Non-suicidal Self-injuries and Suicide Risk in Adolescent Girls with Eating Disorders: Associations with Weight Control, Body Mass Index, and Interpersonal Sensitivity

Несуицидальные самоповреждения и суицидальный риск у девочек-подростков с расстройствами пищевого поведения: связи с контролем веса, индексом массы тела и межличностной чувствительностью

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Original research

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ABSTRACT

BACKGROUND: Eating disorders (EDs) are associated with a risk of premature death, as well as suicidal and self-injurious behavior. A low or high body mass index (BMI) and weight control behavior can also have an impact on self-injurious and suicidal behavior. While some studies show that interpersonal sensitivity is a risk factor for EDs, affective disorders, and self-injurious behavior, in-depth studies of these issues have not been done.

AIM: The present study investigates how self-injurious and suicidal behavior relate to weight control behavior, BMI, and interpersonal sensitivity in adolescent girls from a clinical population with diagnosed EDs compared with adolescent girls from the general population.

METHODS: The main group was comprised of 31 girls with a diagnosis of ED (as the main diagnosis or co-occurring with affective disorders, M=15±1.13 years), being treated in in the Eating Disorder Clinic of the Scientific and Practical Center for Mental Health of Children and Adolescents named after G.E. Sukhareva. The comparison group consisted of 27 adolescent girls recruited from Proton Educational Center (M=15.51±1.09 years). The measures included a qualitative

survey that yielded data on weight control behavior, and self-injurious behavior, a Blitz questionnaire probing the suicide risk (used only in the main group), and the Interpersonal Sensitivity Measure. Height and weight data were also recorded for BMI calculation.

RESULTS: The qualitative analysis of weight control behavior yielded the following results: purging behavior, restrictive behavior, and corrective behavior. Participants in the main group used purging and restrictive behavior more often, whereas participants in the comparison group used strategies associated with a healthy lifestyle. The main group and participants who practiced purging and restrictive weight control in the overall sample had the smallest BMI. Self-injurious behavior was approximately evenly distributed both amongst the main and comparison groups. Self-cutting was the most prevalent type of self-injury. In the main group, self-injury was associated with a smaller BMI, while in the comparison group it was associated with an increase in the fear of rejection and overall interpersonal sensitivity. Based on the assessment of the suicide risk, six participants in the main group were deemed high-risk; they also displayed increased fear of rejection, dependence on the assessments of others, and overall interpersonal sensitivity. All girls in the suicide risk subgroup had non-suicidal self-injuries.

CONCLUSION: The results of our study broaden our understanding of the risk factors of suicidal and self-injurious behavior in adolescent girls with EDs and reveal the characteristics of the type of weight control behavior used by this group in comparison with adolescent girls in the general population. Girls with EDs who were considered at the risk of committing suicide demonstrated high interpersonal sensitivity, which provides a rationale for further studying the general interpersonal mechanisms that underlie the pathogenesis of EDs, as well as that of self-injurious and suicidal behavior.

АННОТАЦИЯ

ВВЕДЕНИЕ: Расстройства пищевого поведения (РПП) связаны с риском преждевременной смерти, суицидальным и самоповреждающим поведением. Слишком низкий или высокий индекс массы тела (ИМТ) и способы контроля веса также могут вносить вклад в самоповреждающее и суицидальное поведение. В отдельных исследованиях было выявлено, что фактором риска для РПП и самоповреждающего поведения может также быть такой показатель, как межличностная чувствительность, однако комплексного исследования этих проблем еще не проводилось.

ЦЕЛЬ: Исследовать связи самоповреждающего и суицидального поведения со способами контроля веса, ИМТ и межличностной чувствительностью у девочек-подростков клинической выборки с диагнозом РПП и в популяции.

МЕТОДЫ: В основную группу вошли девочки-подростки с РПП (как основным диагнозом или сопутствующим в случаях сочетания с аффективными расстройствами, M=15±1.13), проходящие лечение на базе Клиники расстройств пищевого поведения ГБУЗ «Научно-практический центр психического здоровья детей и подростков им. Г.Е. Сухаревой ДЗМ» (N=31). Группу сравнения составили девочки-подростки (N=27) из образовательного центра «Протон» (M=15.51±1.09). Использовалась анкета, направленная на сбор качественных данных о проявлениях контроля за весом и самоповреждающем поведении, блиц-опросник суицидального риска (только в клинической выборке) и опросник межличностной чувствительности. На основе данных о росте и весе высчитывался ИМТ.

РЕЗУЛЬТАТЫ: Качественный анализ позволил выделить темы, связанные с контролем веса: очистительное, ограничительное и корректирующее поведение. В основной группе чаще использовались очистительные и ограничительные стратегии контроля веса, а в группе сравнения — корректирующие стратегии, связанные с поддержанием здорового образа жизни. Наиболее низкий ИМТ (дефицит массы тела) оказался в клинической выборке и у девочек с ограничительным и очистительным поведением в совокупной выборке.

Самоповреждающее поведение примерно в равном соотношении оказалось распространено как в основной группе, так и в группе сравнения. Наиболее распространенный метод самоповреждения — порезы. В основной группе самоповреждающее поведение было связано с меньшим ИМТ, а в группе сравнения — с повышением страха отвержения и общим показателем межличностной чувствительности.
Суицидальный риск был выявлен у 6 девочек из основной группы и оказался связан со страхом отвержения, зависимостью от оценок окружающих и общим показателем межличностной чувствительности. Все девочки из подгруппы суицидального риска указали и на несуицидальные самоповреждения.

ЗАКЛЮЧЕНИЕ: Результаты исследования позволяют расширить представления о факторах риска суицидального и самоповреждающего поведения у девочек с РПП и о способах контроля веса, предпринимаемых ими, по сравнению с девочками из общей популяции. Высокая межличностная чувствительность, выявленная у девочек-подростков из подгруппы суицидального риска, свидетельствует о важности изучения межличностных механизмов, лежащих в основе суицидального и самоповреждающего поведения.

Keywords: *adolescent girls; eating disorders; body mass index; suicide risk; non-suicidal self-injuries; interpersonal sensitivity; fear of rejection*
Ключевые слова: *девочки-подростки; расстройства пищевого поведения; индекс массы тела; суицидальный риск; несуицидальные самоповреждения; межличностная чувствительность; страх отвержения*

INTRODUCTION

Eating disorders (EDs) cause serious health issues and affect a significant part of the population, especially young women [1]. This issue is rather relevant due to its high mortality rate, the predominance of adolescent girls among those diagnosed with EDs, and its negative impact on mental health and fertility in adulthood. Up to 44% of adolescent girls exhibit subclinical forms of EDs [2], and up to 2.58% of women and 1.89% of men in Western countries are diagnosed with ED [3], primarily anorexia nervosa (0.1–2%) and bulimia nervosa (0.37–2.98%) [4]. According to the latest data, 5.5% to 17.9% of girls and 0.6% to 2.4% of boys would develop EDs by the time they mature [5].

Mortality rates amongst people suffering from EDs are 5–7 times higher than the predicted rate in corresponding age-sex cohorts [6], especially among individuals with anorexia nervosa [7]. Up to 24.9% of patients with anorexia nervosa and 31.4% of patients with bulimia nervosa have attempted suicide [8]. Extreme methods of weight control (taking diet pills, inducing vomiting, taking laxatives and diuretics), even in the absence of diagnosed EDs, are a predictor of suicidal thoughts and suicide attempts among women [9].

An equally serious problem that potentially reduces the life expectancy of people with EDs is intentional, non-suicidal actions aimed at damaging their own body [10]. Non-suicidal self-injury is also associated with an increased risk of suicidal behavior and death from suicide in adolescence and early adulthood [11, 12]. Self-injurious behavior is widespread among patients with EDs: 40.8% of adolescents diagnosed with EDs have harmed themselves at least once [13]. According to some data, self-injurious behavior can also be an indicator of a more complex ED [14], predicting more severe ED manifestations in the future [15]. Among patients with EDs and concomitant self-injurious behavior, a significant majority are diagnosed with bulimia nervosa, have had an ED for a longer time, display symptoms of binge eating, purging behavior, co-occurring affective disorders, and they are often substance abusers or victims of violence [13]. It is reported that 78% of those who have engaged in non-suicidal self-injury report suffering from EDs, including binge eating (57.6%), fasting (57.6%), excessive exercise (33.9%), inducing vomit (25.4%), and using diuretics and laxatives (15.3%) [16]. The probability of self-injurious behavior among persons with EDs is significantly higher for people with a history of suicide attempts [17].

Another widely discussed issue is the contribution of the body mass index (BMI) to the suicide risk. Some studies have linked a low BMI to the suicide risk, while others have not. A prospective study on a female sample (n=1,200,000) has shown that BMI <20 is associated with a suicide attempt and completed suicide; low weight in adolescence and youth also turned out to be significant factors [18]. In another large study on a population sample

of adolescents aged 12–15 years (*n*=104,907) from 45 low- and middle-income countries, a high, rather than low, BMI and obesity were significant predictors of suicidal ideation and suicide attempts [19].

Interpersonal functioning deficits are considered one of the transdiagnostic risk factors across the ED spectrum [20]. These deficits are caused, on the one hand, by interpersonal stressors [21], and, on the other, by personal attitudes that affect social functioning and determine vulnerability to interpersonal interaction, in particular, interpersonal sensitivity [22, 23]. Interpersonal sensitivity is considered a dimension of psychological distress [24] and an inherent trait in people with a high susceptibility to the behavior and emotions of others, especially to perceived or real criticism or rejection [25]. There are relatively few studies that look at interpersonal sensitivity as a personality trait [22, 23, 25–27], and all of them, except one [23], involve participants beyond adolescence.

Our recent study of online communities focused on appearance and body found that members of pro-anorexia groups (focused on the normalization of anorexia) have higher levels of body dissatisfaction and sensitivity to rejection due to their appearance, compared with members of body-positive communities [26]. According to our other study, the fear of rejection appears to be a predictor of self-injurious behavior in adolescents and young adults [27]. The only clinical study we found of adolescents aged 12–18 years with a diagnosed ED demonstrated that a heightened interpersonal awareness (one of the components of interpersonal sensitivity) contributes to ED symptoms. Cognitive distortion (negative interpretation of social cues) was proved to act as a mediator of this association. However, due to its methodological limitations, the study failed to consider interpersonal sensitivity in a broader sense or some of its other aspects (since the other scales of the questionnaire showed insufficient internal consistency, and the authors did not include them in the analysis) [23].

Thus, the few available studies of interpersonal sensitivity (as a personality trait) are freighted by limitations associated with either sampling or study methodology. In addition, the various aspects of interpersonal sensitivity were investigated in these studies in relation with either the ED symptoms [23, 26] or non-suicidal self-injuries [27], while the repeatedly confirmed association between EDs and self-injurious and suicidal behavior necessitates a comprehensive study.

The goal of this study was to probe for an association between self-injurious or suicidal behavior and weight mangement, BMI and interpersonal sensitivity in adolescent girls with EDs treated in an inpatient or outpatient setting. To compare the results, we used data from a population sample of adolescent girls from a general education school.

METHODS

Setting

The study was conducted in the form of an individual survey of adolescent girls who have an ED included in section F50 of the International Classification of Diseases and Related Health Problems (10th revision) as the primary or co-occurring diagnosis. The study was conducted in February–April 2023 at the Clinicfor Eating Disorders of the State Budgetary Institution of Healthcare "Scientific and Practical Center for the Mental Health of Children and Adolescents named after G.E. Sukhareva of the Moscow Department of Health" (SBHI "SPC MHCA named after G.E. Sukhareva of the Moscow Department of Health"). And was approved by the Local Ethics Committee of the institution (Minutes No. 1–23 datedJanuary 18, 2023).

Participants

A total of 31 patients participated in the study (M=15±1.13 years). Twenty girls had an ED (F50) as their primary diagnosis: anorexia nervosa or bulimia nervosa. The ED in 11 patients persisted as a co-occurring disorder while they had the depressive syndrome within the affective disorders (F30–F39) or mixed disorders of behavior and emotions (F92) as their primary disorder at the time of the examination.

Fourteen of the girls were being hospitalized for the first time; 11 girls were being re-hospitalized; and 6 girls were in outpatient treatment mode.

Inclusion criteria: female; aged 13–17; diagnosed ED. Exclusion criteria: male; age under 13; thought disorders; cognitive impairment.

To compare the participants in terms of self-injurious behavior, weight control, BMI, and interpersonal sensitivity, we interviewed 27 adolescent girls, aged 13–17 (M=15.51±1.09 years), without ED diagnosis, at the Proton Educational Center, a state budgetary educational institution in Moscow.

Participation in the study was voluntary, based on the informed consent of adolescents and their parents.

Measures

All study participants completed a General Questionnaire, a Suicide Risk Blitz Questionnaire, and an Interpersonal Sensitivity Questionnaire. In addition, weight and height were measured to calculate the body mass index.

The General Questionnaire for this study was designed to collect socio-demographic data (sex, age, education, and place of residence) and obtain information about weight control and self-inflicted physical harm:

- Do you control your weight?
- How old were you when you started controlling your weight?
- Indicate what methods of weight control you have used in the last 6 months.
- Have you ever intentionally hurt yourself physically?
- How exactly did you hurt yourself physically?

The Suicide Risk Blitz Questionnaire (developed at the SBHI "SPC MHCA named after G.E. Sukhareva of the Moscow Department of Health") contains 6 questions about suicidal thoughts, plans and attempts, as well as self-injurious behavior. It was used only in a clinical sample. A yes/no dichotomous scale is used in the responses. The KR-20 reliability coefficient [28] was used to calculate the reliability of the questionnaire (0.66 in the current sample; 0.70 in the adaptation sample). At the time of the study, this questionnaire had undergone clinical testing, including testing of psychometric characteristics; an article based on the results of testing is being prepared.

Interpersonal Sensitivity Questionnaire [25, 29]. In the Russian version, the questionnaire includes 22 items, with a choice of responses on a 5-point scale. It includes three scales: dependence on the assessments of others (Cronbach's alpha α=0.93 in the general sample, α=0.94 in the main group), fear of rejection (α=0.88/0.87), anxiety in interpersonal relationships (α=0.84/0.82), and total interpersonal sensitivity score (α=0.95/0.94).

BMI was calculated using the formula: $BMI=m/h^2$, where m is body weight in kilograms and h is height in meters. BMI was assessed according to age and sex, based on WHO recommendations for assessing anthropometric parameters in children [30].

Statistical analysis

Quantitative data were analyzed using the statistical package SPSS ver. 23. The analysis included frequencies, descriptive statistics, contingency tables (Pearson's χ^2 test for comparing categorical variables), correlation analysis (Spearman's coefficient), and non-parametric tests (Mann-Whitney, Kruskal-Wallis tests). Qualitative data were analyzed by content analysis (the number of the most frequently occurring words in descriptions of weight control and self-injurious behavior was counted) and content analysis (basic weight control strategies were summarized).

RESULTS

The sociodemographic characteristics of the sample are presented in Table 1.

Weight control and body mass index

According to the results of the survey, the age at which weight control started ranges from 8 to 15 years. The bulk of the responses was in the range of 11–14 years, the average age when weight control started was 12.4, SD=1.6.

As part of the content analysis of responses about the weight control methods used in the main group, the most frequently used words (out of 194 used) were the following: fasting (12 mentions); sports/physical activity (10 mentions); vomiting and laxative (8 mentions each); and calorie counting (7 mentions).

In the control group of 27 girls, 17 indicated that they do watch their weight. In this subgroup, the most frequently used words (out of 87 used) when describing the weight control methods used were the following: sport (14 mentions); food/nutrition (9 mentions); weight/weighing (4 mentions); and fasting (3 mentions). Words such as health, diet, gym, calories, body, laxative, and sweet were used not more than once.

Based on a content analysis of the data in both groups, seven categories were identified (purging routines, food restriction, calorie counting, fasting, body measurements, weighing, exercise, and proper nutrition) and summarized into three key patterns that characterize the weight control strategies used by girls both from the main group and from the control group:

1. Purging behavior: artificial induction of vomiting; taking diuretics and laxatives;
2. Restrictive behavior: counting calories; diets and other food restrictions; fasting;
3. Corrective behavior: behavior focused on managing external attractiveness like body measurements; weighing; physical activity, including sports; different types of physical activity combined with a healthy diet (Table 2).

Table 1. Sociodemographic and clinical characteristics of the sample

Sociodemographic and clinical characteristics		Main group (N=31)	Control group (N=27)
		%, *n*	%, *n*
Age		M=15.00±1.13	M=15.51±1.09
Sex	Female	100% (*n*=31)	100% (*n*=27)
Education	Currently in school	87.0% (*n*=27)	100% (*n*=27)
	Currently in college	9.7% (*n*=3)	-
	Does not study anywhere	3.3% (*n*=1)	-
Residence	With parents or one of the parents	96.7% (*n*=30)	96.3% (*n*=26)
	With other relatives	3.3% (*n*=1)	-
	Family Education Assistance Center	-	3.7% (*n*=1)
Diagnosis	Anorexia nervosa (F50.0)	41.93% (*n*=13)	-
	Atypical anorexia nervosa (F50.1)	19.35% (*n*=6)	-
	Atypical bulimia nervosa (F50.3)	3.22% (*n*=1)	-
	Major depressive disorder, single episode, moderate (F32.1). Anorexia nervosa (F50.0)	9.7% (*n*=3)	-
	Major depressive disorder, single episode, moderate (F32.1). Bulimia nervosa (F50.2)	9.7% (*n*=3)	-
	Bipolar disorder, current episode mixed (F31.6). Bulimia nervosa (F50.2)	3.22% (*n*=1)	-
	Other persistent mood [affective] disorders (F34.8). Bulimia nervosa (F50.2)	3.22% (*n*=1)	-
	Other mixed disorders of conduct and emotions (F92.8). Eating disorder, unspecified (F50.9)	3.22% (*n*=1)	-
	Other mixed disorders of conduct and emotions (F92.8). Atypical anorexia nervosa (F50.1)	3.22% (*n*=1)	-
	Other mixed disorders of conduct and emotions (F92.8). Bulimia nervosa (F50.2)	3.22% (*n*=1)	-

Table 2. Weight control strategies: findings from the content analysis

Weight control methods		Categories	Weight control strategies
Main group	**Control group**		
Vomit (8); laxatives (8); diuretics (1)	Laxatives (1)	Purging procedures	Purging behavior
Diets (5); small portions (3); food restrictions (4); throwing away food (2)	Diets (3); food restrictions (4); throwing away food (1)	Diets and other food restrictions	Restrictive behavior
Calorie counting (7)	Calorie counting (1)	Calorie counting	
Fasting (12)	Fasting (3)	Fasting	
Wrist circumference with fingers, measurement of arms, legs with a measuring tape (2)	-	Body measurements	Corrective behavior (appearance control)
Weighing (9)	Weighing (4)	Weighing	
Sports/physical activity/exercise (10)	Sports/physical activity/exercise (14)	Physical exercise	
-	Proper/healthy nutrition (5); meal plan (1)	Proper nutrition	

Note: The values in the brackets are the number of weight control behavior mentions in study groups.

The main group had no descriptions that could be associated with a healthy diet, while the control group did not have such specific methods of weight control as measuring the thinness of one's arms and legs. The control group gave responses that could generally be associated with a healthy lifestyle, and weight control in some cases was described as an attempt to regulate it, rather than reduce it. For example, "swimming, dancing, walking long distances", "going to the gym, avoiding eating sweets", "sports, proper nutrition", and "eating the amount of food that the body requires", whereas the focus of the responses in the main group was squarely on weight loss. Therefore, relatively more words related to weight loss were used (fasting, vomiting, laxatives, diuretics, etc.) and sports were described as "exhausting physical activity", and, in most cases, physical exercises were combined with fasting, inducing vomiting, and counting calories. Thus, girls from the main group significantly more often mentioned purging and restrictive behavior, while girls from the control group indicated corrective behavior related to controlling their looks: χ^2 (2)=22.19; p <0.001.

The distribution of the sample by BMI is presented in Table 3.

In the main group, patients with anorexia nervosa were underweight, while eight out of eleven girls with depressive syndrome and EDs had normal body weight, with a tendency to the lower limit of the normal (in the range from 17.06 to 22.84). There were more underweight patients among those hospitalized for the first time than among those re-hospitalized or receiving outpatient treatment: χ^2 (2)=11.67, p <0.01. The BMI of girls from the main group was significantly lower than that of the control group: χ^2 (2)=21.12, p <0.001.

In the pooled sample of underweight girls, the majority used restrictive means or purging to control their weight, while the normal-weight or overweight girls mostly used appearance control strategies: χ^2 (2)=12.15, p <0.05.

Non-suicidal self-injuries and suicide risk

The suicide risk was assessed only in the main group, while the question about intentionally causing physical harm to oneself and the methods used was asked in both groups.

In the clinical sample (N=31), 51.7% of the girls answered the question about self-injuries in the affirmative; the distribution of answers in the main and control groups is approximately the same: 16 "yes" and 15 "no" in the main group, 13 "yes" and 14 "no" in the control group (N=27). The most common way of inflicting self-injuries was self-cutting: 12 instances in the main group and 11 in the control group. In most cases, several different types of self-injuries were indicated.

As part of the content analysis in the clinical subgroup of girls who confirmed self-injuries (N=16), out of 117 words used, the most frequent were cut (13 mentions), beat/hit (5 mentions), scratch/claw (5 mentions), cauterize/burn (4 mentions), and bite/nibble (2 mentions). Tear out, strangle, cool, and overheat were mentioned once each. Also, one response was related to a suicide attempt: "Pills in large quantities (suicide)", and one was related to physical activity: "Exhausting workouts". In three responses, food restrictions were defined by patients as a type of self-harm: "I wrote on my leg with a pen to eat less", "all EDs are also harmful", and "food restrictions". In the control group (N=13), the most frequently mentioned words out of the 101 words used were cut (11 mentions); beat/hit (8 mentions); bite, scratch, press (2 mentions each); prick, claw, and burn (2 mentions each).

When comparing between patients who confirmed and those who denied engaging in self-injurious behavior, significant differences (Mann-Whitney test) were found only in BMI: girls with self-injuries turned out to have a lower BMI (U=204.00, p <0.001). As for the control group, significant differences between those who confirmed self-injuring and those who denied doing so were found

Table 3. BMI distribution in the main and control groups

Group	Diagnosis	BMI			Total
		underweight	normal-weight	overweight	
Main group (N=31)	Eating disorders (F50.0; F50.1; F50.2)	19	1	0	20
	Affective disorders (F32.1; F34.8; F31.6) and other mixed disorders of conduct and emotions. (F92.8). Eating disorders (F50.0; F50.1; F50.2; F50.9)	2	9	0	11
Control group (N=27)	-	3	20	4	27

in relation to fear of rejection and overall interpersonal sensitivity, but not BMI (Table 4).

The suicide risk was assessed only in the main group as it was the most vulnerable to suicidal behavior, and also due to the fact that the questionnaire that was used for this purpose was only being clinically tested at the time of its use. The distribution of responses is presented in Table 5.

The suicide risk score was calculated based on the sum of affirmative answers. The suicide risk group included those who scored 3 points or more. In this group, three girls scored 3 points, two scored 4, and one scored 6. When comparing the subgroups in terms of suicide risk, patients who scored three or more on the Blitz Questionnaire had higher dependence on the assessments of others, fear of rejection, and overall interpersonal sensitivity (Table 6).

The suicide risk subgroup included girls with depression and EDs who engaged in purging or restrictive behaviors to control their weight.

Association of suicide risk with interpersonal sensitivity and BMI

The link between suicide risk and BMI and psychological characteristics was tested using the Spearman's coefficient. Significant associations are presented in Table 7.

Table 4. Significant differences in self-injurious behavior in the control group

Scales	Self-injurious behavior: Yes/No	N	Average rank	Median	U Mann-Whitney test	*p*
Fear of rejection	Yes	13	19.01	30.00	166.50	0.000
	No	14	8.61	20.00		
Overall interpersonal sensitivity score	Yes	13	18.12	68.00	144.50	0.008
	No	14	10.18	45.00		

Table 5. Distribution of responses in the main group to the suicide risk Blitz Questionnaire

No.	Questions	Yes		No	
		N	%	N	%
1	Have you thought about wanting to die in the past three months?	13	41.9	18	58.1
2	Have you come up with a plan for how you want to die in the past three months?	7	22.6	24	77.4
3	Have you tried to implement this plan in the past three months?	2	6.5	29	93.5
4	During your lifetime, have you ever hurt yourself, hitting, cutting, burning yourself, or injuring yourself in any other way?	16	51.6	15	48.4
5	Have you ever tried to die?	3	9.7	28	90.3
6	Are you thinking about dying right now?	1	3.2	30	96.8

Table 6. Significant differences in the suicide risk factor in the main group

Scales	Suicide risk according to the Blitz Questionnaire	N	Average rank	Median	U Mann-Whitney test	*p*
Dependence on the assessments of others	Yes	6	23.83	32.5	28.00	0.017
	No	25	14.12	25.00		
Fear of rejection	Yes	6	24.42	19.00	24.50	0.009
	No	25	13.98	12.00		
Overall interpersonal sensitivity score	Yes	6	24.08	72.00	26.50	0.012
	No	25	14.06	55.00		

Table 7. Association of suicide risk with BMI and interpersonal sensitivity (Spearman's r_s)

Scales	Suicide Risk Blitz Questionnaire
Dependence on the assessments of others	0.55**
Fear of rejection	0.67***
Anxiety in interpersonal relationships	0.55**
Overall interpersonal sensitivity score	0.62***
Body mass index	0.47*

Note: *p <0.05, **p <0.01, ***p <0.001.

As can be seen from Table 7, an increase in suicide risk is significantly associated with higher interpersonal sensitivity scores. There is also a significant association between increased BMI and suicide risk.

DISCUSSION

According to the results of our study, weight control can start quite early, as early as eight years old, but more often it starts at the beginning of adolescence (12–13 years).

Based on the content analysis, three weight control strategies were identified: (1) purging behavior (vomiting, and using laxatives and diuretics); (2) restrictive behavior (dieting, fasting); and (3) corrective behavior focused on controlling and changing one's appearance (body measurements, weighing, physical activity, including sports, as well as combining various types of physical activity with a healthy diet). Corrective behavior is more focused on creating a socially attractive image, while purging and restrictive behaviors are aimed at reducing body mass that is subjectively perceived as too large, regardless of objective indicators. Corrective behavior was characteristic of girls from both the main group and the control group, but it qualitatively differed in terms of the weight correction methods used. Girls from the main group reported using measurements to check the thinness of their arms or legs, constant weighing, excessive and exhausting physical exertion. In the comparison group, the responses of the girls mainly reflected their desire for a balance of nutrition and physical activity; i.e., a healthy lifestyle.

The lowest BMI, as expected, was found in the main group in girls hospitalized for the first time and diagnosed with anorexia nervosa (F50.0), as well as (in the total sample) in girls with restrictive and purging behavior.

Non-suicidal self-injuries were approximately equally distributed both in the main group and in the overall population, which confirms the high prevalence of self-injurious behavior in adolescence in both the clinical and non-clinical samples. In the pooled sample, just over 50% confirmed that they had intentionally harmed themselves and cutting was the most common type of self-injury.

Interestingly, girls from the main group interpreted physical harm to themselves more broadly than girls from the control group. While the girls from the control group described types of non-suicidal self-injury (cutting, hitting, and scratching the skin), the description of self-injurues in the main group was more consistent with deliberate self-harm and included, in addition to non-suicidal self-injuries, self-destructive actions, such as extreme weight control practices, overdose on pills, and exhausting workouts. Girls with self-injuries in the main group had the lowest BMI, and girls with self-injuries in the control group had the greatest fear of rejection and overall interpersonal sensitivity.

In the clinical sample, a suicide risk subgroup was identified based on the Blitz Questionnaire, which included girls with depressive syndrome and EDs who practiced purging or restrictive behavior. The girls from this subgroup scored the highest on the Interpersonal Sensitivity Questionnaire (dependence on the assessments of others, fear of rejection, and overall interpersonal sensitivity), while all of them confirmed self-injurious behavior.

The significant association between the suicide risk and interpersonal sensitivity demonstrates the importance of interpersonal vulnerability in attitudes to suicide: the more pronounced the interpersonal sensitivity is, the higher the suicide risk. It is also interesting to note the positive association between BMI and suicide risk in our study, which is explained by the specifics of the sample: girls with a BMI close to the norm at the time of participation in the study had a concomitant diagnosis of anorexia nervosa or bulimia nervosa but were treated for depression, in which suicide risk is known to increase.

The limitations of the study include a small sample size and the cross-sectional nature of the study, which limit

the margin for interpreting the results and extrapolating conclusions when building predictive models. However, the advantage of this study is that a group of similar-age adolescent girls studying in a comprehensive school was included for comparison. A qualitative-quantitative approach was also used both in data collection and in their analysis and interpretation, which allowed us to more fully describe the phenomenology of weight control and self-injuries in adolescent girls in a comparative context, as well as to investigate the association of these parameters with suicidal behavior, BMI, and interpersonal sensitivity.

The presented data are consistent with the results of other studies. The fixation of girls from the clinical sample on monitoring their weight and measuring their body parts, in contrast to the increased interest in diets and healthy eating habits in the control group, illustrates body image disconnect such as bias towards certain body parts with overestimation or underestimation of their size [31]. Measuring body parts is part of the concept of body checking, which consists in scrutinizing one's own body and appearance in search of flaws. This behavior is closely associated with EDs [32]. According to neurophysiological studies, adolescent girls with anorexia nervosa have a heightened emotional perception of body parts, and a distorted perception of their size and shape [33].

The differences in self-injurious behavior found in our study between the main group and the control group are consistent with the results of our previous study performed using an older sample. In that study, we also noted that superficial self-harm may be associated with the use of more severe self-harm methods that have a destructive impact on the body as a whole (e.g. risky behavior, deprivation of needs, fasting, substance abuse). The fear of rejection (a factor of interpersonal sensitivity) is one of the predictors of both superficial self-harm and more severe self-destructive behavior [27].

The combination of superficial self-harm with extreme weight loss practices common to girls in the clinical sample backs up the notion that behavioral symptoms of EDs can be classified as indirect self-injurious behavior, and that fasting or purging behavior can be used as a way to inflict physical harm on oneself, both in the short and in the long term [34].

The identified suicide risk in girls with depressive syndrome, co-occurring anorexia/bulimia nervosa, and restrictive and purging behavior, as well as the highest rates of interpersonal sensitivity (especially fear of rejection), in this subgroup are consistent with the results of other studies. According to a retrospective analysis of medical records, depression is one of the psychopathological markers of suicide risk in young people diagnosed with anorexia nervosa and bulimia nervosa [35], and the use of extreme methods of weight control (purging and restriction) in anorexia nervosa is also a significant factor affecting suicide risk [36, 37]. High interpersonal sensitivity, considered in clinical studies primarily as a psychopathological symptom (feeling of the fragility of one's own Self, especially intensely experienced in relationships with others) also indicates an unfavorable prognosis. It has been found that individuals engaged in intense physical exercise have higher interpersonal sensitivity, and its influence increases as compulsive traits increase [38]. In addition, high interpersonal sensitivity among adolescents with anorexia nervosa indicates a risk of re-hospitalization after a year [39]. Therefore, the assessment of interpersonal sensitivity may be useful in predicting the course of the disease.

It should be noted that the association between BMI and suicide risk found in our study is not an exception; it reflects the complexity and nonlinearity of the association between body weight and suicidal behavior, which requires further study. Despite the current view that being underweight is associated with an increased risk of completed suicide [40], the presented data show that both low and high BMI are risk factors for suicide in women with depressive symptoms [41], and that deviation from normative BMI (too low or too high) during childhood is more closely associated with adult suicidal ideation/attempts than actual BMI [42].

There are plans to expand the clinical sample in the future to look into the personal and psychopathological factors of suicide risk in adolescent girls with different types of EDs and concomitant self-injurious behavior. Conducting longitudinal studies starting from primary school age seems promising, given that girls at that age can already be inclined to control their body weight.

CONCLUSION

This study is the first conducted on a Russian-speaking sample which examines the association of eating behaviors (weight control methods) and body mass index with non-suicidal self-injuries, suicide risk, and interpersonal sensitivity in adolescent girls with EDs, compared with

adolescent girls in the general population. The highest vulnerability in terms of suicide risk was shown in adolescent girls with depressive syndrome and concomitant anorexia/bulimia nervosa who used extreme methods of weight control (purging and restrictive behavior), engaged in non-suicidal self-injuries, and scored high on interpersonal sensitivity. A hallmark of the self-injurious behavior in adolescent girls with EDs was the combination of non-suicidal self-injuries with specific dietary restriction and weight loss practices (excessive exercising, fasting) that are aimed at causing physical harm to oneself rather than conforming to social standards of attractive looks.

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References

1. Stice E, Marti CN, Rohde P. Prevalence, incidence, impairment, and course of the proposed DSM-5 eating disorder diagnoses in an 8-year prospective community study of young women. Journal of abnormal psychology.2013;122(2), 445-57. doi: 10.1037/a0030679.
2. Ackard DM, Fulkerson JA, Neumark-Sztainer D. Prevalence and utility of DSM-IV eating disorder diagnostic criteria among youth. International Journal of Eating Disorders. 2007;40(5):409-17. doi: 10.1002/eat.20389.
3. Qian J, Wu Y, Liu F, et al. An update on the prevalence of eating disorders in the general population: a systematic review and meta-analysis. Eating and Weight Disorders. 2022;27(2):415-428. doi: 10.1007/s40519-021-01162-z.
4. Arija Val V, Santi Cano MJ, Novalbos Ruiz JP, et al. Characterization, epidemiology and trends of eating disorders. Nutrition Hospitalaria. 2022;39(Spec No2):8-15. doi: 10.20960/nh.04173. Spanish.
5. Silén Y, Keski-Rahkonen A. Worldwide prevalence of DSM-5 eating disorders among young people. Current Opinion in Psychiatry. 2022;35(6):362-371. doi: 10.1097/YCO.0000000000000818.
6. Iwajomo T, Bondy SJ, de Oliveira C, Colton P, et al. Excess mortality associated with eating disorders: population-based cohort study. The British Journal of Psychiatry. 2021;219(3):487-493. doi: 10.1192/bjp.2020.197.
7. Arcelus J, Mitchell AJ, Wales J, et al. Mortality rates in patients with anorexia nervosa and other eating disorders. A meta-analysis of 36 studies. Archives of General Psychiatry. 2011;68(7):724-31. doi: 10.1001/archgenpsychiatry.2011.74.
8. Udo T, Bitley S, Grilo CM. Suicide attempts in US adults with lifetime DSM-5 eating disorders. BMC Medicine. 2019;17(1):120. doi: 10.1186/s12916-019-1352-3.
9. Crow S, Eisenberg ME, Story M, et al. Are body dissatisfaction, eating disturbance, and body mass index predictors of suicidal behavior in adolescents? A longitudinal study. The Journal of Consulting and Clinical Psychology. 2008;76(5):887-92. doi: 10.1037/a0012783.
10. Polskaya N, Razvalyaeva A. Diagnostics and prevention of self-injurious behavior. Moscow: FGBOU VO MGPPU; 2022. 220 p. Russian.

11. Klonsky ED, May AM, Glenn CR. The relationship between nonsuicidal self-injury and attempted suicide: converging evidence from four samples. The Journal of Abnormal Psychology. 2013;122(1):231-237. doi: 10.1037/a0030278.
12. Castellví P, Lucas-Romero E, Miranda-Mendizábal A, et al. Longitudinal association between self-injurious thoughts and behaviors and suicidal behavior in adolescents and young adults: a systematic review with meta-analysis. The Journal of Affective Disorders. 2017;215:37-48. doi: 10.1016/j.jad.2017.03.035.
13. Peebles R, Wilson JL, Lock JD. Self-injury in adolescents with eating disorders: correlates and provider bias. The Journal of Adolescent Health. 2011;48(3):310-3. doi: 10.1016/j.jadohealth.2010.06.017.
14. Claes L, Vandereycken W, Vertommen H. Eating-disordered patients with and without self-injurious behaviours: A comparison of psychopathological features. European Eating Disorders Review. 2003;11(5):379–396. doi: 10.1002/erv.510.
15. Turner BJ, Yiu A, Layden BK, et al. Temporal associations between disordered eating and nonsuicidal self-injury: examining symptom overlap over 1 year. Behaviour Research and Therapy. 2015;46(1):125-38. doi: 10.1016/j.beth.2014.09.002.
16. Yiu A, Turner BJ, Layden BK, et al. Prevalence and correlates of eating disorder symptoms in a community sample with non-suicidal self-injury. The Journal of Psychopathology and Behavioral Assessment. 2014;37(3):504-11. doi: 10.1007/s10862-014-9470-x.
17. Cucchi A, Ryan D, Konstantakopoulos G, et al. Lifetime prevalence of non-suicidal self-injury in patients with eating disorders: a systematic review and meta-analysis. Psychological Medicine. 2016;46(7):1345-58. doi: 10.1017/S0033291716000027.
18. Geulayov G, Ferrey A, Hawton K, et al. Body mass index in midlife and risk of attempted suicide and suicide: prospective study of 1 million UK women. Psychological Medicine. 2019;49(13):2279-2286. doi: 10.1017/S0033291718003239.
19. Zhang MZ, Tang R, Rao WM, et al. Body mass index and the risk of suicidal ideation and suicide attempt among youth in 45 low- and middle-income countries. The Journal of Affective Disorders. 2022;298(Pt A):357-363. doi: 10.1016/j.jad.2021.11.018.
20. Stice E, Gau JM, Rohde P, Shaw H. Risk factors that predict future onset of each DSM-5 eating disorder: predictive specificity in high-risk adolescent females. The Journal of Abnormal Psychology. 2017;126(1):38-51. doi: 10.1037/abn0000219.
21. Monteleone AM, Ruzzi V, Pellegrino F, et al. The vulnerability to interpersonal stress in eating disorders: The role of insecure attachment in the emotional and cortisol responses to the trier social stress test. Psychoneuroendocrinology. 2019;101:278-285. doi: 10.1016/j.psyneuen.2018.12.232.
22. Atlas JG. Interpersonal sensitivity, eating disorder symptoms, and eating/thinness expectancies. Current Psychology. 2004;22:368-378.
23. Rowlands K, Grafton B, Cerea S, et al. A multifaceted study of interpersonal functioning and cognitive biases towards social stimuli in adolescents with eating disorders and healthy controls. The Journal of Affective Disorders. 2021;295:397-404. doi: 10.1016/j.jad.2021.07.013.
24. Derogatis LR, Yevzeroff H, Wittelsberger B. Social class, psychological disorder, and the nature of the psychopathologic indicator. The Journal of Consulting and Clinical Psychology. 1975;43(2):183–191. doi: 10.1037/h0076514.
25. Boyce P, Parker G. Development of a scale to measure interpersonal sensitivity. Australian and New Zealand Journal of Psychiatry. 1989;23(3):341–351. doi: 10.1177/000486748902300320.
26. Polskaya NA, Yakubovskaya DK, Razvalyaeva AYu. Vulnerability to interpersonal rejection based on appearance in body positive and pro-anorexic online communities. Social Psychology and Society. 2023;14(1):150–171. doi: 10.17759/sps.2023140109.
27. Razvaliaeva AY, Polskaya NA. Predictors of self-harm types in members of online communities: age as a moderating variable. Consortium Psychiatricum. 2022;3(4):38-51. doi: 10.17816/CP216.
28. Zhang S, Kwon S. R Programming for Psychometrics [Internet]. 2022 [cited 2023 June 8]. Available at: https://bookdown.org/sz_psyc490/r4psychometics.
29. Razvaliaeva AY, Polskaya NA. Psychometric properties of the Russian three-factor interpersonal sensitivity measure. Counseling Psychology and Psychotherapy. 2021;29(4):73–94.
30. Chernaya NL, Maskova GS, Ganuzin VM, et al. Norms for the anthropometric measurements in children aged 0–19 in accordance with recommendations of World Health Organization. 2nd edition, amended. Yaroslavl': FGBOU VO YaGMU, 2018. 116 p. Russian.
31. Legenbauer T, Thiemann P, Vocks S. Body image disturbance in children and adolescents with eating disorders. Zeitschrift für Kinder-und Jugendpsychiatrie und Psychotherapie. 2013;42(1):51–59. doi: 10.1024/1422-4917/a000269.
32. Walker DC, White EK, Srinivasan V. A meta-analysis of the relationships between body checking, body image avoidance, body image dissatisfaction, mood, and disordered eating. The Journal of Eating Disorders. 2018;00:1–26. doi: 10.1002/eat.22867.
33. Ganin IP, Kosichenko EA, Sokolov AV, et al. Adapting the P300 brain-computer interface technology to assess condition of anorexia nervosa patients. Bulletin of Russian State Medical University. 2019;2:32–38.
34. Fox KR, Wang SB, Boccagno C, Haynos AF, Kleiman E, Hooley JM. Comparing self-harming intentions underlying eating disordered behaviors and NSSI: evidence that distinctions are less clear than assumed. International Journal of Eating Disorders. 2019;52(5):564-575. doi: 10.1002/eat.23041.
35. Arnold S, Correll CU, Jaite C. Frequency and correlates of lifetime suicidal ideation and suicide attempts among consecutively hospitalized youth with anorexia nervosa and bulimia nervosa: results from a retrospective chart review. Borderline Personality Disorder and Emotion Dysregulation. 2023;10(1):10. doi: 10.1186/s40479-023-00216-1.
36. Bulik CM, Thornton L, Pinheiro AP, et al. Suicide attempts in anorexia nervosa. Psychosomatic Medicine. 2008;70(3):378-83. doi: 10.1097/PSY.0b013e3181646765.
37. Ucuz İ, Uzun CA. Evaluation of the frequency of suicidal thoughts and attempts and related factors in female adolescents with anorexia nervosa. Middle Black Sea Journal of Health Science. 2020;6(3):305-315.
38. Kolar DR, Kaurin A, Meule A, et al. Interpersonal, affective and compulsive features of driven exercise in anorexia nervosa. The Journal of Affective Disorders. 2022;307:53-61. doi: 10.1016/j.jad.2022.03.044.
39. Pruccoli J, Chiavarino F, Nanni C, et al. General psychopathological symptoms in children, adolescents, and young adults with anorexia nervosa-a naturalistic study on follow-up and treatment. The European Journal of Pediatrics. 2023;182(3):997-1007. doi: 10.1007/s00431-022-04745-9.

40. Brown KL, LaRose JG, Mezuk B. The relationship between body mass index, binge eating disorder and suicidality. BMC Psychiatry. 2018;18(1):196. doi: 10.1186/s12888-018-1766-z.
41. Perera S, Eisen RB, Dennis BB, et al. Body mass index is an important predictor for suicide: results from a systematic review and meta-analysis. Suicide and Life-Threatening Behavior. 2016;46(6):697-736. doi: 10.1111/sltb.12244.
42. Forcano L, Fernández-Aranda F, Alvarez-Moya E, et al. Suicide attempts in bulimia nervosa: personality and psychopathological correlates. European Psychiatry. 2009;24(2):91-7. doi: 10.1016/j.eurpsy.2008.10.002.