ED monitoring is more frequent on people who have disease history that need continuous drug use.[43] Also in our study, frequency of ED suspicion is higher on people who have disease history that need continuous drug use than who not have any disease history. Young people who have chronic illness can be gotten ED more with the effect of adverse changes on their bodies related with their illnesses or continuous drug use (especially steroids).

It is known that obesity is a serious risk factor in terms of EDs.[44] Overweight adolescents are gotten ED more frequently because of their physical and mental problems. On the other hand concerns of these people about their physical appearance are making easier to be gotten EDs.[45] However, in this study, no difference is found between obese patients or not in terms of frequency of ED suspicion.

State of education of parents is one of the important issues on determining healthy communication with their children. In this study, no difference is detected between state of education of parents and frequency of ED suspicion. In addition no difference is detected between state of education of parents and ED. Aslo there are some studies that reporting same results. However, Forman-Hoffmann is reported in his study that people whose father is unemployed have higher frequency of ED, but there is no difference between people whose mother is an employee or not in terms of frequency of ED.[46]

Several studies are reported that people who have ED suffer some defects such as depression, anxiety, impulse control, use of alcohol and drug and also they have higher personal pathology.[7,47,48] Some studies are reported that anxiety disorder accompanying with ED as an illness have 36% prevalence.[48-50] There are some studies reporting that 2/3 ED affected patients also have anxiety disorder history.[3,51] Also there is positively directed weak correlation between anxiety level of students and ED severity parallel with our study. This is a possible issue that adolescents who are facing with problems and mental and physical changes from childhood to puberty may suffer from cases such as anxiety disorder.

### *Limitations*

This study may have some finiteness such as being a cross-sectional survey, being used diagnostic test is not enough to establish a final diagnosis, being surveyed in only one district, being token only high school students and being assessed some factors not by using objective measurement tool but by using student's declarations.

## CONCLUSION

In our study, it is detected that %13 of students are carry ED suspicion. Also, prevalence of anxiety is accompanying with ED suspicion. It is monitored that insufficient pocket money, use of alcohol, smoking, having trauma history are the risk factors of frequency of ED on females. ED is an important health problem for adolescents. It must be considered that ED can cause serious result which can be mortal unless it being diagnosed or being cured. On the studies upon epidemiology of ED towards high school students, socio-economic factors should be assessed in more detailed and more comprehensive perspective. Improvement on school based health programs should be cared for ED on students for early diagnoses and treatment. Also, guidance of ED affected people into psychiatry centers for final diagnose and treatment will provide important advance on protecting mental health of students.

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