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Risk behaviors related to eating disorders in adolescents and its association with dental erosion

Comportamento de risco para distúrbios alimentares em adolescentes e sua associação com a erosão dentária

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Resumo

Introdução: A supervalorização da magreza como padrão de beleza vem contribuindo para o desenvolvimento de distúrbios alimentares e têm acometido, sobretudo, adolescentes e adultos jovens. **Objetivo**: Avaliar a prevalência do comportamento de risco para distúrbios alimentares e a sua associação com a erosão dentária em adolescentes. **Material e método**: Trata-se de estudo epidemiológico observacional transversal. A amostra foi composta por 278 adolescentes de 12 a 18 anos, residentes em Campinas - SP, provenientes de escola pública. Foram utilizados para coleta dos dados 02 questionários para investigação dos distúrbios alimentares: o Teste de Investigação Bulímica de Edimburgo e o Teste de Atitudes Alimentares. Logo após, foram realizados exames bucais por examinadores calibrados para a avaliação da erosão dentária. **Resultado:** A idade média da amostra foi de 14,8 anos. A prevalência de médio risco de bulimia na amostra foi de 43,2% (IC95%: 37,3%-49,0%) e a prevalência de adolescentes com possibilidade de bulimia foi de 53,2% (IC95%: 47,4%-59,1%). Do total 11,9% (IC95%: 8,1%-15,7%) apresentou resultado sugestivo para anorexia. Entre as mulheres 66,9% foram classificadas com possibilidade de apresentar bulimia, já nos homens essa prevalência foi de 39,0%. Com relação à erosão, apenas 1,1% da amostra apresentou erosão dentária. **Conclusão:** O estudo apontou para grande número de adolescentes com comportamento de risco para distúrbios alimentares sem que tenha sido evidenciada associação com a erosão dentária, visto a sua baixa prevalência.

Descritores: Adolescentes; anorexia; bulimia; erosão dentária.

Abstract

Introduction: The overvaluation of thinness as a standard of beauty has contributed to the development of eating disorders and has mainly affected adolescents and young adults. **Objective**: To evaluate the prevalence of risk behaviors for eating disorders and their association with dental erosion in adolescents. **Material and method**: This is a cross-sectional observational epidemiological study. The sample consisted of 278 adolescents aged 12 to 19 years, enrolled in a State School in Campinas - SP. Two questionnaires were used for the data collection on eating disorders: Bulimic Investigatory Test of Edinburgh and Eating Attitudes Test -26. The presence of erosion was evaluated by calibrated examiners. **Result**: The mean age of the sample was 14.8 years. The prevalence of mean risk for bulimia in the sample was 43.2% (95% CI: 37.3%-49.0%) and the prevalence of adolescents with a probability of developing bulimia was 53.2% (95% CI: 47.4%-59.1%). Of the total, 11.9% (95% CI: 8.1%-15.7%) showed results suggestive of anorexia. Among women, 66.9% were classified as probability developing bulimia, whereas in men the prevalence was 39.0%. As for dental erosion, only 1.1% of the sample presented erosion. **Conclusion**: The study pointed to large number of adolescents with risk behaviors for eating disorders but no association was found with dental erosion due to low prevalence.

Descriptors: Adolescents; anorexia; bulimia; dental erosion.

INTRODUCTION

Adolescence comprises the transition period between childhood and adulthood that is characterized by physical, mental, emotional, sexual impulses and social development and by the individual's efforts to meet the cultural expectations of the environment in which one lives[1]. According to the Statute of the Child and Adolescent[2], adolescence comprises the ages from 12 to 18 years, beginning with modifications of the body due to puberty and ends when the individual reaches full growth and personality, achieving economic autonomy and a position in a social group[3].

The overvaluation of thinness as a pattern of beauty has contributed to the development of eating disorders that especially affect adolescents[4]. As this is a phase of life in which autonomy and independence begins to develop, eating habits change. This influences their eating behavior, leading to the development of changes in eating patterns, such as eating disorders[5].

Eating disorders are psychopathological conditions with serious health complications, characterized by excessive preoccupation with body image, distorted perception of weight and desire to be thin. The prevalence of eating disorders is 36.5% and women are the most affected[6]. The etiology of major eating disorders, anorexia and bulimia nervosa, is unknown and they are characterized by abnormal eating patterns and weight control, as well as changes in body perception and weight[7].

Inadequate eating behaviors such as self-induced vomiting, binge eating, indiscriminate use of weight loss medications such as diuretics, laxatives, and diet pills, are deleterious health behaviors resulting from an attempt to lose or control body weight. These behaviors are part of the diagnostic criteria for eating disorders such as anorexia and bulimia nervosa[8].

These inadequate eating behaviors may lead to dental problems, such as tooth sensitivity, fractures and dental loss, increased caries index and dental erosion, the latter being the most cited in the literature[9]. Dental erosion is characterized by irreversible loss of the mineral structure through a pathological and chronic process due to the chemical etch on the tooth surface by acid and/or chelation without bacterial involvement, originating from extrinsic or intrinsic factors[10]. The damage caused by extrinsic factors is a result of the action of exogenous acids from medicines, environment or diet, while those resulting from the intrinsic factors are due to the action of the endogenous acids, that is, stomach acids that come into contact with the teeth during regurgitation or gastric reflux[11].

Dental erosion is the typical oral manifestation of an eating disorder, causing dental sensitivity and aesthetic compromise, and it may be the main clinical sign suggestive of the presence of psychiatric disorders[5].

Hyperalgesia and aesthetic impairment are the main factors why patients seek the dental office. In this aspect, dental surgeons play a fundamental role in the identification of eating disorders, as they are usually the first health professional to identify any changes as signs and symptoms suggestive of these disorders are visible[12].

Association studies favor the analysis of early signs and symptoms, as well as promote actions to prevent the establishment of the disease and consequent comorbidities, since diagnosis is usually late due to the denial of the individual's condition[13]. Therefore, the aim of this study was to evaluate the prevalence of risk behaviors associated with eating disorders and its association with dental erosion in adolescents.

MATERIAL AND METHOD

This is an epidemiological, observational, cross-sectional, quantitative study. The study population consisted of 660 adolescents aged 12-18 years, enrolled in the State School Adalberto Nascimento in the city of Campinas-SP. For the sample size calculation, we considered a 5% error and 95% confidence index, resulting in 278 students, including a 20% non-response rate. The project was approved by the Research Ethics Committee of the Dental School São Leopoldo Mandic under report No. 1.049.550, 2015.

Firstly, a free and informed consent form was given to each participant explaining the purpose, characteristics, importance and methods of the study. The adolescents whose parents signed the consent form were included in the study. Students with special needs, such as those with cognitive deficits, individuals with fixed orthodontic appliances making oral evaluation impossible, and those who did not wish to participate in the study or who were not present on the day of the evaluation were excluded.

Before data collection, the examiners were submitted to theoretical and practical calibration procedures. The inter- and intra-examiner agreement was measured by Kappa coefficient and a minimum result of 0.91 was obtained, showing adequate reliability and standardization of collected data.

Six examiners were trained to perform the oral examinations aided by a scorer trained to follow instructions and accurately record the examination codes and criteria. The period of theoretical training of the examination team on the established criteria, in accordance with the WHO recommendation, lasted 1 day. A maximum number of examinations recommended to be performed per exam shift is 30, and the random reexamination of 10% of the sample is required to verify the degree of reliability. The practical calibration exercise was performed in 28 adolescents, following the recommendations of the national epidemiological survey of Oral Health, 2004[4].

The instruments used in the research were based on the Bulimic Investigatory Test, Edinburgh (BITE)[14] and the Eating Attitudes Test (EAT)[15]. The BITE instrument was translated into Portuguese as the *Teste de Investigação Bulímica de Edimburgo*, validated for the Brazilian population and it includes two scales: one on symptoms (30 yes/no items, scores ranging from 0 to 30) and one on severity (3 dimensional items). These two scores can be added to obtain a total score. In the scale of symptoms, a high score (≥20) indicates a very disturbed eating pattern and the presence of binge eating with great probability for bulimia; mean scores (between 10 and 19) suggest an unusual dietary pattern, requiring evaluation by a clinical interview, and scores below 10 are within normal limits. On the severity scale, a score>5 is considered clinically significant and ≥10 indicates a high degree of severity[14].

EAT-26 indicates the presence of abnormal eating patterns when responses score 21 points or more on a 0-78 point scale[15].

The application of the questionnaires was conducted in a separate room in a quiet environment. One researcher was available to assist the students. After answering the questionnaire, the students were referred to the dental examination to check the presence of dental erosion. This examination was performed in another room of the school, and the teenager was seated in front of the examiner. The index used corresponds to the evaluation of the buccal and palatal surfaces of the four upper incisors (11, 12, 21, 22) and occlusal surfaces of the first permanent molars (16, 26, 36, 46). Data was recorded by a calibrated assistant. Appropriate personal protective equipments, such as procedure gloves, over-gloves and disposable wooden spatulas, were used to prevent cross-infection. All teeth, except for the third molars, were examined under natural light with spatulas, which were then discarded. Sterile compresses were used to clean and dry the teeth.

Dental erosion was confirmed when the following clinical characteristics were observed: dentin exposure; hypersensitivity; prominent amalgam restoration (amalgam islands); loss of normal tooth brightness; thin or fractured incisal edges; well-defined concavities of dentin on incisal and occlusal surfaces, and loss of pulp vitality due to dental wear.

The prevalence of eating disorders, dental erosion and the respective confidence intervals were initially calculated. Frequency distribution tables were developed and associations were analyzed by Chi-square and Fisher's exact tests. All analyses were performed on the SAS program (SAS Institute Cary, NC, USA, Release 9.2, 2008). The level of significance adopted in the statistical tests was 5% and 95% confidence interval (CI). The dependent variable chosen for the study was dental erosion.

RESULT

The sample consisted of 278 students with a mean age of 14.8 years (± 1.9), minimum age of 11 and maximum of 19 years, with a discrete predominance of females. Table 1 shows a significant association in the BITE scores for bulimia and sex ($p < 0.05$). Among the women, 66.9% were classified with the probability of presenting bulimia. In men, the prevalence was 39.0%. The presence of dental erosion was small in the sample, found in three adolescents, and they were classified as "at risk" for bulimia (Table 1).

As seen in Table 2, the EAT scores for anorexia was not significantly associated with the other variables analyzed ($p > 0.05$).

The age of the adolescents presented an association close to the threshold for dental erosion ($p = 0.0964$). All adolescents (N = 3) who presented with dental erosion were older than 15 years (Table 3).

The prevalence of mean risk for bulimia was 43.2% in both sexes and the prevalence of adolescents with bulimia was 53.2%. Of the total, 11.9% presented a result suggestive of anorexia and 1.1% presented dental erosion (Table 4).

DISCUSSION

The high number of adolescents exposed to inadequate food habits is causing behavioral and somatic illness with serious repercussions, reaffirming that eating disorders are an emerging problem in the Brazilian health scenario[4].

Anorexia nervosa, according to the Diagnostic and Statistical Manual of Mental Disorders[16], is an eating disorder characterized by the individual's refusal to maintain adequate ratio of weight to height, intense fear of gaining weight, distorted body image, as well as the denial of one's own pathological condition. Bulimia nervosa is a disorder characterized by altered eating behaviors, pathological control of body weight, and distorted perception of body shape[16].

Patients with symptoms of bulimia nervosa who have inadequate compensatory behaviors such as self-induced vomiting lose a large amount of liquid, hydrogen ions, chlorine, and potassium. Tissue irritation due to regurgitation causes increased tongue papillae, asymptomatic parotid enlargement, xerostomia, mucosal irritation oral, cheilitis, and a high risk for developing dental erosion[17].

Regarding the symptoms of bulimia nervosa, in the present research it was found that more than 95% of respondents presented a medium/high score on the BITE scale, among which, 43.2% presented a possibility of developing the disorder. These results are

Table 1. Association between BITE scores for bulimia and other variables studied

Variables		Total N(§%)	BITE scores			p-value
			No risk N(&%)	Mean risk N(&%)	Probability N(&%)	
Sex	Women	142 (51.1)	6 (4.2)	41 (28.9)	95 (66.9)	**<0.001**
	Men	136 (48.9)	4 (2.9)	79 (58.1)	53 (39.0)	
Age	≤15 years	150 (54.0)	7 (4.7)	65 (43.3)	78 (52.0)	0.5973
	>15 years	128 (46.0)	3 (2.3)	55 (43.0)	70 (54.7)	
EAT	Without	245 (88.1)	10 (4.1)	109 (44.5)	126 (51.4)	0.2474
	Suggestive	33 (11.9)	0 (0.0)	11 (33.3)	22 (66.7)	
Erosion	Without	275 (98.9)	10 (3.6)	119 (43.3)	146 (53.1)	1.000
	With	3 (1.1)	0 (0.0)	1 (33.3)	2 (1.4)	

§Relative frequency calculated considering the total sample. &Relative frequency calculated considering each row of variables.

Table 2. Association between EAT scores for anorexia and other variables studied

Variables		Total N(%$)	EAT		p-value
			Without anorexia N(&%)	Suggestive N(&%)	
Sex	Women	142 (51.1)	121 (85.2)	21 (14.8)	0.1243
	Men	136 (48.9)	124 (91.2)	12 (8.8)	
Age	≤15 years	150 (54.0)	128 (85.3)	22 (14.7)	0.1187
	>15 years	128 (46.0)	117 (91.4)	11 (8.6)	
BITE	Without bulimia	10 (3.6)	10 (100.0)	0 (0.0)	0.2474
	Mean risk	120 (43.2)	109 (90.8)	11 (9.2)	
	Probability	148 (53.2)	126 (85.1)	22 (14.9)	
Erosion	Without	275 (98.9)	242 (88.0)	33 (12.0)	1.000
	With	3 (1.1)	3 (100.0)	0 (0.0)	

$Relative frequency calculated considering the total sample. &Relative frequency calculated considering each row of variables.

Table 3. Association between erosion and other variables studied

Variables		Total N($%)	Erosion		p-value
			Absent N(&%)	Present N(&%)	
Sex	Women	142 (51.1)	141 (993)	1 (0.7)	0.6156
	Men	136 (48.9)	134 (98.5)	2 (1.5)	
Age	≤15 years	150 (54.0)	150 (100.0)	0 (0.0)	0.0964
	>15 years	128 (46.0)	125 (97.7)	3 (2.3)	
BITE	Without bulimia	10 (3.6)	10 (100.0)	0 (0.0)	1.000
	Mean risk	120 (43.2)	119 (99.2)	1 (0.8)	
	Probability	148 (53.2)	146 (98.6)	2 (1.4)	
EAT	Without anorexia	245 (88.1)	242 (98.8)	3 (1.2)	1.000
	Suggestive	33 (11.9)	33 (100.0)	0 (0.0)	

$Relative frequency calculated considering the total sample. &Relative frequency calculated considering each row of variables.

Table 4. Prevalence of eating disorders and dental erosion in adolescents

Variables		Frequency (%)	*95% CI
BITE	Mean risk of bulimia	120 (43.2)	37.3%-49.0%
	Possibility of bulimia	148 (53.2)	47.4%-59.1%
EAT	Suggestive of anorexia	33 (11.9)	8.1%-15.7%
Erosion	With erosion	3 (1.1)	-

*Intervalo de confiança.

in agreement with those found in prevalence studies in the same age group[5,18] due to excessive preoccupation with body weight and appearance, leading teenagers to problematic eating patterns in order to fit the ideal standard of beauty[19].

A significant association between the risk of bulimia and women was observed in the study. Similar results were found in a study conducted with adolescents aged 15-18 years, in which 30.0% of the female population presented, according to EAT-26, a risk for eating disorders[15,20].

With regard to anorexia, the study shows that 33% of those surveyed presented a condition suggestive of developing eating disorders, of which the majority were women and within the age

group under 15 years. A study conducted in Spain found that the prevalence of anorexia among adolescents aged 12-18 years was 5.2% in females and 1.1% in males. Approximately 85% of the women who developed the disorder were aged between 13 and 20 years[21].

In the present study, there was no association between dental erosion and behavioral risk for eating disorders, unlike results reported by another Brazilian study with adolescents[22] and other international studies that point out a possible causal relationship between eating disorders and dental erosion[23]. It should be noted that the association was confirmed in some studies. However, the individuals examined, diagnosed with eating disorders, were selected from psychiatric reference centers, as opposed to the present study that was conducted with adolescents in the school environment[22,23]. In the study of Hermont et al.[22], the age range (15-18 years) may have influenced their findings, since the possible effects of eating disorders would have had time to develop, unlike the present study in which practically half of the sample was under the age of 15 years. In this sense, we found that the temporality of the presence of the disorder is related to the presence of dental erosion. However, a minimum of two continuous years of contact between acids and the tooth surface is necessary for the occurrence and severity of erosion to become evident[22].

Medeiros et al.[24] showed that not all bulimics present dental erosion and that the factors associated with the occurrence and severity of the condition are the duration of the disease, frequency of vomiting episodes, and the amount of saliva. For the diagnosis of dental erosions, a longer follow-up period is necessary as the extent of dental erosion varies over time, particularly during the development of eating disorders. Thus, the limitation of the present study is its cross-sectional design, which explains the low frequency of the disease in the study sample.

Although the association between eating disorders and dental erosion was not significant in the present study, the results point to a serious public health problem. The prevalence of eating disorder symptoms was high (65.1%), corroborating the study conducted with adolescents from the city of São Paulo[25]. Some authors suggest that prevalence higher than 20% are worrisome, which shows the need for preventive measures to make adolescents aware of the importance of adequate nutrition, regular physical activity and body appraisal[21].

The contribution of the study emphasizes the essential role of institutional partnerships among schools, health services and the family group for promoting prevention programs that encourage favorable environments to support and encourage young people to adopt healthy behaviors. Thus, these results subsidizing the decision-taking and the development of educational campaigns in schools is of utmost importance to informing the young public that the cult of the body may be associated with the predisposing to these disorders.

CONCLUSION

It was concluded that the prevalence of dental erosion was low in the sample, but the students were classified as being at risk for bulimia. The group presented a high index of eating disorder, mainly in women, requiring surveillance and clinical referrals as these problems are severe in adolescents.

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CONFLICTS OF INTERESTS

The authors declare no conflicts of interest.

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