

## Association between Bulimia Nervosa, Body Mass Index and Depression in Period of Puberty

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### Abstract

**Background:** Obesity is a condition in which fat accumulates to the extent of having adverse effects on health. Overweight and obesity cause serious problems to health and once a high body mass index (BMI) is an important risk factor for variety of chronic conditions. Obese children and adolescents are openly discriminated in their professional and academic lives, increasing the risk for the development of psychiatric conditions in this population, such as depression, anxiety disorders or eating behaviors. **Objective:** The main purpose of this study was to investigate the association between bulimia nervosa, body mass index and depression symptoms in the period of puberty. **Methods:** The survey was conducted among 401 adolescents (229 boys and 172 girls), aged between 13-15 years, in secondary schools in Pristina, Republic of Kosovo using the Eating Attitudes Test – EAT-26 and the Children's Depression Inventory (CDI). At the same time we calculate the Body Mass Index (BMI): a parameter defines as the ration of human body weight and height. **Results:** Of the total number of students who filled survey (401) the highest percentage (57%) had BMI less than 18.5 kg/m<sup>2</sup> while 172 (43%) had BMI of 18.5-25kg/m<sup>2</sup>. According to the EAT-26, 378 (95%) students had a EAT score indicating a possible diagnosis of bulimia nervosa. At the same time there was positive and significant relationships between body mass index, bulimic symptoms and depression at the level of  $p < .01$ . **Conclusions:** The current findings suggest that bulimic pathology is a great factor for depression among adolescents.

**Keywords:** Obesity, Body Mass Index, Depression, Treatment, Puberty.

### Introduction

Anorexia nervosa and bulimia nervosa often are chronic eating disorders associated with high correlation with different psychopathological states (Herzog, Sacks, Keller and Gray, 1993). Bulimia is more frequent than anorexia, with a prevalence of 90 to 95 among females. According some researchers, the prevalence of these eating disorders (between 1 and 41%) has been rapidly increased in the last few years (Miranda, Gelada and Casals, 2004). At the same time anorexia nervosa and bulimia among the most common eating disorders in the developed western world.

People with anorexia nervosa refuse to maintain body weight above or at the minimal body weight, they have intense fear of gaining weight and express significant disturbance in perception of their own bodily shape and site (APA, 2013). Anorexia nervosa has serious complications that result from malnutrition, such as cardiovascular involvement, dehydration, electrolytic disorders, infertility, hypothermia and other signs of low level of metabolism.

On the opposite side, bulimia nervosa does not result a greatly depleted nutritional status. In this stage people feel that have lost control over their eating. They evaluate themselves according to their body shape and weight. Subjects with bulimia nervosa are caught in a cycle of eating large quantities of food and then vomiting, taking laxatives and diuretics. This distortion of body image usually is less pronounced than that observed in anorexia nervosa (Clay, Vignola and Dittmer, 2005). This change in behavior can dominate daily life and lend to difficulties in relationships and social situations. Also people with bulimia nervosa feel anxious; tense; have very low self-esteem (Thompson and Spice, 2011).

Today bulimia nervosa is occurring with increasing frequency among adolescents. Some researchers found that overweight and obesity among young people have been drastically increasing in developing countries, especially in urban areas (Abbot, Ackerman, Agars and Barber, 1993; Leduc, 2001). Also obese adolescents are openly discriminated in their professional and academic lives. The etiology of bulimia nervosa is probably associated with social, psychological and biological factors (Garfunkel, 2002).

There are several psychological hypotheses that attempt to explain inanition as an etiologic factor for bulimia nervosa. There appears to be a consensus between these theories that bulimia nervosa acts as a form of psychological dysfunction by interrupting the physical development of these adolescents, taking them to the pubertal stage. Many of these young persons have familial problems and issues of control to be central problems related to bulimia. Stress and perceptions about self-image such as ineffectiveness and weight dissatisfaction are also factors found to be associated with bulimia nervosa (Killen, 2006).

Another explored cause is fear of loss of control over eating and other restricting their diets and food intake in order to gain a sense of control. Also reports suggest that fear of loss of control over eating is in important part of diagnostic criteria for bulimia nervosa. Emotional problems were found to be the main cause of disordered eating in a study conducted among college and high school students (Gross, 1998).

Numerous theorists have hypothesized that depression increases the risk for development of bulimic pathology (Leon, Perry and Keel, 1999). Conversely, it has been found that bulimic pathology increases the risk of depression (Gross, 1999). The few available reports of adolescents with bulimia nervosa seem to indicate that these persons experience significantly lower self-esteem, high rates of anxiety and depression, personality disorders, disturbances in social functioning, alcohol and drug abuse, suicide attempts (McCarthy, 2006). So the main aim of the present study is to investigate the association between bulimia nervosa, body mass index and depression in period of puberty.

## Methods

### Participants

The survey was conducted among 401 adolescents (229 boys and 172 girls), aged between 13-15 years, in secondary schools in Pristine, Republic of Kosovo. Training sessions were held in order to prepare the researchers for the application of the tests, with the aim of obtaining greater homogeneity and resolving possible doubts. Also height and weight measurements were taken of all participants.

### Ethical Permission Guiding for Study

Ethical approval was obtained and informed consent obtained from all the participants prior to the study.

### Instruments

The instruments were used to collect data for the study. All the instruments do have high validity which makes them relevant and useful for the study.

The Eating Attitudes Test (EA-26) is probably the most widely used standardized self-report measure of symptoms and concerns characteristic of eating disorder (Garner and Garfunkel, 1982). This test is good at detecting clinical cases in high-risk populations and identifying individuals with an abnormal occupation with their diet and weight<sup>10</sup>. EAT-26 is a 26-item self-report instrument. Items are presented in a 6-point forced choice Likert scale ranging from 1 ("never") to 6 ("always"). The EAT-26 total score ranges from 0 to 78. The score equal between 13 and 19 corresponds with normal weight, but the score greater than 20 corresponds to a possible diagnosis of bulimia. Cronbach's reliability for EAT-26 was 0.742, so the questionnaire has been validated for the local settings..

In addition to the EAT-26, participants completed the Children's Depression Inventory (CDI), which is a commonly used self-report measure of the depression symptoms in children and adolescents ages 7 to 17. The scale has 27 items dealing sadness, self-blame, loss of appetite, interpersonal relationships and school adjustment (Kovacs, 1981). CDI items have to be scored on three-point scales with 0, 1 or 2 with higher scores indicative of more severe depression. CDI has been found to have adequate internal consistency (Cronbach's  $\alpha=0.861$ ).

Finally, height and weight measurements were also taken of all participants in order to estimate the Body Mass Index (BMI= $\text{kg}/\text{m}^2$ ) to confirm the diagnosis of Bulimia.

The collected data were coded and imported into a statistical program (SPSS version 17). The basis statistical analysis and interpretation were made using the same program.

### Procedure and Data Analysis

All the participants completed the questionnaires EAT-26, CDI and demographic variables (age, gender, body mass index). The statistical analyses were conducted using Statistical Package for the Social Sciences (SPSS) version 17. Correlation analysis (Pearson correlation) was employed to understand the relationships between bulimic symptoms, depression and body mass index among adolescents.

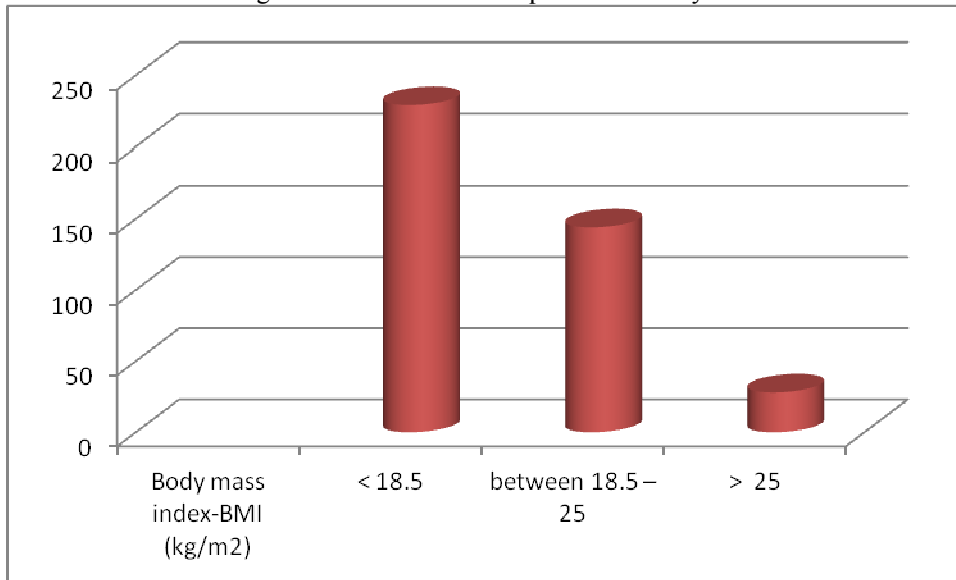
### Results

Among 401 students, 229 were male and 172 were female, with an age range between 13 and 15 years old (mean age of 14.2 years). As shown in Table 1 the majority of participants (144) had body mass index values within the range of 18.5-25  $\text{kg}/\text{m}^2$ , while 28 (8%) had body mass index over 25  $\text{kg}/\text{m}^2$  and 229 (57%) had a body mass index less than 18.5  $\text{kg}/\text{m}^2$ . These results showed that most of our young persons in period of puberty had a high body mass index (BMI) which is an important risk factor for a variety of health and psychiatric complications.

**Table1. The BMI values of students**

Body mass index-BMI (kg/m <sup>2</sup> )	N	%
< 18.5	229	57
between 18.5 – 25	144	35
> 25	28	8
<b>Total</b>	<b>401</b>	<b>100</b>

Figure 1 presents BMI values among adolescents which take part in our study.

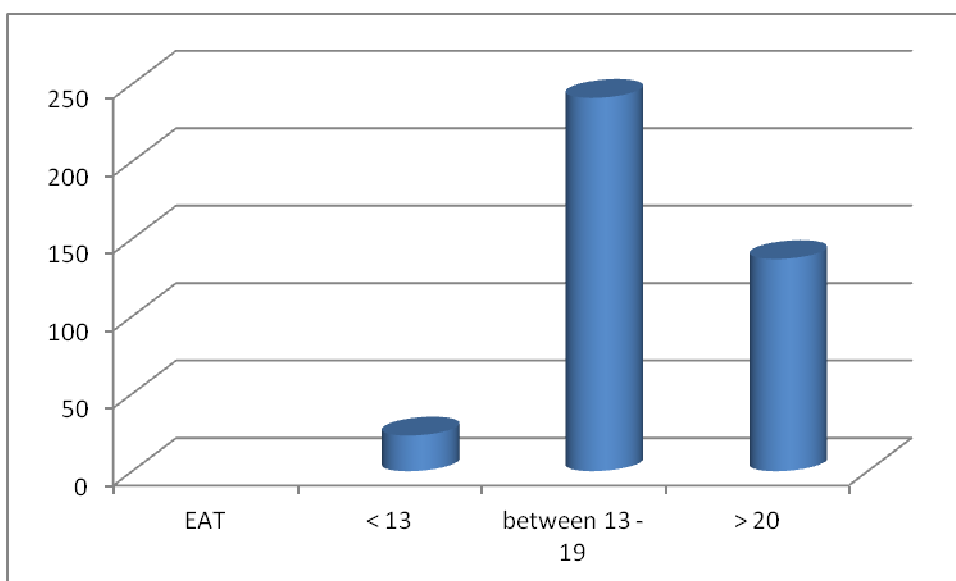


**Figure1. The BMI values of students**

As to the Eating Attitude Test (EAT-26) 137 students (35%) had a score equal to or greater than 20, that is, these students probably have subclinical eating disorder like as bulimia nervosa (Table 2).

**Table2. Prevalence of students according to EAT- 26 scores**

EAT	N	%
< 13	23	5
between 13 - 19	241	60
> 20	137	35
<b>Total</b>	<b>401</b>	<b>100</b>



**Figure2. Prevalence of students according to EAT-26 scores**

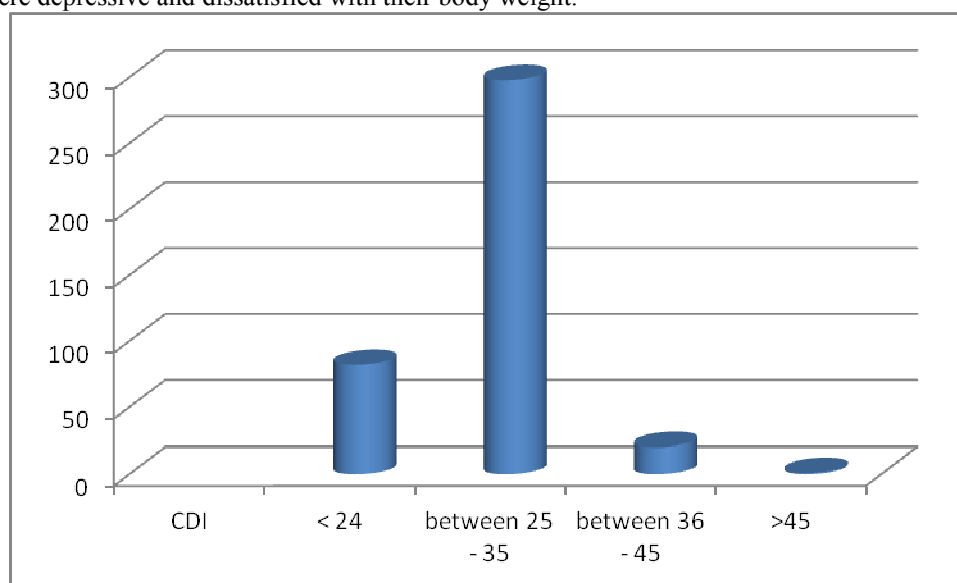
From Figure 2 we can see that a great number of our subjects experience a feeling of loss of control combined with the intake of high amounts of food, even when they are not really hungry, resulting in great discomfort. Being episodes are followed by strong subjective ill-being, characterized by feelings of guilt, shame, anxiety or depression.

At same time we found that 319 students (80%) had negative emotions and felt depression (Table 3).

**Table3. Prevalence of students according to CDI scores**

CDI	N	%
< 24	82	20
between 25 – 35	298	74
between 36 – 45	20	5
>45	1	1
<b>Total</b>	<b>401</b>	<b>100</b>

Figure 3 presents CDI values for young subjects. In this figure we can see that 80% of the surveyed students were depressive and dissatisfied with their body weight.



**Figure3. Prevalence to students according to CDI scores**

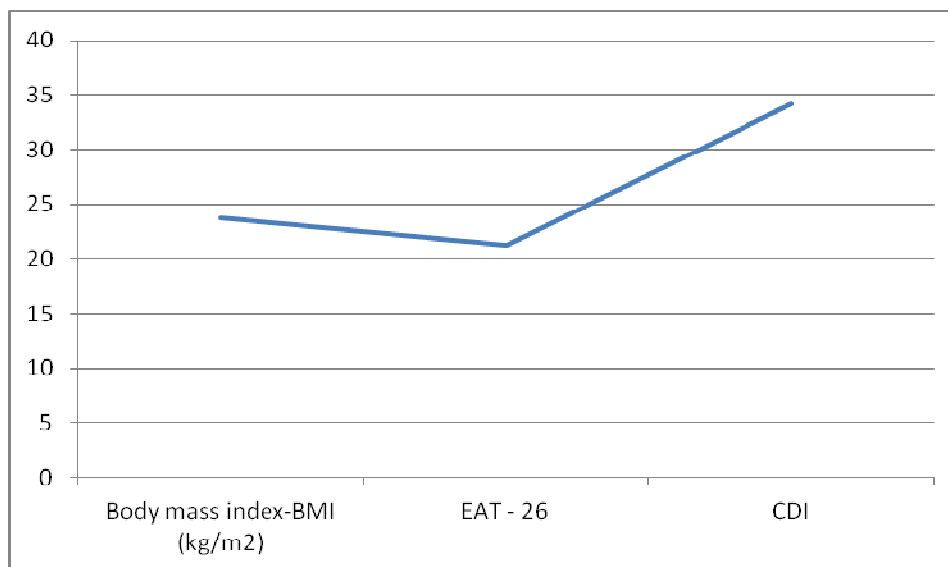
A summary of descriptive statistics is given in Table 4. The mean average of BMI among students was 23.8 kg/m<sup>2</sup>. The average total score obtained on the EAT-26 was 21.2 points, with values ranging between 0 and 76 points. The mean CDI score was 34.21 with values ranging between 0 and 54 points. The correlation of statistical significance by Pearson between body mass index, bulimic symptoms and depression is at the level of .01.

**Table4. The correlation between BMI, EAT-26 and CDI**

Descriptive statistics	Body mass index-BMI (kg/m <sup>2</sup> )	EAT - 26	CDI
<b>N</b>	401	401	401
<b>Mean</b>	23.8	21.2	34.21
<b>Std. deviation</b>	3.78	2.90	4.83
<b>Pearson Correlation</b>	1	0.784**	0.765**

\*\* . Correlation is significant at the 0.01 level

From Figure 4 we can see that adolescents had high level of body mass index, higher scores of the Eating Attitudes test (EAT-26) and depression.



**Figure4. The mean scores values of BMI, EAT-26 and CDI among students**

### Discussion

Worries about weight, shape and eating are common, especially among young persons. Being very overweight or obese can cause a lot of problems, particularly with healthy (Kent and Lacey, 2002). It is known that for somebody is very easy to do that, but everyone need help to find a way of doing this. Adolescents try to lose weight by dieting or skipping meals. For some worries about weight becomes an obsession. This can turn into a serious eating disorder, like anorexia nervosa and bulimia nervosa (Russell, Dare and Eisner, 1997; Silverman, 2003).

In our study of 401 students from secondary schools, we found that half of them with body mass index o 18.5 to 25 kg/m<sup>2</sup> had problems with their weight. They wanted to be slimmer and expected in live with other studies (Pine, Goldstein, Dong .and Price, 2001). Also our results indicates that our subjects scored higher more frequently on EAT-26 and that displayed higher depression. Dissatisfaction with body weight and body shape is in a positive correlation with high level of body mass index and depression.

In general, it can be concluded that higher level of body mass index and scores of EAT-26 may result in more severe forms of depression. It is very clear that eating pathology increases the risk for depression among adolescents. Recurrent binge eating and compensatory behaviors also result in feelings of sadness, insomnia, unhappiness, negative emotion. Bulimic pathology is a main risk factor for depression among adolescents (Spice, 2002; Strobes, 2003). The young people who believe they are overweight prior to puberty may be the risk for the development of disordered eating, related problems and depressed mood.

### Conclusions

The results indicate a high level of depression and dissatisfaction with their figure among adolescent's boys and girls. Further, the results indicate that this population is indeed vulnerable to eating-disordered attitudes and behaviors. Unrealistic notion on the body size may carry different health risks. They vary from an adequate attempt to follow a diet to in a capability to recognize and stop gaining weight. Further research is needed to better understand the structure of such complexity. At the same time we argue that future research should involve some qualitative techniques and interview exercise participants to explore nature of eating attitudes among adolescents.

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