Suicidal ideation and self-injurious behavior in adolescents with eating disorders

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Introduction. The presence of suicidal thoughts and self-injurious behaviors in patients with eating disorders (ED) is well-known; however, this association is currently not defined empirically. The aim of the study is to determine the prevalence of suicidal ideation and self-harm in adolescents with eating disorders. A second objective is to study the association between self-injurious behavior and suicidal ideation, severity of eating disorder symptoms and symptoms of depression and anxiety, motivation to change and perfectionism.

Methodology. We evaluated 109 patients (mean age, 14.74 years (SD: 1.53); 87.2% female) using the Eating Disorder Inventory (EDI-2), the Beck Depression Inventory (BDI-II), the State-Trait Anxiety Inventory (STAI), the Child and Adolescent Perfectionism Scale (CAPS) and the Anorexia Nervosa Stages of Change Questionnaire (ANSOCQ).

Results. Forty-seven patients (43.1%) had suicidal ideation and 34 (31.2%), self-injurious behavior. The presence of suicidal ideation did not discriminate between patients with or without self-injurious behavior. Patients who self-harm had significantly higher scores on all scales of the EDI-2, except for "maturity fears", in the total scores of BDI-II, STAI and CAPS. An association between self-injurious behavior and motivation to change was found.

Conclusions. A significant percentage of adolescents with eating disorders present suicidal ideation and self-injurious behavior, making the psychopathological profile of these patients more severe. The presence of suicidal ideation in adolescents with eating disorders does not necessarily imply that they have self-injurious behavior; rather, such behavior could be a result of the need to regulate intense negative emotions.

Keywords: Self-injurious behavior, Suicidal ideation, Eating disorder, Adolescents

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Ideación suicida y conductas autolesivas en adolescentes con Trastornos de la Conducta Alimentaria

Introducción. Es conocida la presencia de ideas suicidas y comportamientos autolesivos en pacientes con Trastornos de la Conducta Alimentaria (TCA), sin embargo, esta asociación no está claramente definida empíricamente. El objetivo del estudio es determinar la prevalencia de ideación suicida y conductas autolesivas en adolescentes con TCA. Un segundo objetivo es estudiar la asociación entre conducta autolesiva e ideación suicida, gravedad de la sintomatología alimentaria, depresiva, ansiosa, motivación para el cambio y perfeccionismo.

Metodología. Se evaluaron a 109 pacientes (edad media: 14,74 años (DE:1,53); 87,2% mujeres) con el Inventario de TCA (EDI-2), el Inventario de Depresión de Beck (BDI-II), el Inventario de Ansiedad Estado/Rasgo (STAI), la Escala de Perfeccionismo en Niños y Adolescentes (CAPS) y el Cuestionario de Etapas de Cambio en la Anorexia Nerviosa (ANSOCQ).

Resultados. Cuarenta y siete pacientes (43,1%) presentaron ideación suicida y 34 (31,2%) conductas autolesivas. La presencia de ideación suicida no discriminó entre pacientes TCA con y sin comportamiento autolesivo. Los pacientes con comportamiento autolesivo presentaron una puntuación significativamente mayor en todas las escalas del EDI-2, a excepción de *Miedo a Madurar,* en la puntuación total del BDI-II, STAI y en la CAPS. Se encontró una asociación entre la conducta autolesiva y la motivación para el cambio.

Conclusiones. Un porcentaje importante de adolescentes con TCA presentan ideación suicida y comportamientos autolesivos, siendo el perfil psicopatológico de estos pacientes más grave. La presencia de ideación suicida en adolescentes con TCA no tiene necesariamente implicaciones con la conducta autolesiva, este comportamiento podría expli-

carse como consecuencia de la necesidad de regular emociones negativas intensas.

Palabras clave: Autolesiones, Ideación suicida, Trastornos de la conducta alimentaria, Adolescentes

INTRODUCTION

Suicidal behavior is among the leading causes of death worldwide, especially during adolescence and early adulthood, making it the third leading cause of death in youth between the ages of 15 and 24 in the United States[1,2].

Currently, suicide is considered to progress along a continuum of distinct forms and severities that includes several concepts[3]. O'Carroll et al.[4] proposed a nomenclature for thoughts and behaviors that distinguishes between suicidal ideation, instrumental behavior, attempted suicide and completed suicide. In a subsequent review of this approach, Silverman et al.[5,6] conceptualized suicidal behavior taking into account various factors, such as the outcome of the behavior, the agency of the act, the degree of intent and consciousness or awareness of the outcomes of such behavior. This review also used the term self-harm to define potentially self-injurious behavior for which there is evidence, implicit or explicit, that the person did not intend to kill himself/herself. This definition is in agreement with what had already been described by Herpetz[7] and Borges et al.[8]

Even though a large number of terms, definitions and categories have been used over the years to describe self-injurious behavior, no consensus has been reached among researchers about how to operationalize this behavior[9–11]. For some authors[12–14], especially in Australia and in several European countries, self-harm is conceived as the act of intentionally self-poisoning or self-injuring, regardless of the reason or the severity of the suicide attempt. However, another conceptualization is currently used in the United States and Canada, in which a dichotomous distinction is made between acts of self-harm as a behavior without suicidal intent, characterized by self-inflicted damage to the surface of the body with the expectation of experiencing mild or moderate physical harm but without suicidal intent, and acts of attempted suicide[15].

Moreover, few studies have examined self-injurious behavior through a continuum that includes both direct behaviors (cutting or burning the skin, for example) and indirect behaviors (substance abuse, risky sexual behaviors or eating disorders)[16–18]. In indirect behaviors, the main motivation is secondary to causing pain or visible tissue damage, and the relationship between behavior and physical consequence is rarely as instantaneous and unequivocal as in direct behaviors[19,20].

Studies on the prevalence of self-injurious behavior in adolescents show that about 10% engage in such acts. Only about one in eight adolescents who self-harm present to the hospital, with medication overdose as the most common reason[21-23]. Studies of self-injurious behavior under the specific name of "non-suicidal self-injury" (NSSI) have observed a lifetime prevalence of 15% to 18% for adolescents in the general population[24] and of 40% to 80% in the psychiatric population[13,25]. With regard to this, the association between self-injurious behavior and eating disorders (ED) has been described on several occasions, usually in adults. For example, Favazza et al.[26] concluded that patients with ED are at high risk of self-harm due to the phenomenological similarities of both manifestations, such as the onset in adolescence or early adulthood, their greater occurrence in women and the experience of severe psychopathologies, such as impulsivity and dissociation. Between 25% and 38% of patients with ED engage in self-injurious behavior[27-29]. A review from Svirko et al.[30] found a prevalence of NSSI among people with ED of between 25% and 55%.

In their review on adolescents with ED, Peebles et al.[31] found that 40.8% of the evaluated patients reported self-injurious behavior. The prevalence of NSSI appears to be greater in patients with bulimia nervosa (26–55.2%) or purging type anorexia nervosa (27.8–68.1%) as compared to the restrictive type (13.6–42.1%)[9,30,32]. Evidence suggests that purging type behavior is associated with an increased risk of NSSI[31,33,34].

A prevalence of suicidal ideation has also been observed in adolescents with ED, at a high percentage (36.27%)[35]. More research has been carried out for adults in a general or clinical population than for the adolescent population on the association between suicidal ideation, self-injurious behavior and ED; nonetheless, this relationship is complex and has not yet been resolved[36,37]. Furthermore, the adult population with ED was observed to have a higher severity for this if they presented both self-injurious behaviors and suicidal ideation as compared to those who presented only one or neither of these traits. However, this association was not found for all of the main variants of ED, as it may also be mediated by other risk factors, such as personality[35,38].

In adolescents with ED, factors such as associated psychopathology[31,39,40], having experienced situations of sexual abuse[41,42] and substance use[30] have frequently been linked to self-injurious behavior.

Even though motivation for change and readiness to recover from ED have been associated with the severity of ED symptoms[43-45] as well as with engagement in self-injurious

behavior[46], further research on individuals who have both syndromes or manifestations is required. To date, findings show that ED patients who engage in self-injurious behavior show less internal motivation and increased external pressure for change (for example, from parents and relatives)[47,48].

The purpose of this study is: a) to determine, in a sample of adolescents with ED, the prevalence of suicidal ideation and self-injurious behavior; and b) to study the association between self-injurious behavior and suicidal ideation, severity of ED symptoms and symptoms of depression and anxiety, motivation for change and perfectionism.

METHOD

Design

A cross-sectional study was carried out for adolescents under treatment in an eating disorder unit (EDU) of a pediatric general hospital.

Study population

A total of 109 adolescents aged 12 to 17 years (mean: 14.74 years; SD: 1.53) were consecutively evaluated between January 2013 and December 2014. Of the population, 87.2% (n=95) were female and 12.8% (n=14) were male. Inclusion criteria for the study were age (adolescent), ED diagnosis based on the clinical judgment of a clinical psychologist or psychiatrist according to DSM-IV-TR criteria[49], engagement in self-injurious behavior during the therapeutic process and informed consent for study participation from the patient and his/her legal guardian. Exclusion criterion was diagnosis of ED and psychiatric disorder comorbidities (axis I or axis II, using DSM-IV-TR criteria). All patients and their families who were asked to participate voluntarily agreed to be part of the study. Of the total population, 65.1% of the patients (n=71) were monitored in a day hospital, and 34.9% (n=38), on an outpatient basis. Regarding diagnosis, 58.4% (n=66) of patients had anorexia nervosa (AN) [92.4% (n=61) restrictive type and 7.6% (n=5) binge/purging type], while 6.2% (n=7) of patients had bulimia nervosa (BN) [85.7% (n=6) purging type and 14.3% (n=1) non-purging type] and 31.9% (n=36) had eating disorder not otherwise specified (EDNOS).

All participants and their respective legal representatives agreed to participate in the study by written informed consent.

Procedure

Evaluations were carried out by two clinical psychologists specialized in assessment, diagnosis and treatment of ED in an eating disorder unit in a pediatric general hospital with more than 15 years of experience.

The assessment protocol was administered consecutively from January 2013 to December 2014 to patients who were already in treatment and to new cases from the study start date. The evaluation protocol was performed within the first four months of treatment after the first contact with the ED unit for 70.6% (n=77) of participants. The administration time for the protocol was between 60 and 90 minutes.

ED patients received multidisciplinary treatment: psychological (cognitive behavioral therapy), nutrition counseling by nurses, psychopharmacological (where appropriate) and family therapy (psychoeducational and multifamily group).

Instruments

Self-injurious behavior

Self-injurious behavior is defined in this study as the realization of self-inflicted physical harm, including drug overdose, if there was evidence that there was no intent to die[12-15]. Self-injurious behaviors carried out during the therapeutic process and evaluated in clinical interviews by a psychiatrist or clinical psychologist were taken into account. A history of self-injurious behavior was explored retrospectively by review of clinical history. Two groups were defined according to whether or not there was a presence of self-injurious behavior: a NSSI (non-suicidal self-injury) group and a non-NSSI (non non-suicidal self-injury) group.

Suicidal ideation

Item 9 of the Beck Depression Inventory-II (BDI-II) directly assesses suicidal thoughts. In it, the patient should report any thoughts or desires he or she has had about suicide in the past two weeks, using the following scale: 0. "I don't have any thoughts of killing myself"; 1. "I have thoughts of suicide, but I would not carry them out"; 2. "I would like to kill myself"; and 3. "I would kill myself if I had the chance". The patient was deemed to have suicidal ideation if he/she marked a response between 1 and 3. This item is commonly used to monitor changes in suicidal thoughts during treatment, due to its predictive ability to commit an attempted suicide[50]. For instance, a study on the predictive validity of BDI-II revealed that patients who answered 2 or 3 were 6.9 times more likely to commit suicide than patients with a lower score[51].

Psychopathology

Eating disorders were diagnosed according to an evaluation by a clinical psychologist or psychiatrist based on

a clinical interview with the patient and parents and on the criteria given by the DSM-IV-TR.

Clinical variables

For the study, data were collected in a notebook with variables that included age, sex, age at onset of the disorder, the presence of purging behavior and body mass index (BMI), among others.

EDI-2: The Eating Disorder Inventory-2 (EDI-2)[52]. Was used as a self-reporting instrument to assess symptoms that characterize anorexia nervosa and bulimia nervosa. It includes three scales to assess attitudes and behaviors related to food, weight and body image (drive for thinness, bulimia and body dissatisfaction) and eight further, more general scales regarding organizational constructs or psychological traits that are clinically relevant for ED (ineffectiveness, perfectionism, interpersonal distrust, interoceptive awareness, maturity fears, asceticism, impulsive regulation and insecurity). Each scale is scored continuously, such that the higher the score, the greater the manifestation of the evaluated trait. EDI-2 consists of 91 questions scored along a 6-point Likert scale from 0 to 5. Respondents should indicate whether the situation happens "never", "rarely", "sometimes", "often", "usually" or "always". Scores range from 0 to 273. The instrument has demonstrated an internal consistency (Cronbach's alpha) greater than 0.80 in ED patient samples and coefficients of 0.65–0.92 in non-clinical samples[53].

BDI-II: The Beck Depression Inventory-II (BDI-II)[54]. Is a self-report questionnaire consisting of 21 items that assess the severity and intensity of a broad spectrum of depressive symptoms. Each item has four response options, and the patient should select the response option that best reflects his/her situation at the present time as well as over the past two weeks. The higher the score, the greater the severity of the symptom assessed. Scores range from 0 to 63 points. An internal consistency (Cronbach's alpha) greater than 0.85 has been demonstrated for ED patients in studies on the Spanish population[55].

STAI: The State-Trait Anxiety Inventory (STAI)[56]. Is a self-report questionnaire consisting of two parts with 20 questions each. Responses are rated on a 4-point Likert scale depending on intensity (0=never/almost never, 1=sometimes, 2=often; 3=almost always). The first part (STAI-S) evaluates a transitory emotional state characterized by the subjective emotions of attention, apprehension and hyperactivity of the autonomic nervous system. The second part (STAI-T) indicates a relatively stable propensity for anxiety, which characterizes a tendency to perceive situations as threatening. The total score for each scale ranges from 0 to 30, with higher scores indicating higher levels of anxiety. Samples from the Spanish population have shown internal consistency levels ranging between 0.84 and 0.93, for both the total score and each of the subscales[57].

CAPS: The Child and Adolescent Perfectionism Scale (CAPS)[58]. Questionnaire consists of 22 items that are answered on a 5-point Likert scale, with 1 corresponding to "true" and 5 to "false". It consists of two scales: the self-oriented perfectionism scale, which refers to unrealistic self-expectations and consists of 12 items that are scored from 1 to 60; and the socially prescribed perfectionism scale, which refers to the pressure receiving by the person from others to achieve unrealistic goals and consists of 10 items that are scored from 1 to 50. Higher scores indicate higher levels of perfectionism. In the Spanish adaptation of Castro et al.[59], the Cronbach's alpha coefficients for these scales were 0.88 and 0.87, respectively.

Motivation for change

ANSOCQ: The Anorexia Nervosa Stages of Change Questionnaire (ANSOCQ)[60,61]. Is a self-report questionnaire comprising 20 items to assess the readiness to recover from disease in individuals with anorexia nervosa. Its items evaluate aspects about weight and body shape, eating behavior, methods of weight control and emotional and relationship problems. The structure of the questionnaire is based on the stages of change model developed by Prochaska and DiClemente[62]. For each item, respondents must choose from five possible answers, which reflect the stages of motivation for change: pre-contemplation, contemplation, preparation, action and maintenance. Scores range from 0 to 80, with higher total scores in the ANSOCQ reflecting greater motivation for change. The Spanish adaptation of Serrano et al.[63] for adolescents has a good internal consistency, with a Cronbach's alpha of 0.94, and a weekly test-retest reliability of 0.94.

Statistical analysis

Analyses were performed using SPSS v.22. contingency tables and Pearson´s chi-square (χ^2) test for the description of prevalence and association between nominal variables. Differences in quantitative variables between the NNSI group and the non-NSSI group were analyzed with the nonparametric statistical Mann-Whitney U-test.

RESULTS

Prevalence of suicidal ideation and self-injurious behavior

Of the 109 patients, 43.1% (n=47) reported suicidal ideation; among these, 34.9% (n=38) replied "I have

thoughts of suicide, but I would not carry them out"; 4.6% (n=5), "I would like to kill myself" and 3.7% (n=4), "I would kill myself if I had the chance." The remaining 56.9% (n=62) patients reported no suicidal ideation at the time of the evaluation.

Moreover, 31.2% (n=34) of the patients engaged in self-injurious behavior during the therapeutic process, as opposed to 68.8% (n=75) who did not. Of the patients who had a recorded history of self-injurious behavior (n=34), 55.9% (n=19) reported suicidal ideation at the time of the evaluation.

Self-injurious behavior and sociodemographic and clinical characteristics

No significant associations were found between engaging in self-injurious behavior and patient age (U=1206.5; p=0.648), sex (χ^2=0.051; p=0.821), age of onset of disease (U=1254.00; p=0.889), BMI (U=1164.50; p=0.626), an ED diagnosis (χ^2 =0.475; p=0.789) or the presence of purging behavior (χ^2=0.152; p=0.696). In addition, results revealed that experiencing suicidal ideation and engaging in self-injurious behavior were independent variables and therefore not associated (χ^2=3.282; p=0.07) (Table 1).

Meanwhile, and as shown in Table 2, the NSSI group of ED patients had significantly higher scores as compared to the non-NSSI ED group (without self-injurious behavior) on the total score on the BDI-II (p<0.001), the STAI-S (p<0.001) and the STAI-T (p<0.001), and on all EDI-2 scales [drive for thinness (p<0.01), bulimia (p<0.01), body dissatisfaction (p<0.001), ineffectiveness (p<0.001), perfectionism (p=0.001), interpersonal distrust (p=0.001), interoceptive awareness (p<0.001), asceticism (p<0.001), impulsivity (p<0.001) and insecurity (p<0.001), except for maturity fears (p=0.055), for which no significant differences were observed between groups with or without self-injurious behavior]. Self-injurious patients (NSSI) also scored significantly higher compared to patients without self-harm on the CAPS total score (p<0.05). Finally, a significant association was found between self-injurious behavior and motivation for change (p<0.01). Of the patients who performed self-injurious behavior, the distribution of the stages of change according to ANSOCQ was as follows: 32.35% (n=11) were in pre-contemplation; 32.35% (n=11), in contemplation; 5.88% (n=2), in preparation; and 2.94% (n=1), in action.

Table 1 Percentages, means and standard deviations for each study group

	NSSI group (n=34) Mean (SD)	non-NSSI group (n=75) Mean (SD)	p-value
Age	14.62 (1.51)	14.80 (1.54)	0.648[1]
Male n (%) Female n (%)	4 (11.8) 30 (88.2)	10 (13.3) 65 (86.7)	0.821[2]
Age at disease onset	13.53 (1.48)	13.61 (1.47)	0.889[1]
BMI	17.94 (1.47)	18.42 (2.89)	0.626[1]
AN n (%) BN n (%) EDNOS (%)	20 (58.8) 3 (8.8) 11 (32.4)	46 (61.3) 4 (5.3) 25 (33.3)	0.789[2]
Purging behavior Yes n (%) No n (%)	 4 (11.8) 30 (88.2)	 7 (9.3) 68 (90.7)	0.696[2]
Suicidal ideation Yes n (%) No n (%)	 19 (55.9) 15 (44.1)	 28 (37.3) 47 (62.7)	0.070[2]

NSSI: non-suicidal self-injury; SD: standard deviation; BMI: body mass index; AN: anorexia nervosa; BN: bulimia nervosa; EDNOS: eating disorder not otherwise specified.
[1]Mann-Whitney U test; [2]chi-squared

CONCLUSIONS

The objectives of this study were to determine the prevalence of suicidal ideation and self-injurious behavior in ED adolescents and to study the association between self-injurious behaviors and suicidal ideation, severity of ED symptoms and symptoms of depression and anxiety, perfectionism and motivation for change.

Our results show that about half of the sample of ED adolescents who were assessed presented suicidal ideation at the time of the evaluation and that more than a third performed self-injurious behaviors during the therapeutic process. The findings show that the presence of suicidal ideation is not related to engaging in self-injurious behavior. Moreover, self-injurious behavior is not associated with age, sex, BMI, age of onset of the disease, any ED subtype (anorexia nervosa, bulimia nervosa or EDNOS) or the presence of purging behavior. In the clinical and psychopathological profile, patients who engage in self-injurious behaviors present more severe ED, depression and anxiety symptoms, perfectionism and less motivation to change.

The results of our study on the prevalence of suicidal ideation and self-injurious behaviors are consistent with current reports in the literature[9,32,34]. Our finding that suicidal ideation and self-injurious behavior are not associated may be consistent with the postulated explanatory

Table 2 Means, standard deviations and comparison of scales for each study group

	NSSI Group (n=34) Mean (SD)	non-NSSI Group (n=75) Mean (SD)	Mann-Whitney U-test	p-value
BDI-II	27.32 (10..92)	17.55 (11.43)	693.00	<0.001
STAI				
STAI-S	39.39 (10.24)	27.48 (14.22)	613.00	<0.001
STAI-T	44.50 (9.39)	29.79 (13.53)	480.00	<0.001
EDI-2				
Drive for thinness	13.76 (6.88)	9.19 (7.78)	826.00	<0.01
Bulimia	3.00 (3.82)	1.22 (2.00)	841.50	<0.01
Body dissatisfaction	17.76 (7.32)	10.88 (8.69)	681.50	<0.001
Ineffectiveness	15.00 (7.60)	7.34 (6.26)	546.00	<0.001
Perfectionism	6.91 (3.69)	4.51 (4.24)	779.50	0.001
Interpersonal distrust	8.29 (5.43)	4.69 (4.47)	755.00	0.001
Interoceptive awareness	14.71 (7.20)	6.57 (4.80)	467.00	<0.001
Maturity fears	10.88 (6.12)	8.43 (4.84)	969.00	0.055
Asceticism	9.41 (4.57)	5.50 (4.45)	627.00	<0.001
Impulsive regulation	9.03 (5.29)	4.73 (4.79)	675.50	<0.001
Insecurity	11.41 (5.21)	5.16 (4.34)	445.50	<0.001
CAPS				
Self-oriented	42.62 (10.24)	39.47 (10.67)	1002.50	0.075
Socially prescribed	26.15 (7.90)	24.11 (7.79)	1078.00	0.190
Total	70.29 (11.89)	63.55 (15.86)	945.50	<0.05
ANSOCQ	22.32 (16.03)	36.56 (22.15)	498.50	<0.01

NSSI: non-suicidal self-injury; SD: standard deviation; BDI-II: Beck Depression Inventory-II; STAI: State-Trait Anxiety Inventory; EDI-2: Eating Disorder Inventory-2; CAPS: Child and Adolescent Perfectionism Scale; ANSOCQ: Anorexia Nervosa Stages of Change Questionnaire.

models that describe self-harm as a functionality of an emotion regulation strategy. The model of Nock and Prinstein[25], for example, specifies four main functions of NSSI behavior: automatic negative reinforcement (to stop unpleasant emotions), automatic positive reinforcement (to create an emotion that replaces numbness or dissociation), social negative reinforcement (to avoid an unwanted situation) and social positive reinforcement (as a way to ask others for help).

Our finding that self-injurious behavior is not associated with suicidal ideation or with any specific ED subtype differs from previous findings that have described a relationship between engaging in self-injurious behaviors and suicidal ideation, ED subtypes (with more association with purging type anorexia nervosa and bulimia nervosa) and purging behavior in general[30,64,65]. This discrepancy could be explained by the low number of diagnosed cases of purging type anorexia nervosa and bulimia nervosa in our sample.

Nonetheless, our results revealing a relationship between self-injurious behaviors and depressive symptoms and perfectionism corroborate investigations showing that self-injurious behaviors share certain risk factors with ED[66-

[68]. Further, these are in line with explanatory models of the etiology of self-injurious behaviors in which perfectionism and impulsivity stand out as central concepts[69,70].

The association we observed between self-injurious behavior and motivation for change/readiness for recovery from ED has clinical implications and is in line with previous investigations[48]. Therefore, taking this factor into consideration may be useful in the therapeutic approach, such as by intervening to enhance the patient's abilities, and it may provide a basis for exploring readiness for recovery and for resolving the usual ambivalence to the process of change[71].

One could infer from our findings that suicidal ideation and the ED-typical manifestations, such as purging or restrictive behaviors, do not have a direct relationship with engaging in self-injurious behaviors in ED adolescents, as what may discriminate between whether or not they are carried out are the intensity of negative affectivity (manifested as depression or anxiety symptoms, for example), distorted beliefs about oneself and one's physical image (body dissatisfaction, insecurity or ineffectiveness) and psychological traits such as perfectionism and impulsivity. These risk factors participate, along with the low readiness for recovery, in an interaction that increases the intensity of negative affectivity and beliefs. As explained by the emotional cascade model of Selby and Joiner[72], this in turn leads to strategies of extreme coping (such as self-harm through purging or restrictive behavior, for example), as moderate strategies would not be effective enough to regulate the intense negative emotions experienced[19].

Thus, in agreement with previous investigations[73,74], the importance of emotional dysregulation as an established risk factor for developing an ED and engaging in self-injurious behavior should not be overlooked, as it increases the risk when associated with negative attitudes about one's own body[75] and with depressive symptoms[68].

Several limitations of this study should be noted, such as the low sample size and the low prevalence of patients diagnosed with bulimia nervosa. An additional limitation could come from the fact that risk factors such as drug use, history of sexual abuse or other traumatic experiences of emotional neglect were not included in the analysis; whereas, these have been associated with engagement in self-injurious behaviors in people with ED in previous investigations[76]. Furthermore, our assessment of self-injurious behaviors was retrospective and did not coincide with the evaluation of suicidal ideation, which could explain, at least in part, a lack of relationship between self-injurious behaviors and suicidal ideation. Moreover, for some cases, clinical symptoms were not evaluated prior to treatment in the ED unit but rather during treatment, such that the scores for clinical variables could have been influenced by the treatment effect. It should also be noted that, as this was a cross-sectional study, the relationships analyzed do not prove causality.

Despite the aforementioned limitations, we can conclude from our study that there is a high prevalence of suicidal ideation and self-injurious behaviors in the population of ED adolescents treated in a specialized unit. These behaviors are associated with a psychopathological profile characterized by increased severity of symptoms of ED behavior, negative affectivity, perfectionism and low motivation for change. The presence of suicidal ideation in ED adolescents does not necessarily imply self-injurious behavior; rather, this behavior could be explained as a result of the need to regulate intense negative emotions, which would enhance the existing negative attitudes towards one's body.

Lastly, our study findings may have implications for future research. Self-injurious behaviors are not usually considered in routine psychopathological examinations; however, they should be regularly assessed in ED patients with a twofold aim: for early detection (as it is a potent risk factor for completed suicide)[36,77] and for conceptualizing functionality (as it is a strategy for coping or emotional regulation)[72-74]. Therefore, understanding the seriousness and complexity of cases of persons with ED who present self-harm has implications for diagnosis as well as for the therapeutic process and its outcome.

CONFLICT OF INTEREST

The authors have no conflict of interest to declare.

REFERENCES

1. Bridge JA, Goldstein TR, Brent DA. Adolescent suicide and suicidal behavior. J Child Psychol Psychiatry. 2006;47:372-394.
2. Nock MK, Greif Green J, Irving Hwang MA, McLaughlin KA, Sampson NA, Zaslavsky AM, et al. Prevalence, correlates, and treatment of lifetime suicidal behavior among adolescents: results from the National Comorbidity Survey Replication Adolescent Supplement. JAMA psychiatry. 2013;70(3):300-10.
3. Grupo de trabajo de la Guía de Práctica Clínica de Prevención y Tratamiento de la Conducta Suicida. Guía de Práctica Clínica de Prevención y Tratamiento de la Conducta Suicida. Plan de Calidad para el Sistema Nacional de Salud del Ministerio de Sanidad, Política Social e Igualdad. Agencia de Evaluación de Tecnologías Sanitarias de Galicia (avalia-t); 2012. Available in: http://www.guiasalud.es/GPC/GPC_481_Conducta_Suicida_Avaliat_compl.pdf
4. O'Carroll PW, Berman AL, Maris RW, Moscicki EK, Tanney BL, Silverman MM. Beyond the Tower of Babel: a nomenclature for suicidology. Suicide Life Threat Behav. 1996;26(3):237-52.
5. Silverman MM, Berman AL, Sanddal ND, O'Carroll PW, Joiner TE.

Rebuilding the Tower of Babel: A Revised Nomenclature for the Study of Suicide and Suicidal Behaviors. Part 1: Background, Rationale, and Methodology. Suicide Life Threat Behav. 2007; 37(3):248-63.
6. Silverman MM, Berman AL, Sanddal ND, O'Carroll PW, Joiner TE. Rebuilding the Tower of Babel: A Revised Nomenclature for the Study of Suicide and Suicidal Behaviors. Part 2: Suicide-related ideations, Communications, and Behaviors. Suicide Life Threat Behav. 2007;37(3):264-77.
7. Herpetz S. Self-injurious behavior: Psychopathological and nosological characteristics in subtypes of self-injurers. Acta Psychiatr. Scand. 1995;91:57-68.
8. Borges G, Anthony JC, Garrison CZ. Methodological issues relevant to epidemiologic investigations of suicidal behaviors of adolescents. Epidemiol Rev. 1995;17(1):228-39.
9. Claes L, Vandereycken W, Vertommen H. Self-injurious behaviors in eating-disordered patients. Eat Behav. 2001;2(3):263-72.
10. Favaro A, Santonastaso P. Self-injurious behavior in anorexia nervosa. J Nerv Ment Dis. 2000;188(8):537-42.
11. Welch SL, Fairburn CG. Childhood sexual and physical abuse as risk factors for the development of bulimia nervosa: a community-based case control study. Child Abuse Negl. 1996; 20(7):633-42.
12. Hawton K, Hall S, Simkin S, Bale E, Bond A, Codd S, et al. Deliberate self-harm in adolescents: A study of characteristics and trends in Oxforder, 1990-2000. J Child Psychol Psychiatry. 2003;44:1191-8.
13. Muehlenkamp JJ, Claes L, Havertape L, Plener PL. International prevalence of adolescent non-suicidal self-injury and deliberate self-harm. Child Adolesc Psychiatry Ment Health. 2012;6(1):10.
14. National Collaborating Centre for Mental Health. Self-harm: longer term management. NICE clinical guideline 133. London: National Institute for Clinical Excellence; 2011. Available in: https://www.nice.org.uk/guidance/cg133/resources/selfharm-in-over-8s-longterm-management-35109508689349
15. American Psychiatric Association. Diagnostic and statistical manual of mental disorders: DSM-5 (5th ed.). Arlington, VA: American Psychiatric Publishing; 2013.
16. St. Germain SA, Hooley JM. Aberrant pain perception in direct and indirect non-suicidal self-injury: An empirical test of Joiner's interpersonal theory. Compr Psychiatry. 2013;54(6):694-701.
17. Osuch EA, Noll JG, Putnam FW. The motivations for self-injury in psychiatric inpatients. Psychiatry Interpers Biol Process. 1999;62(4):334-46.
18. Patton GC, Harris R, Carlin JB, Hibbert ME, Coffey C, Schwartz M., et al. Adolescent suicidal behaviors: A population-based study of risk. Psychol Med. 1997;27:715-24.
19. Claes L, Muehlenkamp JJ. Non-Suicidal Self-Injury in Eating Disorders: Advancements in Etiology and Treatment. New York: Springer; 2014. Available in: http://www.springer.com/us/book/9783642401060
20. Claes L, Vandereycken W. Self-injurious behavior: differential diagnosis and functional differentiation. Compr Psychiatry. 2007;48(2):137-44.
21. Hawton K, Rodham K, Evans E, Weatherall R. Deliberate self-harm in adolescents: self-report survey in schools in England. BMJ. 2002;325(7374):1207-11.
22. Hawton K, Saunders K, O'Connor RC. Self-harm and suicide in adolescents. Lancet. 2012;379(9834):2373-82.
23. Madge N, Hewitt A, Hawton K, Wilde EJ, Corcoran P, Fekete S, et al. Deliberate self-harm within an international community sample of young people: Comparative findings from the Child & Adolescent Self-harm in Europe (CASE) Study. J Child Psychol Psychiatry Allied Discip. 2008;49(6):667-77.
24. Nixon MK, Cloutier P, Jansson SM. Non suicidal self-harm in youth: A population-based survey. Cmaj. 2008;178(3):306-12.
25. Nock M, Prinstein M. A functional approach to the assessment of self-mutilative behavior. J Consult Clin Psychol. 2004;72(5):885-90.
26. Favazza AR, DeRosear L, Conterio K. Self-mutilation and eating disorders. Suicide Life Threat Behav. 1989;19(4):352-61.
27. Claes L, Vandereycken W, Vertommen H. Personality traits in eating-disordered patients with and without self-injurious behaviors. J Pers Disord. 2004;18:399-404.
28. Sansone RA, Sansone LA. Self-harm behavior and eating disorders. En P. I., Swain, ed. Eating disorders: New research. New York: Nova Publications; 2005. p. 1-17.
29. Unikel C, Von Holle A, Bulik CM, Ocampo R. Disordered eating and suicidal intent: The role of thin ideal internalisation, shame and family criticism. Eur Eat Disord Rev. 2012;20(1):39-48.
30. Svirko E, Hawton K. Self-injurious behavior and eating disorders: the extent and nature of the association. Suicide Life Threat Behav. 2007;37(4):409-21.
31. Peebles R, Wilson JL, Lock JD. Self-Injury in Adolescents With Eating Disorders: Correlates and Provider Bias. J Adolesc Heal. 2011;48(3):310-3.
32. Claes L, Vandereycken W, Vertommen H. Eating-disordered patients with and without self-injurious behaviours: A comparison of psychopathological features. Eur Eat Disord Rev. 2003;11(5):379-96.
33. Favaro A, Santonastaso P. Purging behaviors, suicide attempts, and psychiatric symptoms in 398 eating disordered subjects. Int J Eat Disord. 1996;20(1):99-103.
34. Ruuska J, Kaltiala-Heino R, Rantanen P, Koivisto AM. Psychopathological distress predicts suicidal ideation and self-harm in adolescent eating disorder outpatients. Eur Child Adolesc Psychiatry. 2005;14(5):276-81.
35. Miotto P, Preti A. Eating disorders and suicide ideation: the mediating role of depression and aggressiveness. Compr Psychiatry. 2007;48(3):218-24.
36. Paul E, Tsypes A, Eidlitz L, Ernhout C, Whitlock J. Frequency and functions of non-suicidal self-injury: Associations with suicidal thoughts and behaviors. Psychiatry Res. 2015;225(3):276-82.
37. Victor SE, Styer D, Washburn JJ. Characteristics of non-suicidal self-injury associated with suicidal ideation: evidence from a clinical sample of youth. Child Adolesc Psychiatry Ment Health. 2015;9(1):20.
38. Eichen DM, Kass AE, Fitzsimmons-Craft EE, Gibbs E, Trockel M, Barr Taylor C, et al. Non-suicidal self-injury and suicidal ideation in relation to eating and general psychopathology among college-age women. Psychiatry Res. 2015;235:77-82.
39. Bühren K, Schwarte R, Fluck F, Timmesfeld N, Krei M, Egberts K, et al. Comorbid psychiatric disorders in female adolescents with first-onset anorexia nervosa. Eur Eat Disord Rev. 2014;22(1):39-44.
40. Ross S, Heath NL, Toste JR. Non-suicidal self-injury and eating

pathology in high school students. Am J Orthopsychiatry. 2009;79(1):83-92.
41. Fennig S, Hadas A. Suicidal behavior and depression in adolescents with eating disorders. Nord J Psychiatry. 2010;64(1):32-9.
42. Mayes SD, Fernandez-Mendoza J, Baweja R, Calhoun S, Mahr F, Aggarwal R, et al. Correlates of suicide ideation and attempts in children and adolescents with eating disorders. Eat Disord. 2014;22(4):352-66.
43. Ålgars M, Ramberg C, Moszny J, Hagman J, Rintala H, Santtila P. Readiness and motivation for change among young women with broadly defined eating disorders. Eat Disord. 2015;23(3):242-52.
44. Ametller L, Castro J, Serrano E, Martínez E, Toro J. Readiness to recover in adolescent anorexia nervosa: Prediction of hospital admission. J Child Psychol Psychiatry Allied Discip. 2005; 46(4):394-400.
45. Bustin LA, Lane-Loney S, Hollenbeak CS, Ornstein RM. Motivational stage of change in young patients undergoing day treatment for eating disorders. Int J Adolesc Med Health. 2013;25(2):151-6.
46. Kress VE, Hoffman RM. non-suicidal self-injury and motivational interviewing enhancing readiness for change. J Ment Heal Couns. 2008;30(4):311–29.
47. Fernández-Aranda F, Jimenez-Murcia S, Sánchez I, Islam MA, Menchon JM. Males with Non-suicidal Self-Injury and Eating Disorder: A Unique Approach. In: Claes L, Muehlenkamp JJ, ed. Non-Suicidal Self-Injury in Eating Disorders Advancements in Etiology and Treatment; 2014. p. 341–51.
48. Vansteenkiste M, Claes L, Soenens B, Verstuyf J. Motivational dynamics among eating-disordered patients with and without non-suicidal self-injury: A self-determination theory approach. Eur Eat Disord Rev. 2013;21(3):209-14.
49. American Psychiatric Association. Diagnostic and statistical manual of mental disorders (4th ed., text rev.). Washington, DC: Author; 2000.
50. Whisman MA. Adapting Cognitive Therapy for Depression: Managing Complexity and Comorbidity. New York: Guilford Press; 2008.
51. Brown GK, Beck AT, Steer RA, Grisham JR. Risk factors for suicide in psychiatric outpatients: A 20-year prospective study. J Consult Clin Psychol. 2000;68:371-7.
52. Garner DM. Inventario de trastornos de la conducta alimentaria 2. Madrid: Tea Ediciones, SA; 1998.
53. Corral S, González M, Pereña J, Seisdedos N. Adaptación española del Inventario de trastornos de la conducta alimentaria. In: Garner DM, ed. EDI-2: Inventario de Trastornos de la Conducta Alimentaria. Manual. Madrid: TEA; 1998. p. 69-80.
54. Beck AT, Steer RA, Brown GK. BDI-II. Beck Depression Inventory Second Edition. Manual. San Antonio, TX: The Psychological Corporation; 1996.
55. Sanz J, García-Vera MP. The Beck Depression Inventory-second edition (BDI-II): factor congruence and generalizability of its indexes of internal consistency. En Řehulka E, ed. School and health 21. General issues in health education. Brno: MSD; 2009. p. 331-42.
56. Spielberger CD, Gorsuch R, Lushene R. Manual for the State Trait Anxiety Inventory. Palo Alto, California: Consulting Psychologist Press;1970.
57. Buela-Casal G, Guillén-Riquelme A, Seisdedos Cubero N. Cuestionario de ansiedad estado-rasgo. 8ª ed. Madrid: TEA Ediciones; 2011.
58. Flett GL, Hewitt PL, Boucher DJ, Davidson LA, Munro Y. The Child-Adolescent Perfectionism Scale: Development, validation, and association with adjustment. Department of Psychology Reports (Nº 203). Toronto, Canadá: York University; 1992.
59. Castro J, Gila A, Gual P, Lahortiga F, Saura B, Toro J. Perfectionism Dimensions in Children and Adolescents with Anorexia Nervosa. J Adolesc Heal. 2004;35:382-98.
60. Rieger E, Touyz S, Beumont P. The Anorexia Nervosa Stages of Change Questionnaire (ANSOCQ): Information regarding its psychometric properties. Int J Eat Disord. 2002;32:24-38.
61. Rieger E, Touyz S, Schotte D, Beumont P, Russell J, Clarke S, Kohn M, Griffiths R. Development of an instrument to assess readiness to recover in anorexia nervosa. Int J Eat Disord. 2000;28:387-96.
62. Prochaska JO, DiClemente CC. Transtheoretical therapy: Toward a more integrative model of change. Psychother Theory, Res Pract. 1982;19:276-88.
63. Serrano E, Castro J, Ametller L, Martínez E, Toro J. Validity of a measure of readiness to recover in Spanish adolescent patients with anorexia nervosa. Psychol Psychother. 2004;77(Pt 1):91-9.
64. Favaro A, Santonastaso P, Monteleone P, Bellodi L, Mauro M, Rotondo A, et al. Self-injurious behavior and attempted suicide in purging bulimia nervosa: Associations with psychiatric comorbidity. J Affect Disord. 2008;105(1-3):285-9.
65. Miotto P, Preti A. Eating disorders and suicide ideation: the mediating role of depression and aggressiveness. Compr Psychiatry. 2007;48(3):218-24.
66. Bardone-Cone AM, Wonderlich S a., Frost RO, Bulik CM, Mitchell JE, Uppala S, et al. Perfectionism and eating disorders: Current status and future directions. Clin Psychol Rev. 2007;27(3):384-405.
67. Holm-Denoma JM, Gordon KH, Bardone-Cone AM, Vohs KD, Abramson LY, Heatherton TF, et al. A test of an interactive model of bulimic symptomatology in adult women. Behav Ther. 2005;36(4):311-21.
68. Muehlenkamp JJ, Peat CM, Claes L, Smits D. Self-injury and disordered eating: expressing emotion dysregulation through the body. Suicide Life Threat Behav. 2012;42(4):416-25.
69. Chapman AL, Gratz KL, Brown MZ. Solving the puzzle of deliberate self-harm: The experiential avoidance model. Behav Res Ther. 2006;44(3):371-94.
70. Heatherton TF, Baumeister RF. Binge eating as escape from self-awareness. Psychol Bull. 1991;110(1):86–108.
71. Miller WR, Rollnick S. Motivational interviewing: Preparing people to change addictive behavior. New York: Guilford Press; 1991.
72. Selby EA, Joiner TE. Cascades of emotion: The emergence of borderline personality disorder from emotional and behavioral dysregulation. Rev Gen Psychol. 2009;13:219-29.
73. Burns EE, Fischer S, Jackson JL, Harding HG. (2012). Deficits in emotion regulation mediate the relationship between childhood abuse and later eating disorder symptoms. Child Abuse and Neglect. 2012;36:32-9.
74. Lavender JM, Anderson DA. Contribution of emotion regulation difficulties to disordered eating and body dissatisfaction in

college men. Int J Eat Disord. 2010;43:352-7.
75. Anderson CB, Carter FA, McIntosh VV, Joyce PR, Bulik CM. Self-harm and suicide attempts in individuals with bulimia nervosa. Eat Disord. 2002;10(3):227-43.
76. Dohm F-A, Striegel-Moore RH, Wilfley DE, Pike KM, Hook J, Fairburn CG. Self-harm and substance use in a community sample of Black and White women with binge eating disorder or bulimia nervosa. Int J Eat Disord. 2002;32(4):389-400.
77. Victor SE, Klonsky ED. Correlates of suicide attempts among self-injurers: A meta-analysis. Clin Psychol Rev. 2014;34(4):282-97.