

# Disordered Eating Attitudes and Behaviors: Gender Differences in Adolescence and Young Adulthood

Massaldjieva R Ivanova\*, Desislava Bakova, Maria Semerdjieva, Bianka Torniova, Boris Tilov and Ekaterina Raikova

Department of Health Care Management, Medical University of Plovdiv, Bulgaria

\*Corresponding author: Massaldjieva RI, Associate Professor in Psychology, Department of Health Care Management, Medical University of Plovdiv, Bulgaria, Tel: +359-32-602471; E-mail: rada\_ivanova@yahoo.fr

Received date: April 25, 2017; Accepted date: May 08, 2017; Published date: May 25, 2017

Copyright: © 2017 Massaldjieva RI, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

## Abstract

**Introduction:** Dieting, obsessive weight control practices, fears of fatness, negative body image, food and weight preoccupation and other distorted attitudes and behaviors are proven risk factors with a serious potential to facilitate the development of anorexia and bulimia nervosa and the so called "atypical ED". They are not enough studied in Bulgaria. The purpose of this study was to assess the prevalence and the gender differences in disordered eating attitudes and behaviors in adolescents and young adults from Bulgaria.

**Methods:** We studied two age groups – 886 (80.7%) adolescents from 14 to 19 years and 212 (19.3%) young adults from 20 to 40 years, 402 male and 696 female. The respondents were Bulgarian high school students, undergraduate university students and volunteers from the general population with higher education. All participants anonymously completed the Eating attitudes and behaviors questionnaire (EABQ); Bulgarian version of the SCOFF, The Eating Disorder Diagnostic Scale (EDDS) and gave information about their age, gender, height and weight, the lowest body weight during the last three months; the frequency of measuring the body weight. We calculated three composite EDDS sub-scores.

**Results:** The boys and girls total and composite questionnaires scores differed significantly. There were no significant gender differences in young adults, except for EABQ total score. The mean ranks in the adolescent group showed that the female subjects reported more disordered eating behavior and risky attitudes compared with the males. In both age groups, the total SCOFF and EABQ scores and the composite scores of EDDS correlated significantly and proportionally (Spearman's correlation,  $p < 0.01$ ). The mean results from EABQ showed more distorted eating attitudes and behaviors in the groups above the SCOFF "Yes" risk threshold, the EABQ scores of males and females from the groups at risk and from the non-risk groups differed significantly ( $p < 0.05$ ).

**Conclusion:** More than one fifth (22.5%) of the girls examined are at risk for ED development and have significantly lower BMI values than boys. The risk in adult women and in males from both age groups is smaller. EABQ showed good discriminative capacities.

**Keywords:** Disordered eating attitudes; Healthy adolescents; Healthy young adults; Gender differences; Bulgaria

## Introduction

Eating disorders (ED) anorexia nervosa, bulimia nervosa and binge eating disorder are one of the leading causes of disability among young women [1]. Adolescence and early adulthood are the periods of life with a highest incidence of ED and gender, together with age is a very important predictor of the risk for developing an ED [1-4]. The ED treatment is difficult and time consuming. Anorexics tend to deny the seriousness of their problems and have a high suicidal risk and mortality rate up to 15% from long-term studies [5].

Patients with bulimia nervosa are often distressed and ashamed by the loss of control over eating. They frequently experience depression and anxiety symptoms and are vulnerable to self-injuries. Many of the so-called "atypical ED" is also severe and long lasting [6]. ED and the eating behavior in men are not as frequently studied as in women. Nevertheless some authors report an increasing ED risk in males [7-11].

Restrictive or binge eating, purgative behavior, excessive exercising, limited or excessive drinking, body checking or body avoidance, physical symptoms-weight loss, menstrual cycle impairments, reduced libido, fatigue; and body image disturbances are common characteristics of ED [12].

Distorted eating attitudes and behaviors have been proven as risk factors for ED. Dieting and other obsessive weight control practices, fears of fatness and negative body image, intensive food and weight preoccupation are forms of eating impairment with a great potential to facilitate the development of anorexia and bulimia nervosa [13,14].

Disordered eating attitudes and behaviors have a significant impact on the health and their scientific study could enrich the knowledge of the ED risk. Development of effective preventive programs depends on the early determination of the groups at risk. Reliable data about the pathologic attitudes towards the body and the body weight are scarce in Bulgaria [15].

The purpose of this study was to examine the prevalence and the gender differences in disordered eating attitudes and behaviors in adolescents and young adults from Bulgaria.

## Methods

The study was carried out in two big South Bulgarian cities between September 2014 and June 2016. Participants were 1098 volunteers, 402 male and 696 female, aged 14-40 years. Initially, the sample included 1232 respondents, but 136 were excluded because of the positive response to the question whether they have ever sought psychiatric help.

We recruited high school students, from four schools; undergraduate university students, from three universities and

volunteers from the general population with higher education, all of Bulgarian origin and Caucasian.

The sample was divided in two age groups – 886 (80.7%) adolescents from 14 to 19 years and 212 (19.3%) young adults from 20 to 40 years.

The number of women was greater in both age groups. Demographic characteristics are presented in Table 1.

Age Group	Gender				Age		BMI			
	Males		Females		Mean	SD	Min	Max	Mean	SD
	n	%	n	%						
Adolescents	356	40.2	530	59.8	16.45	SD=1.522	12.5	33.14	20.74	2.88
Young adults	46	21.7	166	78.3	25.39	SD=5.634	15.15	38.06	22.77	4.2

**Table 1:** Demographic characteristics.

All participants anonymously completed three self-report scales, under the supervision of one researcher. The subjects answered as well questions about their age, gender, height and weight, the lowest body weight during the last three months; the frequency of measuring the body weight. The respondents gave verbal consent for inclusion in the study.

## Study Measures

### The Eating attitudes and behaviors questionnaire (EABQ)

It is a new questionnaire, developed by a multidisciplinary team to assess disordered eating attitudes and behaviors. The team included physicians, specialists in social medicine and nutrition; psychologists, general practitioners and health care professionals.

The set of items of EABQ was generated on the basis of the core features of eating disorders, included in the diagnostic criteria of DSM5 and ICD10, as well as risky eating attitudes and behaviors, discussed in the literature [16-20].

EABQ consists of 25 items (Likert scale: 1-always; 2- frequently; 3-sometimes; 4-no, never), describing eating and weight concerns and preoccupations; fears and other feelings, related to body image, self-evaluation and food consumption; dietary restraints and behaviors, linked to restrictions of food intake, eating rules, purging and other compensatory activities.

The bigger total score means less risky eating attitudes and behaviors. A pilot study was conducted with the first EABQ version. It included students and staff of the Medical University in Plovdiv and the feedback received was discussed by our project team, then the final version of the questionnaire was made.

A four-factor structure of EABQ was found by Principal Component Analysis, oblimin rotation. The content of the items, loading on each of the factors extracted permitted us to give them the following labels: "Body shape and weight concerns" 9 items, "Personal control over eating and calories intake" 6 items, "Dieting 6 items" and "Preoccupation with food and binge eating" 4 items [21].

### Bulgarian version of the SCOFF

SCOFF is an eating disorder screening questionnaire [22] comprising essential characteristics of anorexia and bulimia nervosa [23].

This questionnaire includes 5 questions with dichotomous "Yes" or "no" answers. They are related to "food dominance in life", "beliefs about fatness", significant weight loss in a 3-month period and worries about the control over eating and self-induced vomiting.

With SCOFF coding in our study the bigger the total scores, the smaller the risk of eating disorders.

### The Eating Disorder Diagnostic Scale (EDDS)

A diagnostic scale for anorexia, bulimia and binge eating disorder in accordance with DSM-IV criteria for eating disorders.

It is a 22 items questionnaire with different response scales-Likert scale for four items; Yes-no answers for nine items; frequency reporting for seven items and two write-in responses [24].

EDDS was developed to provide diagnoses of ED. We used it mainly to assess the psychometric qualities of our EABQ questionnaire. For the statistical analyses we calculated three composite sub-scores from:

- The items, assessing eating attitudes with a Likert-scale (the bigger score means higher eating disorder risk)
- The Yes-no items, concerning eating behaviors (the bigger score means smaller eating disorder risk)
- The items, assessing eating behavior by a frequency reporting (the bigger score means bigger frequency of disordered eating behavior)

This procedure allowed us to compare the results from our questionnaire and from the SCOFF with the results from EDDS, related to disordered eating attitudes and behaviors.

We received permission to translate and to use The SCOFF (from the author) and EDDS (from The American Psychological Association).

## Statistical Analysis

Our data were analyzed with the Statistical Package for Social Sciences (SPSS 16.0) statistical software. Normality of the data was assessed by skewness, kurtosis and Kolmogorov-Smirnov test. We used descriptive statistics-means and percentages to calculate age and gender group characteristics.

Comparisons between the groups were made by the Mann-Whitney U test. Spearman Rank Order coefficient was used to test for possible associations among the variables tested. By single item analysis we interpreted the SCOFF results and respondents answers to questions related to risky behaviors. Chronbach Alpha was calculated for the

results from the three questionnaires. Statistical significance was set at  $p < 0.05$  (two-tailed analyses).

Body mass index-BMI, was calculated on the base of self-reported height and weight ( $BMI = \text{weight (kg)} / \text{height (m)}^2$ ).

## Results

Descriptive statistics (min, max, means and SD) for the measures, used in our study are shown in Table 2. We found significant age differences (Mann-Whitney test) for the total results from SCOFF ( $p = 0.003$ ) as well as for the composite sub-scores from EDDS items, assessing eating attitudes ( $p = 0.024$ ).

Scales	Min	Max	Mean	SD
SCOFF				
Adolescents	5	10	8.72	1.2
Young adults	6	10	9	1.07
EABQ				
Adolescents	27	98	80.94	11.38
Young adults	40	97	80.38	10.66
EDDS eating attitudes				
Adolescents	0	24	8.04	6.89
Young adults	0	21	7.66	6.05
EDDS presence of disordered eating behavior				
Adolescents	6	12	10.37	1.6
Young adults	7	12	10.72	1.27
EDDS frequency of disordered eating behavior				
Adolescents	0	77	8.7	10.74
Young adults	0	55	7.36	8.63

**Table 2:** Descriptive statistics (total and composite scores) for SCOFF, EABQ and EDDS.

The total SCOFF and EABQ scores and the composite scores of EDDS correlated moderately and significantly (Spearman's correlation,  $p < 0.01$ ), in both age groups (Tables 3 and 4). The positive and negative relationships found were directly proportional.

Scales	SCOFF	EABQ	EDDS (1)	EDDS (2)	EDDS (3)
SCOFF	-	$r = 0.600^{**}$	$r = -0.523^{**}$	$r = 0.380^{**}$	$r = -0.440^{**}$
EABQ	$r = 0.600^{**}$	-	$r = -0.694^{**}$	$r = 0.368^{**}$	$r = -0.526^{**}$
EDDS eating attitudes (1)	$r = -0.523^{**}$	$r = -0.694^{**}$	-	$r = -0.271^{**}$	$r = 0.403^{**}$
EDDS presence of disordered eating behavior (2)	$r = 0.380^{**}$	$r = 0.368^{**}$	$r = -0.271^{**}$	-	$r = -0.423^{**}$
EDDS frequency of disordered eating behavior (3)	$r = -0.440^{**}$	$r = -0.526^{**}$	$r = 0.403^{**}$	$r = -0.423^{**}$	-

**Table 3:** Spearman's correlations between the total scores from SCOFF, EABQ and EDDS in adolescents [ $^{**}$ Correlation is significant at the 0.01 level (2-tailed)].

Scales	SCOFF	EABQ	EDDS (1)	EDDS (2)	EDDS (3)
SCOFF	-	r=0.491**	r=-0.497**	r=0.314**	r=-0.358**
EABQ	r=0.491**	-	r=-0.673**	r=0.384**	r=-0.497**
EDDS eating attitudes (1)	r=-0.497**	r=-0.673**	-	r=-0.312**	r=0.532**
EDDS presence of disordered eating behavior (2)	r=0.314**	r=0.384**	r=-0.312**	-	r=-0.461**
EDDS frequency of disordered eating behavior (3)	r=-0.358**	r=-0.497**	r=0.532**	r=-0.461**	-

**Table 4:** Spearman's correlations between the total scores from SCOFF, EABQ and EDDS in young adults [\*\*Correlation is significant at the 0.01 level (2-tailed)].

The scales results of the males and females in the total sample differed significantly except for EDDS presence of disordered eating behavior.

When we analyzed the gender differences of the scales results in the age groups, we found that scores differed significantly in adolescents, but not in young adults, except for EABQ total score (Table 5).

The mean ranks in the adolescent group showed that the female subjects reported more disordered eating behavior and risky attitudes compared with the male.

Scales	M rank		U	p
	Men	Women		
SCOFF: Total sample	636.95	485.31	97680.5	P<0.001
Adolescents	524.33	374.47	59555.5	P<0.001
Young adults	110.52	105.39	3633	P=0.595
EABQ: Total sample	641.88	446.13	76953.5	P<0.001
Adolescents	516.2	347.06	48884	P<0.001
Young adults	119.93	98.37	2797	P=0.033
EDDS eating attitudes				
Total sample	395.1	628	77854	P<0.001
Adolescents	309.42	522.38	46873.5	P<0.001
Young adults	95.23	109.62	3299.5	P=0.158
EDDS presence of disordered eating behavior				
Total sample	552.07	518.8	122506	P=0.079
Adolescents	454.13	413.01	79934	P<0.05
Young adults	98.4	103.03	3393	P=0.628
EDDS frequency of disordered eating behavior				
Total sample	477.34	562.8	109831	P<0.001
Adolescents	383.65	457.08	72636	P<0.001
Young adults	90.83	108.27	3052.5	P=0.083

**Table 5:** Gender differences in the total and composite scores from SCOFF, EABQ and EDDS [Mann-Whitney test].

We found age differences in the answers to three SCOFF items 1,4 and 5: A significantly higher percentage of adolescent boys and girls,

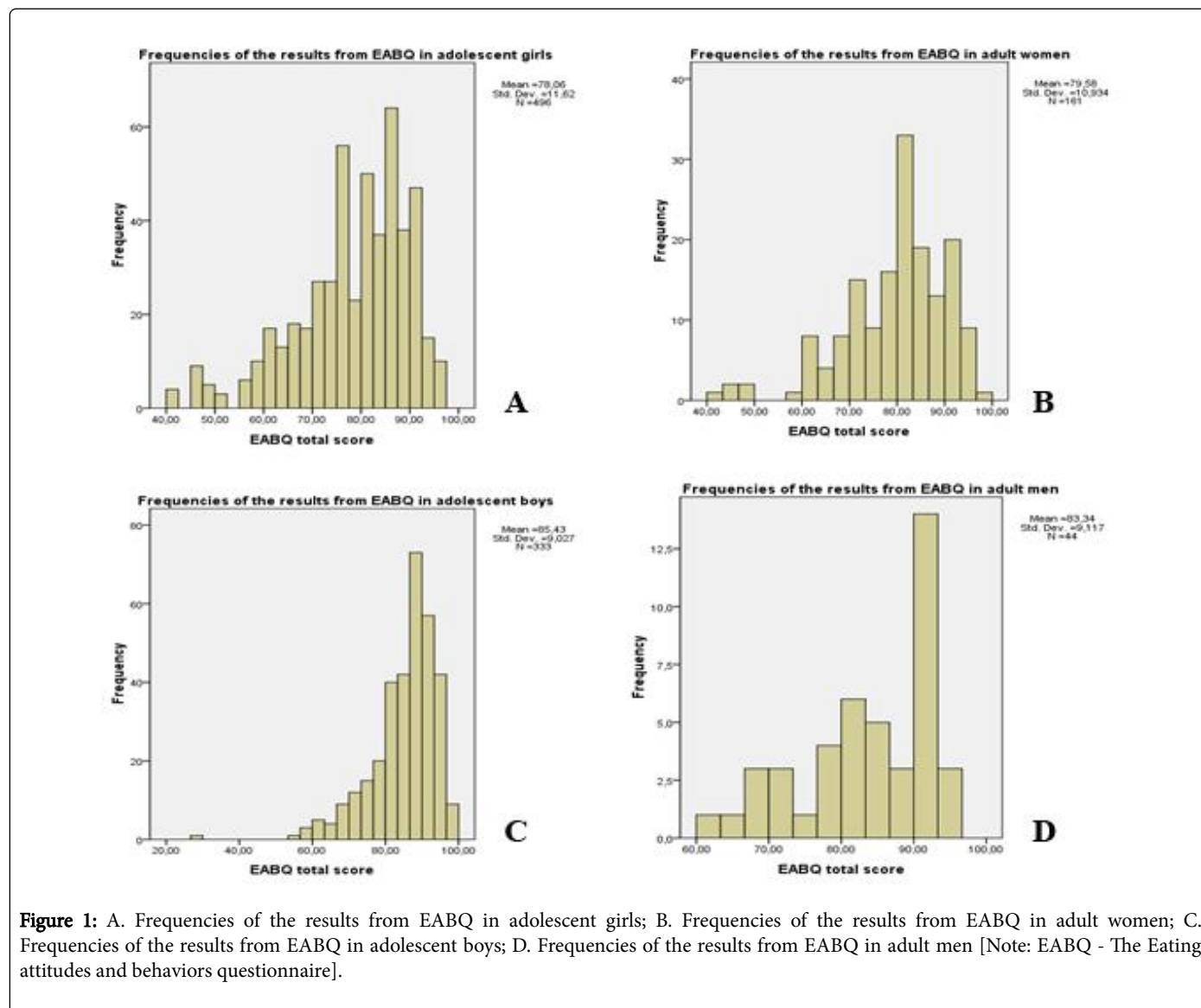
compared with the young adults reported self-induced vomiting (7.1% vs. 2.8%;  $\chi^2=5.365$ ,  $df=1$ ,  $p=0.021$ ); "thinking oneself fat, when others

say being too thin"; (40.0% vs. 28.8%;  $\chi^2=9.225$ ,  $df=1$ ,  $p=0.002$ ); and food dominance into life (29.5% vs. 20.3%;  $\chi^2=0.241$ ,  $df=1$ ,  $p=0.007$ ). In the adolescents group there were significant gender differences in the SCOFF positive answers to two of the five items 2 and 4.

The prevalence of female subjects who answered "Yes" to the items related to worries about the control over eating and to feeling oneself fat was significantly higher than that of males (respectively 32.4% vs. 12.5%;  $\chi^2=45.149$ ,  $df=1$ ,  $p<0.001$  and 55.8% vs. 16.5%;  $\chi^2=1.358$ ,  $df=1$ ,  $p<0.001$ ).

In the group of adult the results showed a bigger prevalence in male subjects, who reported significant weight loss in a 3 month period (34.8% vs. 20.5%;  $\chi^2=4.087$ ,  $df=1$ ,  $p=0.043$ ).

We found a higher prevalence of women, feeling themselves fat (32.5% vs. 15.2%;  $\chi^2=5.268$ ,  $df=1$ ,  $p=0.022$ ). The frequencies of the total scores from EABQ in the adolescent and adult gender groups are shown on Figure 1.



**Figure 1:** A. Frequencies of the results from EABQ in adolescent girls; B. Frequencies of the results from EABQ in adult women; C. Frequencies of the results from EABQ in adolescent boys; D. Frequencies of the results from EABQ in adult men [Note: EABQ - The Eating attitudes and behaviors questionnaire].

To assess the concurrent validity of EABQ we compared the mean ranks of the male and female respondents in the age groups with SCOFF "Yes" score equal to 2 and less than 2.

Two positive answers to SCOFF items are a sensitive cutoff used to classify the groups at risk for anorexia and bulimia [22,23,25].

The results are presented in Table 6. The EABQ total scores of males and females, adolescents and young adults, from the groups at risk and from the non-risk groups differed significantly ( $p<0.05$ ).

The mean results from EABQ showed more distorted eating attitudes and behaviors (smaller values) in the groups above the SCOFF "Yes" risk threshold.

The small number of men in early adulthood ( $n=2$ ) is a limitation of this analysis (Table 6).

Variables	SCOFF "Yes" groups	Frequency SCOFF "Yes"		Mean	SD	M rank	U
		N	%				
Adolescent girls	SCOFF "Yes" ≤2	402	77.50%	81.49	8.61	280.09	6444.00*
	SCOFF "Yes">2	116	22.50%	65.93	12.9	114.29	
Adolescent boys	SCOFF "Yes" ≤ 2	322	90.70%	86.44	8.28	176.5	1656.50*
	SCOFF "Yes">2	33	9.30%	75.32	9.85	69.44	
Women in early adulthood	SCOFF "Yes" ≤ 2	139	87.40%	80.81	10.44	82.92	487.00*
	SCOFF "Yes">2	20	12.60%	69.83	11.09	36.56	
Men in early adulthood	SCOFF "Yes" ≤ 2	43	95.60%	84.41	8.48	22.85	6.00*
	SCOFF "Yes">2	2	4.40%	69	1.41	4.5	

**Table 6:** Means and mean ranks of EABQ in gender groups, based on the SCOFF "Yes" cutoff=2 [Mann-Whitney test; \*P<0.05].

The results concerning the frequency of measuring the body weight in school boys and girls were as follows: 33.1% check their weight once every few months; 26.5% once a month; 19.4% once a week; 12.1% several times a week; 6.6% every day and 1.8% several times a day. In the adult group 41.5% once every few months; 25.0% once a month; 20.3% once a week; 8.0% several times a week; 3.8% every day and 1.4% several times a day. The sum of the percentages in the adolescents

who frequently check their weight (more frequently than once a week) was greater than that of the adults, but there were no significant differences between the age groups  $\chi^2=8.527$ ,  $df=5$ ,  $p=0.129$ . As to gender female respondents checked their weight more frequently than male in both age group, the difference not reaching statistical significance ( $\chi^2=10.450$ ,  $df=5$ ,  $p=0.063$  for adolescents and  $\chi^2=6.838$ ,  $df=5$ ,  $p=0.233$  for the adults) (Table 7).

Scale	BMI	M rank		M rank	
		Men	U	Women	U
SCOFF	BMI ≤ 17.5	212.93	3708.5	395.95	16978.5*
	BMI>17.5	195.52		330.16	
EABQ	BMI ≤ 17.5	247.75	2335.0*	457.28	10310.5*
	BMI>17.5	184.1		308.28	
EDDS eating attitudes	BMI ≤ 17.5	164.41	3364	222.25	13523.5*
	BMI>17.5	197.88		353.11	
EDDS presence of disordered eating behavior	BMI ≤ 17.5	197.08	3528.5	331.31	19.811.5
	BMI>17.5	191.72		330.41	
EDDS frequency of disordered eating behavior	BMI ≤ 17.5	141.68	2623.5*	269.92	17003.5*
	BMI >17.5	195.29		339.13	

**Table 7:** Mean ranks in disordered attitudes and behaviors in underweight males and females, compared with these with BMI>17.5 [Mann-Whitney test; \*P<0.05].

Significant gender differences were found for BMI in both age groups (Mann-Whitney test,  $p<0.01$ ), with smaller mean rank values (389.24 in adolescents; 99.49 in adults) for females. The mean ranks for males were 501.17 in adolescents and 129.36 in adults. A larger number of female subjects 73 (10.7%) 63 adolescents and 10 adults, than male 22 (5.6%) 21 adolescents and 1 adult, were underweight (BMI=17.5) [18]; Pearson  $\chi^2=4,196$ ,  $df=1$ ,  $p=0,041$ . Sixty six (7.59%) school boys and girls were overweight (BMI ≥ 25) [26]. The prevalence of overweight adults was 48 (22.75%). We compared the scales mean

ranks in the underweight women and in these with BMI>17.5 and the results showed significant differences ( $p<0.05$ ) between them, except for EDDS presence of disordered eating behavior. There were significant differences only for EABQ and for EDDS frequency of disordered eating behavior in men with BMI under the norms and those with BMI>17.5 (Table 7).

The analysis of the BMI influence on the scales results in the age groups was not appropriate, because of the small number of underweight adult subjects. Values of the mean ranks in the groups



based on BMI showed that the higher weight increases the likelihood of disordered eating attitudes and behaviors.

We analyzed the reliability of the questionnaires scores, received in our study. The internal consistency of EABQ, SCOFF and the results from the EDDS composite scores are presented in Table 8.

Scale		Cronbach's Alpha	No. of items
SCOFF	Adolescents	0.479	5
	Young adults	0.425	
EABQ	Adolescents	0.883	25
	Young adults	0.877	
EDDS	Adolescents	0.592	22
	Young adults	0.546	

**Table 8:** Cronbach's Alpha for EABQ, SCOFF and EDDS results.

## Discussion

The adolescence is a developmental period focusing the interest of scientists as a "time of risk" [27]. It is characterized by different changes and some of them, such as the changes of self-perception, could be a basis for problematic and distorted attitudes and behaviors. Reports confirm that the adolescents are at the highest risk for ED [8,25,28].

Simultaneously, it was proven that the female gender increase the vulnerability to different forms of disordered eating [1-2,4]. Thin-ideal internalization and body dissatisfaction, largely influenced by the exposure to media images, as well as dieting and elevated body weight are risk factors with considerable effects on the onset or worsening of ED [1].

In a large sample of healthy Bulgarian adolescents and young adults, we used self-report scales with questions about respondents height and weight, the lowest body weight during the last three months; the frequency of weight measuring and risky eating attitudes and practices. The questionnaires of those subjects who have sought psychiatric help were not included in the processing of the results. Our first aim was to examine the prevalence of distorted attitudes and behaviors in these two groups representing the young urban Bulgarian population. As a second purpose of this cross-sectional study we planned to analyze the gender differences in risky for clinically significant disorders eating attitudes and practices.

The results revealed that one fifth (20.5%) of the adolescent subjects frequently checked their weight from several times a week to several times a day. This frequency was lower in the adults (13.2%), but the difference was not significant. The urge on controlling body weight was stronger in female groups of both age samples, without statistical significance of this difference. In a large female teenage sample (12-18 years) Jones et al. [29] found that 38% reported feeling overweigh and 47% felt unhappy about their weight. Our findings show lower significance of the weight, expressed in the frequency of its measurement. At the same time we found higher percentages of girls (55.8%) who reported feeling fat, than in the Jones et al. [29] sample.

In 154 young women from Greece, of normal body weight, 6.2% were measuring their body weight on a daily basis [30]. Our results are similar 6.6% of the adolescents and 3.8% of the young adults checked

their weight every day. This similarity may be associated with common cultural traits of the Balkan region. The SCOFF frequencies showed significantly higher percentage of adolescents than young adults with self-induced vomiting, thoughts and fears of fatness and food dominance into life.

SCOFF "Yes" answers of female adolescents to questions about worries related to control over eating and to feeling oneself fat was significantly higher than those of males. One finding that leads towards the conclusion that disordered eating behavior is not primarily a female problem is the significantly bigger prevalence of males from the adult group, who reported significant weight loss in a 3-month period, although generally women adolescents are at higher risk of disordered eating. In the adult age group the females showed significantly higher prevalence of answers revealing fears of fatness, compared with adult men.

The analyses on the basis of BMI in our study gave significantly lower BMI values in females from both age groups; the same was true with respect to abnormally low weight (BMI=17.5). In the above cited study of Jones et al. [29] of adolescent girls, BMI was positively related with drive for thinness, body dissatisfaction, dieting, binge eating and bulimia. In our study the underweight women (with BMI=17.5) showed lower risk of disordered eating (better total and composite scores from SCOFF, EABQ and EDDS, except for EDDS presence of disordered eating behavior), i.e. the higher the weight in adolescence, the bigger the risk of eating pathology. This result probably reflects the pursuit of body thinness in healthy young women. It would be interesting to compare this finding in a clinical sample with similar demographic features [30].

We found significant proportional correlations between the scores from the three self-report scales,  $p < 0.01$ , in the age groups, which confirms the acceptable psychometric features of our eating attitudes and behaviors questionnaire. In the same direction is the significant difference of EABQ total result between males and females from the groups with SCOFF "Yes" under and above the cutoff of 2, giving information about the individuals at risk for ED.

In the second half of the 20<sup>th</sup> century in the Western countries a belief was established, that the thin body shape, as a guaranty for beauty and success, can be obtained through dieting, exercises and other practices [31] some of them increasing the risk of ED. This phenomenon is not enough studied in Bulgaria. The analyses of our SCOFF results confirmed that the prevalence of self-induced vomiting, fears of fatness and food dominance is significantly higher in adolescence and that the adolescent girls have significantly more worries about the control over eating and feeling to be fat compared with the boys. This, together with the highest percentages of SCOFF "Yes" score in girls confirm other countries data [25,32-34] about the biggest risk of eating pathology in female adolescent. We found as well that young women are more at risk than young men.

The internal consistency of SCOFF results in our study was similar to that of other authors [25]. EABQ results showed acceptable reliability (Cronbach Alpha > 0.8). The explanation of Cronbach Alpha values greater than 0.5 for the composite score of EDDS could be the small number of items in the group of items we used.

## Conclusion

The main objective of our study was to collect and to analyze data about the distorted eating attitudes and behaviors in Bulgarian high

school and undergraduate university students and volunteers from the general population up to 40 years.

The results showed that more than one fifth (22.5%) of the girls examined are at risk for ED development and have significantly lower BMI values than boys. The risk in adult women and in males from both age groups is smaller.

The scores of the questionnaire that we developed as a screening tool for distorted eating attitudes and behaviors (EABQ) correlated significantly with the other measures of this study (SCOFF and EDDS) and had discriminative capacity for the groups at risk for ED. Its internal consistency was assessed by Cronbach Alpha, which was greater than 0.8.

Our study results confirmed the Western countries tendency for a biggest risk of eating pathology in adolescent girls that have to be the main target group for prevention programs and practices.

## Acknowledgements

This research was supported by a grant in the framework of University Research Scientist Projects of Medical University in Plovdiv, Bulgaria, 2014-2016.

## References

1. Moore RH, Bulik CM (2007) Risk factors for eating disorders. *Am Psychol* 62: 181-198.
2. Jacobi C, Hayward C, Zwaan M, Kraemer HC, Agras WS (2004) Coming to terms with risk factors for eating disorders: Application of risk terminology and suggestions for a general taxonomy. *Psychol Bull* 130: 19-65.
3. O'Dea JA, Abraham S (1999) Onset of disordered eating attitudes and behaviours in early adolescence: Interplay of pubertal status, gender, weight and age. *Adolescence* 34: 671-679.
4. Touchette E, Henegar A, Godart NT, Pryor L, Falissard B, et al. (2011) Subclinical eating disorders and their comorbidity with mood and anxiety disorders in adolescent girls. *Psychiatry Research* 185: 185-192.
5. Shader M (1994) *Manual of psychiatric therapeutics*. Little, Brown and Co., Boston.
6. Fairburn CG, Harrison PJ (2003) Eating disorders. *Lancet* 361: 407-416.
7. Herzog DB, Norman DK, Gordon C, Pepose M (1984) Sexual conflict and eating disorders in 27 males. *Am J Psychiatry* 141: 989-990.
8. King MB (1990) Eating disorders in general practice. *JR Soc Med* 83: 229-232.
9. Pope HG, Katz DL, Hudson JI (1993) Anorexia nervosa and "reverse anorexia" among 108 male bodybuilders. *Comprehensive Psychiatry* 34: 406-409.
10. Moore RH, Silberstein LR, Rodin J (1986) Toward an understanding of risk factors for bulimia. *Am Psychol* 41: 246-263.
11. Thiel A, Gottfried H, Hesse FW (1993) Subclinical eating disorders in male athletes. A study of the low weight category in rowers and wrestlers. *Acta Psychiatr Scand* 88: 259-265.
12. Treasure J, Claudino AM, Zucker N (2010) Eating disorders. *Lancet* 375: 583-593.
13. Currie A, Crosland J (2009) Responding to eating disorders in sport-UK guidelines. *Nutr Food Sci* 39: 619-626.
14. Yannakoulia M, Matalas AL, Yiannakouris N, Papoutsakis C, Passos M, et al. (2004) Disordered eating attitudes: an emerging health problem among Mediterranean adolescents. *Eat Weight Disord* 9: 126-133.
15. Boyadjieva S, Steinhilber HC (1996) The eating attitudes test and the eating disorders inventory in four bulgarian clinical and nonclinical samples. *Int J Eating Disorders* 19: 93-98.
16. Tsai LY, Ghaziuddin M (2014) DSM-5 ASD moves forward into the past. *J Autism Dev Disord* 44: 321-330.
17. Bulik CM, Reba L, Riz AM, Kjennerud T (2005) Anorexia nervosa: Definition, epidemiology, and cycle of risk. *Int J Eating Disorders* 37: S2-S9.
18. International classification of diseases (ICD 10) (1998) National center for complex human investigation, Sofia.
19. Dahlmann B (2009) Adolescent eating disorders: Definitions, symptomatology, epidemiology and comorbidity. *Child Adolesc Psychiatr Clin N Am* 18: 31-47.
20. Sepulveda AR, Carroles JA, Gandarillas AM (2008) Gender, school and academic year differences among Spanish university students at high-risk for developing an eating disorder: an epidemiologic study. *BMC Public Health* 8: 1.
21. Massaldjieva R, Bakova D, Semerdjieva M, Tilov B, Raikova E, et al. (2016) The hidden picture: Unhealthy eating attitudes and behaviours in a non-clinical population from Bulgaria. *CBU International conference proceedings*. Prague pp: 693-699.
22. Morgan JF, Reid F, Lacey JH (1999) The SCOFF questionnaire: Assessment of a new screening tool for eating disorders. *BMJ* 319: 1467-1468.
23. Garcia FD, Grigioni S, Chelali S, Meyrignac G, Thibaut F, et al. (2010) Validation of the French version of SCOFF questionnaire for screening of eating disorders among adults. *World J Biological Psychiatry* 11: 888-893.
24. Stice E, Telch CF, Rizvi SL (2000) Development and validation of the eating disorder diagnostic scale: A brief self-report measure of anorexia, bulimia, and binge-eating disorder. *Psychol Assess* 12: 123-131.
25. Sans P, Campos JA, Morgan JF (2007) The SCOFF-c: Psychometric properties of the Catalan version in a Spanish adolescent sample. *J psychosomatic Research* 64: 81-86.
26. <https://www.cdc.gov/obesity/downloads/bmiforpractitioners.pdf>
27. Eccles JD, Midgley C, Wigfield A, Buchanan C, Reuman D, et al. (1993) Development during adolescence: The impact of stage-environment fit on young adolescents' experiences in schools and in families. *Am Psychol* 48: 90-101.
28. Pastore DR, Fisher M, Friedman SB (1996) Abnormalities in weight status, eating attitudes, and eating behaviors among urban high school students. *J Adolesc Health* 18: 312-319.
29. Jones JM, Bennett S, Olmsted MP, Lawson ML, Rodin G (2001) Disordered eating attitudes and behaviours in teenaged girls: A school-based study. *CMAJ* 165: 547-552.
30. Michou M, Costarelli V (2011) Disordered eating attitudes in relation to anxiety level, self-esteem and body image in female basketball players. *J Exerc Sci Fit* 9: 109-115.
31. Levine M, Smolak L, Hayden H (1994) The relation of sociocultural factors to eating attitudes and behaviours among middle school girls. *J Early Adolescence* 14: 471-490.
32. Croll J, Sztainer D, Story M, Ireland M (2002) Prevalence and risk and protective factors related to disordered eating behaviors among adolescents: relationship to gender and ethnicity. *J Adolescent Health* 2: 166-175.
33. Maor NR, Sayag S, Dahan R, Hermoni D (2006) Eating attitudes among adolescents. *Isr Med Assoc J* 8: 627-629.
34. Rosen JC, Gross J, Vara L (1987) Psychological adjustment of adolescents attempting to lose or gain weight. *J Consulting Clin Psychol* 55: 742-747.