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Screening For Eating Disorders In Adolescents

Amanda Fontana Gouveia Fiorelli [1], Natália Custódio Uggioni[1], Marcela Soares [1], Fabiano Sandrini[2], Gleice Fernanda Costa Pinto Gabriel[3], Marcos Antonio Da Silva Cristovam[3]

Pediatric Resident Physician, 3th Grade, Western Paraná State University/University Hospital Of Western Paraná, Cascavel, PR, Brazil.
Ph.D., M.D. Associated Professor Of Pediatrics, Medical School At Western Paraná State University, Cascavel, PR, Brazil
M.D., Assistant Professor Of Pediatrics, Medical School At Western Paraná State University, Cascavel, PR, Brazil.

Abstract:
Background: *Eating disorders are associated with eating habits and behaviors, commonly characterized by irregular food consumption, obsession, compulsion, and restrictive diets.*
Objective*: To screen for eating disorders in adolescents regularly enrolled in two public schools.*
Method: *Cross-sectional, observational, and epidemiological study carried out between 2023/February and 2024/October with adolescents regularly enrolled in two public schools in Cascavel City, PR, Brazil, by application of the Eating Attitude Test-26 (EAT-26) questionnaire, in addition to the variables: BMI, age, gender and EAT-26 score. For this study, EAT-26 score > 21 was an adolescent at risk of eating disorders. Quantitatives variables were described by mean, median, minimum, and maximum values, quartiles and standard-deviation, and qualitatives variables by frequencies and percentages. Analyses included Spearman's Correlation for age and EAT-26, Kruskal-Wallis test for BMI and EAT-26, and Chi-square test for association between BMI, gender, and EAT-26 score > 21. The Breslow-Day and Mantel-Hanzel tests were used to evaluate BMI and eating disorders considering gender. Values of p < 0.05 indicated statistical significance.*
Results: *213 questionnaires were filled in, of which 12 were excluded due to incomplete completion. Age ranged from 12 to 18 years old (mean: 15.4 years old), 118 (58.7%) participants were female, and 83 (41.3%) were male. Positive score on the EAT-26 was found in 41 (20.3%) participants, 24 (58.5%) of whom were overweight or obese. There was an association between the EAT-26 score, BMI (0.001), and gender (0.005).*
Conclusion: *BMI and gender were risk factors for the development of eating disorders. Validated screening tools and monitoring procedures are useful in clinical practice for identifying at risk individuals and early referral for treatment.*
Keywords: *eating disorder, adolescent, obesity, anorexia, bulimia.*

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I. Introduction

Eating disorders (EDs) are related to eating habits and behaviors characterized by irregular food intake, compulsions, obsessions, and restrictive diets[1]. There is currently an increase in these disorders in adolescents, with an estimated prevalence between 1% and 5% in the general population, especially in females, and it can be classified as the third most common chronic disease of adolescence in female[2].

The most common EDs are anorexia nervosa (AN), which is characterized by an unhealthy and systematic refusal to eat, resulting in significant weight loss and a quest to lose weight, and bulimia nervosa (BN), which aims to lose weight quickly with compensatory behaviors such as induced vomiting, intense physical exercise, use of laxatives, and excessive caffeine consumption after binge eating[3,4]. Eating disorders are considered serious mental illnesses that can impair cognition, physical health, delay or promote sexual maturation, development, and psychosocial functioning, and may go unnoticed for months or years[5,6].

To screen for eating disorders, to complement diagnosis and even to monitor patients with these disorders, there are questionnaires that can be used, such as the Eating Disorder Inventory (EDI), the Eating Disorder Examination Version Questionnaire (EDE-Q), the Binge Eating Scale (BES) or the Eating Compulsions During Cessation Scale (ECAP), the Sick, Control, One Stone, Fat, Food Questionnaire (SCOFF) and the Eating Attitudes Test-26 (EAT-26). The latter consists of questions divided into 3 scales: the Diet Scale, which reflects an unhealthy refusal of high-calorie foods and an intense preoccupation with body shape; the Bulimia and Preoccupation with Food Scale, which refers to episodes of compulsive eating followed by

vomiting and other behaviors to avoid weight gain; and the Oral Control Scale, which demonstrates self-control over food and recognition of external factors that stimulate food intake[7].
This study was designed to determine the risk of ED in adolescents regularly enrolled in two public schools.

II. Method

This was a cross-sectional, observational and epidemiological study conducted from 2023/February to 2024/October in two public schools in the municipality of Cascavel, PR, Brazil. After the Free and Informed Consent form was signed by the guardians and the Adolescent Written Informed Assent was obtained of adolescents, the EAT-26 questionnaire was administered to students regularly enrolled in the participating schools. For this study, the cut-off point used for the EAT-26 was > 21, this score is a risk factor for AD. Other variables included in the study were: body mass index (BMI), age, and gender. Exclusion criteria were: incomplete completion of the questionnaire, subjects who showed no interest in participating in the research, and subjects with an intellectual disability that made it impossible to understand the questions.

To assess the adolescent`s' body mass index, a Relaxmedic® weight scale (model RM-BD9090A, year of manufacture: 2018, Brazil) was used, with the subjects wearing light clothing, and to analyze height, a wall-mounted stadiometer (brand Balmak® model EST-223, year of manufacture: 2020, Brazil) was used, with the subjects walking barefoot. The z-score was used to classify BMI, where the z-score classification was as follows: thinness between -3 and -2; eutrophy between - 2 and +1; overweight between +1 and +2; obesity between +2 and +3 and severe obesity > +3[8].

This study used the EAT-26 questionnaire, which was developed by Garner and Garfinkel (1979) and is available from the service where the research was conducted. In this study, a score above 21 was considered a risk factor for EDs, situation this which the participant was referred to a mental health service. The questions are divided into 3 scales: Diet Scale (questions numbers 1, 6, 7, 10, 11, 12, 14, 16, 17, 22, 23, 24, and 25), which reflects an unhealthy refusal of high-calorie foods and an intense preoccupation with body shape; Bulimia Scale and Preoccupation with Food (questions 3, 4, 9, 18, 21, 26), which refers to episodes of compulsive food intake followed by vomiting and other behaviors to avoid weight gain, and the Oral Control Scale (questions 2, 5, 8, 13, 15, 19, 20), which demonstrates self-control over food and recognition of external factors that stimulate food intake[7].

The statistics used to describe the quantitative variables were mean, median, minimum and maximum, 1st and 3rd quartiles and standard-deviation. Frequencies and percentages were used to describe the qualitative variables. Spearman's Correlation Coefficient was used to assess the association between age and EAT-26 score. The Kruskal-Wallis nonparametric test was used to compare BMI classifications in relation to EAT-26 scores. Due to the small number of participants, BMI was divided into two groups: thinness/eutrophy and overweight, obesity/severe obesity. Chi-squared test was used to assess the association between BMI and the presence of ED and the association between gender and the presence of ED. The Breslow-Day test and the Mantel-Hanzel test were used to assess the association between BMI and the presence of ED, excluding the effect of the adolescent's gender. The p-value of less than 0.05 indicated statistical significance.

This study was approved by the Research Ethics Committee of the Western ParanáState University, Cascavel, Brazil, under protocol number 5.677.767/2022.

III. Results

In this study, 213 (100%) questionnaires were used, of which 12 (5.6%) were excluded due to incomplete completion. There were 201 (100%) validated questionnaires, of which 118 (58.7%) were female and 83 (41.3%) were male. Age ranged from 12 to 18 years (mean: 15.4 years, median: 16 years). Positive scores on the EAT-26 were found in 41 (20.3%) participants, of whom 32 (78%) were female and 19 (59.3%) were classified as overweight/obese; and nine (22%) were male and five (55.5%) were overweight/obese. Table 1 shows that there was a relationship between EAT-26 score, BMI (0.001), and gender (0.005).

Table 1. Relationship between EAT-26 scores according to BMI and gender.

	BMI classification				
EAT-26 Score*	Thinness/Eutrophy		Overweight or Obesity or Morbid Obesity		p value
	n	%	n	%	
Normal	112	86.8	48	66.7	
EAT > 21	17	13.2	24	33.3	0.001
Total	129	100	72	100	
	Gender				
EAT-26 score	Female		Male		
	n	%	n	%	
Normal	86	72.9	74	89.2	
EAT > 21	32	27.1	9	10.8	0.005
Total	118	100	83	100	

*Eating atittude test

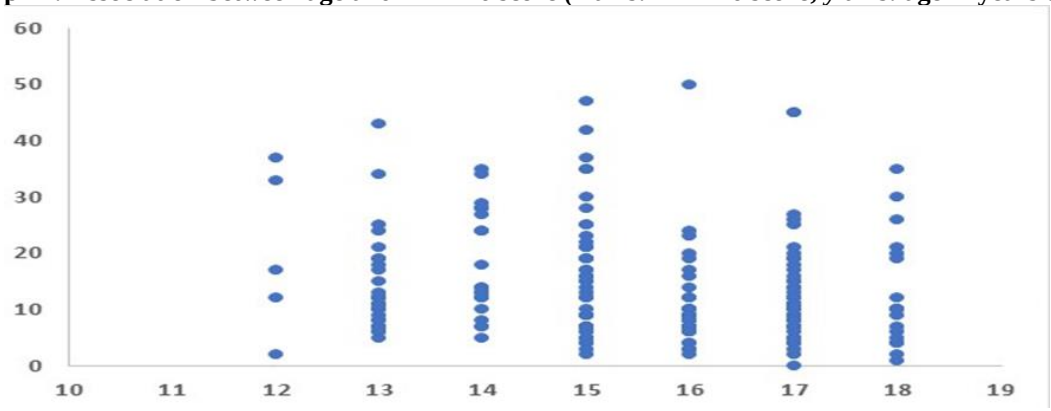
Table 2 show correlation between BMI classification and EAT-26 score.There was association between eutrophy, overweight or obese when the three BMI classifications were considered with the EAT-26 score (p 0.03).

Table 2. Correlation between BMI classification and EAT-26 score.

Classification of BMI	p-value
Thinness x Eutrophy	0.731
Thinness x Overweight or Obesity or Morbidly Obese	0.483
Eutrophic and Overweight or Obesity or Morbidly Obese	0.003

In graph 1 below, Spearman's Correlation Coefficient has been estimated, indicating that older age is associated with lower scores on the EAT-26. It should be noted that although this association is significant, it can be considered weak.

Graph 1: Association between age and EAT-26 score (*x* axis: EAT-26 score; *y* axis: age in years old).



IV. Discussion

Anorexia and bulimia are EDs that affect an alarming percentage of teenagers, especially those between the ages of 12 and 25. According to the World Health Organization (WHO), 70 million people worldwide currently suffer from some form of ED. It is estimated that 0.5% to 3% of adolescents will develop anorexia in their lifetime, while bulimia may affect approximately 1% to 2% of this age group[3,9]. In Brazil, 1 in 5 adolescents between the ages of 6 and 18 show symptoms of these disorders[10]. In addition, a Spanish study showed that the EAT-26 is a valid tool for assessing adolescents suspected of having an eating disorder[11].

In this study, there was an association between weight and the risk of ED. In a case-control study, adults who were obese in childhood were three times more likely to develop bulimia than their healthy control peers[12]. In addition, in a sample of 3,043 Canadian adolescents, the estimated prevalence of both subclinical and clinical ED was higher in obese adolescents (9.3% of males and 20.2% of females) compared with normal-weight adolescents (2.1% of males and 8.4% of females)[13,14]. A study of 14 adolescents in a specialized child and adolescent mental health clinic found that 35.7% of the participants had a BMI of overweight[15], supporting this study.

This study found a higher prevalence of risk for ED in girls, a finding similar to other studies showing that women are more likely to develop ED[16]. A meta-analysis of 94 studies found that the weighted mean (with ranges) of lifetime ED was 8.4% (3.3-18.6%) for females and 2.2% (0.8-6.5%) for males[17]. The number of EDs in young men has increased with the prevalence of hypermuscular body ideals, with the result that disordered eating symptoms are increasingly focused on the pursuit of a muscular body[18,19].

Preliminary evidence suggests that the age of onset of juvenile AN has decreased over the past decade. Steinhausen and Jensen[20] reported that in 1995 the predominant age of onset of AN was 16-19 years, whereas in 2010 the most common age of onset was 12-15 years. In the United Kingdom, the prevalence of AN in children aged 10 to 14 years has increased from 2.5 to 7.5 per 100,000 children over the last two decades[21,22]. There is evidence that older age is associated with lower scores on the EAT-26, similar to that found in this study. A meta-analysis of 192 studies showed that the mean age of onset of AN and BN was 15.5 years[23], which is consistent with this study, but it should be noted that there was a selection bias (high school adolescents).

V. Conclusion

This study found that being overweight and female were risk factors for developing AD. There was a higher prevalence of positive scores on the EAT-26 in young females and those who were overweight/obese, and younger age was a risk factor for AD.

Because of the significant increase in EDs among young people, validated screening tools and monitoring procedures are useful in clinical practice to identify individuals at risk, monitor them, and allow early intervention to improve the physical and mental health of these adolescents.

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