

The Relationship Between Peer Bullying and Anxiety-Depression Levels in Children With Obesity

ABSTRACT

Objective: It has been reported that there is a significant relationship between obesity and mental health problems, and the exposure to peer bullying plays a mediating role in this relationship. This study aimed to evaluate the risk of peer bullying in children with obesity and to investigate the relationship between bullying and anxiety and depression levels.

Methods: A total of 64 patients aged between 8 and 16 years with obesity and 51 age- and gender-matched healthy children and adolescents without obesity were included in the study. Children in both groups were administered the Children's Depression Inventory (CDI) to determine their depression levels, the State-Trait Anxiety Inventory (STAI) to determine their anxiety levels, and the Revised Olweus Bully/Victim Questionnaire for Students to evaluate the bullying status.

Results: Peer bullying rates, CDI, and STAI scores were significantly higher in children and adolescents in the obesity group compared with those in the control group ($P < .05$ for all). In the obesity group, depression and anxiety scores were found to be higher in children who were exposed to bullying compared with those who were not exposed to bullying ($P < .05$ for all). Obesity was found to increase the likelihood of peer bullying by 3.015 times ($P = .018$), and it was also found that the increase in the symptoms of trait anxiety and depression increased the likelihood of peer bullying ($P = .01, P = .002$, respectively).

Discussion: In this study, it was shown that obesity is a risk factor for peer bullying, and both obesity and peer bullying negatively affect children's mental health. More detailed studies that explain the relationship between obesity, bullying, and mental problems will guide clinicians in obesity management.

Keywords: Bullying, anxiety, depression, obesity

Introduction

In simple terms, obesity is an important chronic health problem that is characterized by excessive fat storage in the body, resulting from a higher calorie intake compared with the calories consumed and leading to psychosocial and medical problems. Obesity in childhood is defined as having a body mass index (BMI) above the 95th percentile for age and gender. The incidence is increasing day by day because of new habits.¹ The prevalence of obesity among children and adolescents is 23.8% in boys and 22.6% in girls in developed countries. In developing countries, these rates are 12.9% in boys and 13.4% in girls.² According to the data obtained from the World Health Organization (WHO), European Childhood Obesity Surveillance Initiative (COSI, 2013), the rates of overweight and obesity in children were found to be 14.2% and 8.3%, respectively.³ In studies conducted in Turkey, obesity rates in children have been reported to range between 2.5% and 7.7%.⁴⁻⁶ It is emphasized that obesity is a life-threatening condition owing to its potential complications.⁷ Obesity alone can lead to a variety of health problems or worsening of an underlying health problem. In particular, obesity has been found to be responsible for the increase in the incidence of hypertension, coronary heart disease, diabetes mellitus (type 2), or some malignancies.⁸ It has been reported that



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obesity causes a predisposition to many psychological problems, in addition to physical complications. When children and adolescents with obesity were compared with their peers with normal body weight, it was found that they had higher rates of low self-esteem, negative body image, stigmatization, depressive disorders, anxiety disorders, eating disorders, attention deficit and hyperactivity disorder, somatoform disorders, pain disorders, conduct disorders, and low academic success.⁹⁻¹¹ However, some studies do not support the existence of such a relationship.^{12,13} This inconsistent information in studies may be related to the presence of other causes that affect the relationship between obesity and mental symptoms.¹⁴ It has been reported that symptoms of depression and anxiety, loneliness, or disruptive behavior are associated with exposure to peer bullying in obese adolescents.^{15,16} In a recent study, it was shown that there was a significant relationship between obesity and mental health problems, and exposure to peer bullying also played a mediating role in this relationship.¹⁷

Bullying is a form of violence among peers in schools. Physical actions such as hitting, kicking, and pushing are called physical bullying, whereas repetitive naming, threatening, and using offensive words are defined as verbal bullying. Sexual bullying involves jokes with sexual content and verbal or tactile harassment.¹⁸

Studies show that the rate of bullying is higher in children with obesity than in their peers without obesity. The relationship between obesity and bullying is thought to have gender-related differences. It has been reported that obese boys can be stronger than their peers and can bully their peers. In addition, obese girls are more likely to be victims of bullying compared with obese boys.^{19,20}

This study aimed to evaluate the risk of peer bullying in obese children and to investigate the relationship between bullying and anxiety and depression levels.

Methods

A total of 64 obese patients aged between 8 and 16 years, who presented to Muğla Sıtkı Koçman University School of Medicine Hospital Pediatric outpatient clinic, were included in the study. Cases with intellectual disability that would make communication difficult and cases with a comorbid chronic disease were excluded. A total of 51 age- and gender-matched children and adolescents who did not have intellectual disability or any known psychiatric or chronic diseases, presented to the Pediatric outpatient clinic were included in the study as the control group. From the information obtained from

MAIN POINTS

- Peer bullying rates, depression, and anxiety scores were higher in children and adolescents with obesity compared to healthy children and adolescents.
- Depression and anxiety scores were higher in the cases who were exposed to bullying compared to those who were not exposed to bullying in children and adolescent with obesity.
- Obesity increased the likelihood of peer bullying by 3.015 times, and the increase in the symptoms of anxiety and depression increased the likelihood of peer bullying.
- Obesity is a risk factor for peer bullying, and both obesity and peer bullying negatively affect child's mental health.

their parents, patients who did not have a history of psychomotor retardation, who did not receive any special education support, who learned to read and write on time in their first grade, and who did not have significant problems in school success were accepted as having no intellectual disability and were included in the study.

For obesity, the BMI percentiles for age and gender were determined on the basis of reference values according to Neyzi standards and classified according to the WHO-2007 reference values. Those with a BMI over the 95th percentile were included in the obesity group.

Participants in both groups were administered the sociodemographic data form, which questioned age, gender, parental education level, family income status, height, and weight values; the Children's Depression Inventory (CDI), which evaluated depression levels; the State-Trait Anxiety Inventory (STAI), which evaluated anxiety levels, and the Revised Olweus Bully/Victim Questionnaire for Students, which evaluated peer bullying status.

The study was approved by Muğla Sıtkı Koçman University Scientific Research and Publication Ethics Committee (Approval Date: June 6, 2018; Approval Number: 09/I). In accordance with the Helsinki Declaration, all subjects and families were informed about the study, and informed consent forms were obtained from the volunteers.

Scales Used

Revised Olweus Bully/Victim Questionnaire for Students: The scale was developed by Olweus²¹ in 1983 and revised in 1996. It is a self-report scale consisting of 39 items prepared to evaluate the bullying situation of children and adolescents, the type of bullying, and the nature of bullying behavior, and to determine the child's search for help in bullying, the reactions of adults, and third parties. The scale does not have a cut-off score. The cut-off point of the questionnaire in terms of being a bully, victim, or bully/victim is the situation where the questioned action takes place "2 or 3 times or more in a month." Any response marked above the cut-off point in the questions 4-13 is defined as being a victim; the same condition in the questions 24-33 is defined as being a bully; being involved in both groups is defined as being a bully/victim; and participants who are in neither of the groups are defined as non-participants.²² The Turkish validity and reliability study of the scale was performed by Sipahi and Karababa.²³

Children's Depression Inventory: It was developed by Kovacs²⁴ to measure the level of depression in children. This self-evaluation scale consisting of 27 items with 3 options can be applied between the ages of 6 and 17 years. The cut-off point of the scale is 19, and the highest score that can be obtained is 54. The increasing total score indicates the severity of the level of depression. Internal consistency reliability was found with coefficients ranging from 0.71 to 0.89. It was adapted in Turkey in 1991 by Oy,²⁵ and it was found that the scale had a good concurrent validity, acceptable test-retest reliability ($r = 0.70$), and internal consistency ($\alpha = .80$) in Turkish children and adolescents.

State-Trait Anxiety Inventory: It was developed by Spielberger et al,²⁶ and its Turkish validity and reliability studies were performed by Öner and Le Compte.²⁷ Cronbach's alpha coefficient was found between .94 and .96 for the state anxiety inventory, and between .83 and .87 for the trait anxiety inventory in Turkish population. It consists of 2 scales, each of which is a 1-4 Likert-type scale, including a 20-item state anxiety scale and a 20-item trait anxiety scale. The state

anxiety inventory determines how the individual feels at a certain time under certain conditions. The trait anxiety inventory, in contrast, determines how the individual feels, regardless of the situation and conditions. Scores ranges from 20 to 80 per scale, meaning that anxiety levels increase as the score increases.

Statistical Analysis

Statistical evaluations were made using Statistical Package for the Social Sciences (SPSS) software for Windows 22.0 (IBM Corp.; Armonk, NY, USA). The normality of the distribution was evaluated by the Shapiro-Wilk test. To compare the data obtained from the obesity and control groups who participated in the study, the independent sample *t* test was used for normally distributed data and the Mann-Whitney *U* test was used for non-normally distributed data. Categorical data were compared using the chi-square test. Descriptive statistical values including mean and standard deviation were expressed for continuous data, and median and interquartile range (IQR) were

Table 1. Sociodemographic Data, Bullying Rates and Types of Bullying in the Patient and Control Groups

	Obesity group n (%)	Control group n (%)	<i>P</i>
Age			
Median (IQR)	13.5 (12-16)	14 (12-16)	.283
Maternal age, mean (SD)	43.15 (4.97)	41.08 (5.83)	.297 ^a
Paternal age, mean (SD)	46.30 (4.91)	45.14 (5.33)	.240 ^a
Gender			
Female	41 (64.1)	33 (64.8)	.943 ^b
Male	23 (35.9)	18 (35.2)	
Education level			
Primary	7 (10.9)	3 (5.9)	.583 ^b
Middle	26 (40.6)	20 (39.2)	
High	31 (48.4)	28 (54.9)	
Participating in bullying			
Victim	23 (35.9)	8 (15.6)	.015 ^b
Bully	21 (32.8)	7 (13.7)	
Bully-victim	1 (1.5)	1 (1.9)	1 (1.9)
Physical bullying	1 (1.5)	-	
Verbal bullying	2 (3.1)	4 (7.8)	.258 ^b
Relational bullying	15 (23.4)	1 (1.9)	.001 ^b
Cyberbullying	11 (17.1)	3 (5.8)	.065 ^b
Sexual bullying	1 (11.5)	-	.370 ^b
Ethnic bullying	1 (1.5)	2 (3.9)	.430 ^b
Ethnic bullying	1 (1.5)	-	.370 ^b

Abbreviations: SD, standard deviation; IQR, inter-quartile range.

^aIndependent sample *t*-test.

^bChi-square test.

Table 2. Anxiety and Depression Scale Scores Between Groups

	Obesity group, mean (SD)	Control group, mean (SD)	<i>P</i>
STAI-S	38.18 (11.15)	32.46 (6.30)	.004
STAI-T	47.70 (10.00)	40.36 (6.80)	.024
CDI			
Median (IQR)	14 (6-17.75)	8 (5-12)	< .001 ^a

Abbreviations: SD, standard deviation; IQR, inter-quartile range; CDI, Children's Depression Inventory; STAI-S, State Anxiety Inventory; STAI-T, Trait Anxiety Inventory.

^aMann-Whitney *U* test.

expressed for nonparametric data. To evaluate the relationship between the sociodemographic data and scale scores of the obese adolescents and controls, Pearson's correlation analysis was used for parametric data, and Spearman's correlation analysis was used for nonparametric data. Logistic regression analysis was conducted to evaluate the factors affecting peer bullying. A *P* value of < .05 was considered statistically significant.

Results

A total of 64 children and adolescents with obesity and 51 healthy controls were included in the study. While 23 (35.9%) of the obesity group were boys and 41 (64.1%) were girls, 18 (35.2%) of the control group were boys, and 33 (64.8%) were girls. The median age was 13.5 (IQR, 12-16) in the obesity group and 14 (IQR, 12-16) in the control group. There was no significant difference between obesity and control groups in terms of age (*P* = .283), gender (*P* = .943), education level (*P* = .583), maternal age (*P* = .297), paternal age (*P* = .240), family income status (*P* = .141), and the number of siblings (*P* = .314) (Table 1).

The rate of bullying was found to be 35.9% (*n* = 23) in the obese group and 15.6% (*n* = 8) in the healthy group; the difference was statistically significant (*P* = .015). Regarding the type of bullying, it was found that exposure to verbal bullying occurred at a significantly higher rate in the obese children and adolescents (*P* = .001) than in the control group, while no statistically significant difference was

Table 3. The Relationship Between BMI and Scale Scores in the Obesity Group

BMI	STAI-S	STAI-T	CDI
<i>r</i>	0.174	0.280	.268
<i>P</i>	.063 ^a	.002 ^a	.004 ^b

Abbreviations: BMI, body mass index; CDI, Children's Depression Inventory; STAI-S, State Anxiety Inventory; STAI-T, Trait Anxiety Inventory.

^aPearson correlation analysis.

^bSpearman correlation analysis.

Table 4. Scale Scores for the Victim Subgroup and the Subjects Who Did Not Participate in Bullying in the Obesity Group

	Obesity group victim subgroup Mean (SD)	Obesity group not participating in bullying Mean (SD)	<i>P</i>
STAI-S	39.90 (9.64)	33.90 (9.64)	.035
STAI-T	47.28 (10.80)	41.29 (10.15)	.035
CDI			
Median (IQR)	15 (7-21)	9 (6-14)	.011 ^a

Abbreviations: SD, standard deviation; CDI, Children's Depression Inventory; STAI-S, State Anxiety Inventory; STAI-T, Trait Anxiety Inventory.

^aMann Whitney *U* test.

Table 5. The Effects of Obesity and Anxiety-Depression Symptoms on Peer Bullying

	Odds ratio (95% confidence interval)	<i>P</i>
Obesity	3.015 (1.212-7.5)	.018
CDI	1.103 (1.035-1.176)	.002
STAI-S	1.043 (0.998-1.090)	.059
STAI-T	1.065 (1.015-1.118)	.010

Abbreviations: CDI, Children's Depression Inventory; STAI-S, State Anxiety Inventory; STAI-T, Trait Anxiety Inventory.

Logistic regression analysis.

found in terms of physical bullying ($P = .258$), relational bullying ($P = .065$), cyberbullying ($P = .370$), sexual bullying ($P = .430$), and ethnic bullying ($P = .370$) (Table 1).

When the anxiety and depression scale scores were compared between the groups, statistically significant higher scores were found in the depression ($P < .001$) and anxiety scales ($P = .004$ for STAI-S, $P = .024$ for STAI-T) of the obese group than in the control group (Table 2).

Although the depression and trait anxiety scores increased significantly as the BMI scores increased in the patient and control groups ($r = 0.268$, $P = .004$; $r = 0.280$, $P = .002$, respectively), no statistically significant correlation was found between the state anxiety scores and BMI scores (Table 3).

When the status regarding participation in bullying was compared between genders in the obese group, 36.5% of the girls ($n = 15$) and 34.7% of the boys ($n = 8$) were found to have participated in bullying, and there was no statistically significant difference ($P = .885$).

When the scale scores were compared between the victim subgroup and those who did not participate in bullying in the obesity group, it was found that the STAI-S, STAI-T, and CDI scores were statistically significantly higher in the victim subgroup ($P = .035$, $P = .035$, $P = .011$, respectively) (Table 4).

When the factors affecting peer bullying in both groups were evaluated, it was found that obesity increased the likelihood of peer bullying by 3.015 times, whereas a one-point increase in CDI score caused an increase in the likelihood of peer bullying by 1.103 times.

In addition, although a one-point increase in STAI-T score caused an increase in the likelihood of peer bullying by 1.065 times, the STAI-S score had no significant effect on peer bullying (Table 5).

Discussion

In this study evaluating the levels of peer bullying and anxiety and depression in obese children and adolescents, it was found that the rates of exposure to bullying and anxiety and depression levels were higher in obesity group than in healthy controls without obesity, and it was confirmed that depression and trait anxiety scores increased as BMI increased. It was found that those who were bullied had higher anxiety and depression scores than those who did not participate in bullying in the obesity group, and obese adolescents were exposed to verbal bullying at a higher rate than healthy adolescents. It was found that obesity increased the likelihood of peer bullying 3.015 times, and the increase in the symptoms of trait anxiety and depression also increased the likelihood of peer bullying.

In accordance with the current literature, our study showed that anxiety and depressive symptoms occurred with a significantly higher rate in obese children and adolescents than in children and adolescents with a healthy body weight. Studies have shown that an increased body weight in adolescents is often associated with depressive symptoms, followed by anxiety symptoms.^{28,29} In a case-control study conducted by Esposito et al³⁰ with 148 children, which evaluated the relationship between psychological problems and obesity, rates of depression and anxiety symptoms were significantly higher in the obese group than in the control group. Similarly, a study con-

ducted with obese children and adolescents showed that more than 50% of the participants had a diagnosis of DSM-IV, 32% had an anxiety disorder, and 12% had a mood disorder.³¹ In another study, it was shown that there was a negative relationship between depression and anxiety scores and the quality of life in obese and overweight children.³² In a meta-analysis study conducted, the data of 51,272 participants from 18 studies were collected and examined, and a positive relationship was found between childhood and adolescent obesity and depression and more severe depressive symptoms.³³ However, several other studies have suggested that there may be no causal relationship between increased body weight, depression, and anxiety. In a study involving obese adolescents and young adults, no significant relationship was found between BMI and mood, anxiety, drug use disorders, and somatoform disorders.¹³

The relationship between obesity and depression in children and adolescents is still unclear. Adolescents are more sensitive to body weight and shape concerns compared with young children because identity development shapes in adolescence and both body image and self-esteem are related to identity formation.³⁴ The relationship between childhood and adolescent obesity and depression is particularly important in terms of the increasing prevalence of the use of social media and its pressure on children and adolescents. With an increase in exposure to social media, it has been shown that there is an increase in body dissatisfaction as well as depression.^{35,36} Body dissatisfaction and negative body image also increase with an increase in the BMI.³⁷ As a result, there is a positive correlation between increased levels of body dissatisfaction and an increase in depression or depressive symptoms.³⁸ Other contributing factors may be peer victimization, bullying, and ridicule, which appear to increase with obesity and are strongly associated with depression.^{39,40} Studies have consistently associated childhood bullying with a series of psychological problems, including anxiety symptoms, loneliness, low self-esteem, suicidal thoughts, and depression.^{41,42} In recent years, many studies have emphasized that being overweight or obese is one of the most common causes of exposure to peer bullying in children and adolescents.^{39,43} In a meta-analysis study, it has been shown that both overweight and obese youth are more likely to be victims of bullying and these results are not moderated by gender.⁴⁴ It has been reported that peer bullying related to being overweight or obese occurs more frequently compared with peer bullying related to race, religion, or disability at school^{43,45} and contributes to negative emotional outcomes, academic failure, and peer rejection.^{40,43,46} In a study conducted by Bacchini et al,⁴⁷ it was shown that higher BMI z-scores in children and adolescents was a risk factor for peer victimization and poor self-concept. Obesity is often considered a sign of lack of self-discipline, insufficiency, indolence, and sloppiness and puts obese adolescents at a risk of verbal bullying. A recent meta-analysis study, which analyzes the data of 114,240 participants from research published in 41 low- and middle-income countries showed that both being overweight and obese significantly increased the likelihood of bullying by making fun of physical appearance for both genders.⁴⁸ The results of our study also support the current literature. In our study, higher peer bullying rates were found in obese children and adolescents, and obese adolescents were exposed to verbal bullying at a higher rate than healthy adolescents. In addition, it was found that anxiety and depression levels were higher in children and adolescents who were exposed to peer bullying in the obesity group.

When the factors affecting peer bullying in our study were evaluated, it was found that the greatest factor was being obese or not, and the increase in depression and trait anxiety scores also increased the likelihood of peer bullying. In a study similar to our study, it was reported that peer bullying victimization had a stronger effect on children who had high levels of baseline anxiety and depression symptoms.⁴⁹ Exposure to peer bullying can be a major source of stress for children, and children who exhibit symptoms of anxiety and depression can be particularly vulnerable to such stress, which can cause psychopathology over time. In addition, ruminative thought that has been associated with both cause and consequence of depression and various anxiety disorders may play an important role in the development of psychopathology in children who are the victims of bullying.⁵⁰ Children with baseline depressive or anxious symptoms may experience difficulties in coping with bullying by directing their attention to ruminative thoughts when exposed to peer bullying. Therefore, studies to identify the factors that can make children more vulnerable to the negative effects of peer victimization are important in terms of preventing the negative effects that may occur owing to peer bullying. Considering that children with obesity are more exposed to peer bullying and the negative effects that bullying has on mental health, it is considered important to focus on individual factors that exacerbate the negative effects of peer bullying and also to shape the content of preventive interventions according to these individual differences.

However, this study has some limitations. The cross-sectional design and small sample size are the main limitations. We believe that further studies with larger sample sizes are needed to clarify the relationship between the predisposing factors related to peer bullying and its negative mental effects on obesity. The absence of a psychiatric examination and semistructured interview and a standard intelligence measure was considered as one of the most important limitations of our study.

Ethics Committee Approval: Ethics committee approval was received for this study from the Ethics Committee of Muğla Sıtkı Koçman University (Approval Date: June 6, 2018; Approval Number: 09/1).

Informed Consent: Informed consent was obtained from the individuals who participated in this study.

Peer-review: Externally peer-reviewed.

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