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Eating disorders are associated with an increased risk of suicide

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Abstract
Aim of the study: To examine suicidal behavior and depression in adolescents with eating disorders and to identify risk factors associated with suicidal ideation and attempted suicide.
Methods: Two hundreds adolescents with anorexia nervosa or bulimia nervosa completed self-report particulars at the time of assessment or treatment. Suicide attempts and suicidal ideation were investigated in relation to clinical (e.g. body mass index, purging) and psychological (e.g. body dissatisfaction) features of the eating disorders, as well as depression. Twenty-four percent of the subjects had attempted suicide, and 65% reported suicidal thoughts. Fifty-eight percent were moderately to severely depress.
Findings: The risk of attempted suicide was associated with depression, a history of sexual abuse and longer duration of illness, but it was moderated by hospital treatment. Suicidal ideation was related only to depression.
Conclusions: The risk of suicide is not restricted to clinical samples of adolescents with eating disorders, but can also be detected in non-clinical samples. Moreover, the risk is higher among adolescents with symptoms of both eating disorders and depression. The results of this study emphasize the importance of treating aggressively depression in adolescents with eating disorders. Depression seems to amplify illness severity. Currently, strategies for treating eating disorders focus more on the eating disorder behaviors and less on depression. It's suggested for investing more resources in detecting and treating the co-morbid depression.

Keywords: adolescents, depression, eating disorders, suicide, eating disorders; suicide; adolescent; depression

Introduction

Suicide is an important public health problem [1] and one of the main causes of death among individuals with eating disorders [2], as such disorders share numerous risk factors for suicide [3], such a purging, depression, substance abuse, anxiety and impulsiveness [4]. Eating disorders are among the most common disorders associated with the onset of adolescence, especially among girls [5], and represent a life risk that affects physical, emotional, behavioral and social development in adolescents [6]. In some cases, depression seems to aggravate the severity of eating disorders [7, 8]. Thus, depression may be an important link between eating disorders and suicide in adolescents, which may even exclude the direct influence of such disorders on suicidal behavior in this population [9]. Studies that investigate suicidal behavior among adolescents with eating disorders [8, 10-12], including depression [8, 13], have been conducted involving adolescents diagnosed with eating disorders without offering information on individuals with only some symptoms (no conclusive diagnosis). However, it is important to recognize suicidal behavior such individuals, as adolescents in the subclinical phase are more frequent than those with a conclusive diagnosis of an eating disorder [14]. Moreover, previous studies only offer information on suicidal ideation, which demonstrates that knowledge on the correlates of the risk of suicide in adolescents with eating disorders is limited, since the risk of suicide encompasses both thoughts (suicidal ideation) as well as Planning a suicide attempt and is manifested in different manners [15]. Thus, identifying the risk of suicide is fundamental to patient management and the prevention of such events [16]. Thus, the question arises as to the extent of the risk of suicide among adolescents with simultaneous symptoms of both eating orders and depression. The aim of the present study was to determine the risk of suicide in adolescents with concomitant symptoms of eating disorders and depression, since the determination of depressive symptoms may be significant in the evaluation of the risk of suicide in adolescents with eating disorders.

Table 1: Distribution of adolescent analysed according to clinical data

Variable	N	%
Eat- 26[a]		
Positive	351	25.5
Negative	1028	74.5
Bite[b]--Symptoms		
None	931	67.5
Medium Score	404	29.3
High Score	44	3.2
Bite[b]--Severity		
Non-Significant	1313	95.5
Significant	61	4.8
Strong intensity	5	0.4
	179	100.0

Table 2: Evaluation of risk factor according to clinical data

Variable	Risk of suicide (MINI)						p value	OR (95& CI)
	Yes		No		Total			
	n	%	n	%	n	%		
EAT-26							p<0.001	2.22(1.72 to 2.86)
Positive	150	42.7	201	57.3	351	100		1.00
Negative	259	25.2	769	74.8	1028	100		
BITE-Symptoms								
None	205	22.0	726	78.0	931	100	p<0.001	1.00
Medium score	179	4.43	225	55.7	404	100		2.82(2.19 to 362)
								4.66 (2.52-8.63)
High Score	25	5.67	19	4.32	44	100		
BITE-Severity								
Non-Significant	383	29.2	930	70.8	1313	100	p=0.104	--
Significant	23	37.7	38	62.3	61	100		--
Strong Intensity	3	60.0	2	40.0	5	100		--
Total	409	29.7	970	70.3	1379	100		

Materials and Methods

A population-based, cross-sectional study was conducted during a four-month period in 2014 in the city of Recife (northeast Brazil) involving individuals aged 10 to 17 years. The sample size was calculated based on the population of students enrolled in the state-run public education system in Recife in the target age group. Students between 10 and 17 years of age were enrolled in this pubic system in 2013. Thus, the total number of adolescents to be evaluated was 1350. However, 1350 adolescents were evaluated, as no adolescents who agreed to participate in the study (through a statement of informed consent) were excluded.

Procedures and ethical considerations

The principals of the schools were first contacted, received clarifications regarding the objectives of the study and granted official authorization for the participation of their schools. Prior to administration, statements of informed consent were sent to the parents/guardians of the students in compliance with the norms stipulated. Each adolescent also signed a statement of consent agreeing to participate. Measures Socio-economic and demographic data on each participant, along with data regarding symptoms of eating disorders, depressive symptoms and the risk of suicide, were acquired using different questionnaires. Eating disorders Eating Attitudes Test (EAT-26): While EAT-26 does not allow a diagnosis of eating disorders; it assists in the detection of clinical cases in populations at high risk and the identification of individuals with abnormal concerns regarding eating and weight. EAT-26 is widely used in screening studies for the early identification of symptoms of eating disorders. On the symptoms scale, a high score (≥ 20) indicates compulsive eating behavior with considerable possibility of bulimia, medium scores (10 to 19 points) suggest an unusual eating pattern that requires an evaluation through a clinical interview and scores lower than 10 points indicate an eating practice within the limits of normality. On the severity scale, a score of >5 is considered clinically significant and ≥ 10 indicates a high degree of severity.

Risk of suicide: This interview has satisfactory reliability and validity and can be used for the rapid selection of homogeneous populations in epidemiological studies.

Data analysis: The data were entered into a databank with the aid of the Statistical Package for the Social Sciences (SPSS) version 21. Descriptive and inferential statistics were used for the data analysis. Descriptive analysis was used to characterize the sample based on the calculation of measures of dental tendency and dispersion for the variables of interest. Inferential statistics were used to analyse associations between categorical variables using Pearson's chi-square test. Odd ratios (OR) and respective confidence intervals (CI) were calculated to determine the strength of associations between the independent variables and outcome (risk of suicide). 5% was used as the margin of error and 95% was used for the confidence interval.

Results

In the present study, 65.5% of the adolescents were female. Mean age was 13.80 years (standard deviation: 1.76 years) and median age was 14 years. Table 1 shows that 25% of the 1379 adolescents surveyed were considered positive for inadequate eating behavior based on EAT26 and 29.3% has a medium score for bulimia nervosa. On the BITE severity scale, only 0.4% was classified with highly intensive severity. Table 2 shows that the prevalence of the risk of suicide was much higher among the adolescents who had a positive EAT-26 and high BITE symptoms score. Tables 4 and 5 display the estimate percentage probabilities of the risk of suicide based on the regression model. In the presence of both inadequate eating behaviour and depressive symptoms, the risk of suicide would be 61.9%. In the case of positive symptoms for bulimia nervosa and depressive symptoms, the probability would be 63.4%.

Table 3: Results of multivariate logistic regression for percentage with risk of suicide.

	Bivariate Results		Adjusted bivariate Results	
Variable	OR(95% Cl)	p-value	OR(95% Cl)	p-value
Age Group				

10 to 11	1.00	P=0.003	1.00	0.003
12 to 13	1.64(1.02 to 2.61)		1.78(1.09-1.92)	0.022
14 to 15	2.10(1.59-2.61)		2.29(1.42-4.71)	0.001
16 to 17	2.27-(1.38-3.72)		2.41(141-408)	0.001
Sex				
Male	1.00	P <0.001	1.00	0.001
Female	2.06(1.59-2.68)		1.58(1.20-210)	
EAT=26				
Positive	2.22(1.72-286)		1.58(1.20-2.10)	0.001
Negative	1.00	P<0.001	1.00 0.001	
BITE-Symptoms				
None	1.00	p<0.001	1.00	0<001
Medium Score	2.82(219-3.62)		2.17(1.67-284)	0>.001
High Score	4.66(2.52-8.63)		1.87(1.92-3.71)	p=0.60
Children's Depression Inventory				
Positive	3.40(2.52-4.68)	P <0.001	2.67(1.92-3.71)	p>0.001
Negative	1.00		1.00	

Discussion

In the present study, the risk of suicide was found to be high among adolescents with symptoms of eating disorders and could be aggravated by depressive symptoms. Symptoms of eating disorders in a sample of adolescents amongst the total of adolescents surveyed, 44.5% exhibited symptoms of eating disorders, which are common in adolescence, especially non-specified disorders [7]. The emergence of such symptoms in adolescence may be explained by characteristics of an intrapersonal order [8], such as the increased vulnerability and sensitivity in this phase of human development, which also includes a predisposition to risks and imprudent behavior. Observations suggest the proneness to take on risks and dangerous behavior in adolescence may be explained by the immaturity of the neurocortical systems, particularly the prefrontal cortex, which is not capable of altering the perception and evaluation of risk and reward, leading to changes in the social and affective processing of the brain [9]. Thus, adolescents are often vulnerable to pressure from means of communication, the social environment [3] and family environment [3]. In the family environment, excessive control of food, the application of rigorous eating rules and the individualization of the eating process has a positive association to the emergence of eating disorders [1].

Table 4: Risk of suicide according to possible risk factors: EAT-26 & children's Depression Inventory evaluated through logistic regression model (97%Cl)

EAT-26	Children's Depression Inventory	
	Positive	Negative
Positive	61.9	35.3
Negative	46.4	22.5
EAT-26-Eating Attitude Test		

Table 5: Risk of suicide according to possible risk factors; BITE symptoms subscale and children's depression inventory evaluated through logistic regression model

BITE [n] ---Symptoms	Children's Depression Inventory	
	Positive	Negative
Positive	63.8	38.9
Negative	40.5	20

Risk of suicide in adolescents

With symptoms of eating disorders significant associations between the risk of suicide and symptoms of eating disorders were found in the population studied using both screening scales, with the exception of the BITE severity subscale. This indicates that the risk of suicide is not restricted to clinical samples of adolescents with eating disorders, but can also be found in non-clinical samples. The risk of suicide was found in the majority of adolescents with symptoms of eating disorders. Few studies that related suicidal behavior with eating disorders in adolescence [8-11] and eating disorders seem to lead to a greater risk of suicide than any other psychiatric problem [3].

It is currently known that depression is the comorbidity linked to eating disorders, affecting 25 to 52% of individuals with anorexia and bulimia [9]. However, the relationship between these disorders is complex. Several theories have been developed in an attempt to clarify this relationship: 1) The fact that serotonergic functioning in individuals with depression and eating disorders are similar, with dysfunction in the transmission of serotonin, especially among individuals with severe eating disorders; and 2) the issue that eating disorders may cause depressive symptoms as a result of changes induced in the monoaminergic systems due to the restricted diet, which is characteristic of anorexia nervosa.

Conclusion

The risk of suicide is not restricted to clinical samples of adolescents with eating disorders and can also be detected in non-clinical samples. The risk is higher among adolescents with symptoms of both eating disorders and depression, with a 61.9% probability for those with positive results on the EAT-26 scale and a 63.4% probability for those with positive results on the BITE scale. Thus, greater attention should be given to individuals with symptoms of eating disorders and depression, as these factors combined can increase the risk of suicide. Therefore, inadequate eating behavior among adolescents should be investigated to guide future suicide prevention strategies.

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