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Research Paper

Screening for eating disorders in adolescents

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Abstract:
Background: *Eating disorders are psychiatric conditions characterized by disordered eating behaviors and distorted body image perceptions, predominantly diagnosed in adolescent females.*
Objective: *to screen adolescents for eating disorders using the SCOFF questionnaire.*
Method: *After obtaining a Parental Written Informed Consent from parents or guardians and an Adolescent Written Informed Assent from adolescents, the SCOFF questionnaire was administered to adolescents aged 12 to 18 of both genders attending two public elementary and high schools. Subsequently, the following variables were analyzed: SCOFF score, gender, age and BMI. This study was approved by the Research Ethics Committee of Western Paraná State University under protocol number 6.917.028/2024.*
Results: *A total of 581 questionnaires were administered, of which 60 (10.3%) were excluded due to incomplete answers, while 521 (89.7%) were considered valid, resulting in a demographic distribution of 259 (49.7%) female and 262 (50.3%) male participants, aged 11 to 18 (mean: 15.45 years), and BMI ranging from 12.21 to 61.72 (mean: 21.93). A significant correlation was found between female gender, higher BMI, and the likelihood of developing eating disorders ($p<0.001$).*
Conclusion: *With the rising incidence of eating disorders and evidence of a correlation between BMI, gender, and their development, prevention strategies are essential for both healthy and vulnerable young people. Early screening, timely diagnosis, and targeted interventions can improve outcomes and contribute to better prognosis.*

Key-words: *adolescent, questionnaire, anorexia nervosa, bulimia nervosa, epidemiology*

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I. INTRODUCTION

Eating disorders, as defined by the World Health Organization (WHO), involve abnormal eating patterns, a preoccupation with food, and significant concerns about body weight and shape[1]. Anorexia nervosa (AN) is more common in young females, with a 10:1 female-to-male ratio and a prevalence of 0.4%. Symptoms of AN typically emerge between ages 12 and 14, often starting with a desire to "eat healthier". This may lead to the exclusion of food groups such as carbohydrates and red meat, as well as behaviors like avoiding meals with others[2]. Bulimia nervosa (BN) is also more prevalent among young women, with onset occurring often between ages 18 and 25. It is characterized by recurrent episodes of binge eating, followed by compensatory behaviors such as self-induced vomiting, laxative use, and excessive exercise to prevent weight gain. These behaviors occur at least once a week for three months, with the severity of the disorder being determined by their frequency. In addition to these clinical manifestations, individuals with BN often have a distorted self-image and

exhibit impulsive behaviors. They may avoid eating in public and frequently use the restroom immediately after meals[2].

Early diagnosis of eating disorders improves treatment response, preventing cognitive, physical, and psychosocial developmental impairments, as well as progression to chronic illness, associated with high morbidity and mortality. Several screening tools are available for eating disorders, including the SCOFF (Sick, Control, One Stone, Fat, Food) questionnaire, the EAT (Eating Attitudes Test), the EDE-Q (Eating Disorder Examination Questionnaire), the ChEDE-Q8 (a version of the EDE-Q adapted for children), the EDI-C (Eating Disorder Inventory for children), the KEDS (The Kids' Eating Disorders Survey), and the ChEAT (Children's Eating Attitudes Test) [2,3,4,5]. Among these, the SCOFF questionnaire stands out as a quick and practical tool for identifying eating disorders, so it was chosen for the present research.

This study aimed application of the SCOFF questionnaire to screen for eating disorders in adolescents.

II. METHODS

This was an epidemiological, cross-sectional, and observational study carried out at two public elementary and high schools, as well as at an medicine of adolescence outpatient clinic in Cascavel, Paraná, Brazil. The study sample consisted of adolescents aged 12 to 18 who were regularly enrolled at participating schools and voluntarily agreed to participate in the research.

After obtaining written informed consent from parents or legal guardians and written informed assent from adolescents, the SCOFF questionnaire was administered to screen for eating disorders. SCOFF is a widely used screening tool for detecting eating disorders, adapted for at least 15 different cultures worldwide, including Brazil, where it was culturally adapted and validated[6]. It consists of five dichotomously scored questions (yes = 1, no = 0), with two or more "yes" responses suggesting the presence of an eating disorder, in which case a mental health professional should evaluate the individual. The questions are as follows: (1) Do you induce vomit when you feel uncomfortably full? (2) Do you worry that you have lost control of how much you eat? (3) Have you recently lost over 5 kg in a 3-month period? (4) Do you believe you are fat, even though other people say you are very thin? (5) Would you say that food dominates your life? For this study, a SCOFF score greater than 2 was considered a positive screening result, indicating that the student should seek evaluation by a mental health professional. Furthermore, the following variables were analyzed: gender, age, school grade, body mass index (BMI), and SCOFF score.

The collected data were entered into a Microsoft Excel spreadsheet and analyzed using Stata/SE v.14.1 (StataCorp LP®, USA, 2021). Quantitative variables were described using mean, median, 1st and 3rd quartiles, minimum and maximum values, and standard deviation. Qualitative variables were presented as frequencies and percentages. To compare cases with and without eating disorders in terms of quantitative variables, the Student's t-test for independent samples was used. The Chi-squared test was applied to examine associations between grade, gender, and eating disorder status. Logistic Regression Model was employed to evaluate the combined effects of gender and BMI on the presence of an eating disorder. A p-value < .05 was considered statistically significant.

This study was approved by the Research Ethics Committee of Western Paraná State University under protocol number 6.917.028/2024.

III. RESULTS

A total of 581 questionnaires were completed, of which 60 (10.3%) were excluded due to incomplete responses. Consequently, 521 (89.7%) were considered valid. Of these, 259 (49.7%) were female and 262 (50.3%) were male. Participants' ages ranged from 11 to 18 (mean: 15.45 years), and BMI ranged from 12.21 to 61.72 (mean: 21.93).

A significant correlation was observed between female gender, higher BMI, and the development of eating disorders ($p < .001$). Participants were enrolled from the 7th grade of elementary school to the 3rd year of high school.

Table 1 presents the relationship between age, BMI and SCOFF score.

Table 1. **Relationship between age, BMI and SCOFF score**

		n	Mean	Minimum	1st quartile	Median	3rd quartile	Maximum	SD*	p-value
Relationship between age and SCOFF score**	**No**	275	15.4	11	14	16	17	18	1.5	0.732
	Yes	246	15.5	12	15	16	16	18	1.3	
Relationship between BMI and SCOFF score	**No**	275	20.87	13.49	18.55	20.08	22.33	61.72	4.1	< .001
	Yes	246	23	12.21	19.96	22.23	25.28	39.04	4.37	

*Standard-Deviation, ** Sick, Control, One Stone, Fat, Food Questionnaire.

Table 2 presents the relationship between gender and SCOFF score (score >2 indicates that the teenager should seek a mental health professional).

Table 2. Relationship between gender and SCOFF score.

SCOFF score	Gender				p-value
	Female		Male		
	n	%	n	%	
No	100	38.6%	175	66.8%	< .001
Yes	159	61.4%	87	33.2%	
Total	259	100.0%	262	100.0%	

Table 3 presents the relationship between grade and SCOFF score.

Table 3: Relationship between grade and SCOFF score.

Grade	Clinical				Total	p-value
	No		Yes			
	n	%	n	%		
1st year HS*	51	47.2%	57	52.8%	108	0.530
2nd year HS	86	52.1%	79	47.9%	165	
3rd year HS	58	57.4%	43	42.6%	101	
7th year ES**	2	100.0%	0	0.0	2	
8th year ES	21	55.3%	17	44.7%	38	
9th year ES	57	53.3%	50	46.7%	107	

*High School, ** Elementary Scholl

IV.DISCUSSION

Eating disorders (EDs) are conditions that significantly impair social well-being, contributing to the deterioration of psychosocial health in adolescents. Early diagnosis is therefore crucial, as it improves prognosis and promotes better social outcomes. Questionnaires serve as valuable tools for early diagnosis, facilitating the screening of larger populations in a shorter time frame[7].

Although the present study did not show a correlation between age and the development of EDs, other research focusing on different populations have found that the prevalence of EDs tends to increase with age[7,8,9,10,11].

The interaction between EDs and BMI can be complex, influenced by often elusive psychological factors involved in the development of EDs. However, a clearer understanding of this relationship emerges when considering the profound impact of body image vulnerability, as individuals with low self-esteem, particularly

adolescents, are more likely to be affected[12,13]. In this study, a significant correlation was observed between higher BMI and the development of EDs. Nevertheless, some studies have failed to demonstrate an association, even when focusing exclusively on overweight or obese participants[10, 14, 15, 16].

Finally, the analysis of questionnaire responses revealed a correlation between gender and tendency to develop ED, consistent with globally accepted literature. However, some studies have not found this association, instead reporting similar proportions of tendency to develop EDs across both genders [17,18,19].

This study had any limitations that warrant consideration. First, it focuses only on a specific population, which limits the generalizability of these findings to a broader population. Second, reliance on self-reported data introduces potential sources of bias.

V.CONCLUSION

A correlation between BMI, gender, and the tendency to develop eating disorders was observed. Given the concerning rise in the incidence of eating disorders, particularly among adolescents, there is a clear need for social interventions focused on prevention in both healthy and at-risk populations. Additionally, effective and comprehensive screening methods, such as the SCOFF questionnaire, should be employed to ensure that the largest possible proportion of the population is screened. Early diagnosis and timely intervention can lead to improved treatment outcomes, contributing to favorable prognosis and overall well-being.

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