



# Influencing factors of non-suicidal self-injury according to DSM-5 in adolescents admitted to the psychiatric department: a cross-sectional study

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**Background:** Non-suicidal self-injury (NSSI) is being increasingly recognized as a prominent mental health concern, especially among adolescents. In psychiatric clinical samples, its incidence is high and difficult to identify. However, few studies have explored the NSSI behavior of psychiatric hospitalized adolescents. This study aimed to explore the influencing factors of NSSI according to the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5) in adolescents admitted to the psychiatric department.

**Methods:** In this cross-sectional study, by convenient sampling, a total of 505 psychiatric adolescent inpatients aged 10–19 years completed questionnaires to record details of sociodemographic characteristics, the NSSI questionnaire, the Child Psychological Abuse and Neglect Scale (CPANS), the self-report version of the Strengths and Difficulties Questionnaire (self-report SDQ), the Coping Style Scale for Middle School Students (CSSMSS), which were compared between NSSI inpatients and non-NSSI inpatients. This study used the diagnostic criteria for NSSI disorder in DSM-5: adolescent patients who have NSSI behaviors for more than 5 times in the past 1 year are called NSSI. A multiple logistic regression model was built to explore the relationships among general information, CPANS, SDQ, CSSMSS, and NSSI. Risk for NSSI is quantified by odds ratio (OR) with 95% confidence interval (CI).

**Results:** The results showed that 77.82% (n=393) of adolescent inpatients had NSSI, and 80.0% were female (n=404). NSSI adolescent inpatients experienced more family scolding, psychological abuse, and neglect and showed more positive attitudes toward NSSI than non-NSSI adolescent inpatients. However, after controlling for covariables, the difference disappeared. NSSI behavior was significantly associated with female (OR =2.391, 95% CI: 1.396–4.097, P=0.002), younger age (10–14 years old) (OR =1.876, 95% CI: 1.154–3.049, P=0.011), have close friends (OR =0.355, 95% CI: 0.164–0.768, P=0.008), peer discussion about self-injury (OR =1.977, 95% CI: 1.047–3.734, P=0.036), emotional and behavioral difficulties (OR =1.853, 95% CI: 1.054–3.258, P=0.032), problem-oriented coping styles (OR =0.968, 95% CI: 0.945–0.991, P=0.007), emotion-oriented coping styles (OR =1.035, 95% CI: 1.006–41.064, P=0.016).

**Conclusions:** Measures should be taken to prevent and reduce the occurrence of NSSI behaviors among hospitalized adolescents in psychiatric department, which include improving adolescents' attitude towards NSSI, reducing adolescents' gathering behavior in the ward, preventing adolescents from discussing NSSI through social media, improving their coping style when facing difficulties, and reasonably regulating their abnormal emotions and behaviors.

**Keywords:** Non-suicidal self-injury (NSSI); Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5); influencing factors; psychiatric adolescent inpatients

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## Introduction

Non-suicidal self-injury (NSSI) is one of the most important mental health problems of adolescents worldwide and is defined as the deliberate, direct, and socially unacceptable destruction of body tissue, but without suicidal intent (1,2). It represents some of the strongest and most consistent predictors of future suicidal behavior across both inpatient and general populations (3-5). The Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5) lists NSSI as an independent symptom that “needs further study”, suggesting that it may be an independent mental disorder that requires more attention (6).

A nationwide survey in rural regions in China showed that approximately 29% of 15,623 adolescents had a history of at least 1 instance of NSSI during the past year (7). According to a meta-analysis involving 264,638 adolescents in a non-clinical sample, the lifetime prevalence of NSSI was 22.0% [95% confidence interval (CI): 17.9–26.6%], and the 12-month prevalence of NSSI was 23.2% (95% CI: 20.2–26.5%) (8). The rates of NSSI in adolescents meeting DSM-5 criteria were lower and ranged from approximately 1.5% to 6.7% in child and adolescent community samples (9). In adolescent psychiatric samples, the prevalence of NSSI

has been found to be as high as 60% for 1 incident of NSSI and approximately 50% for repetitive NSSI (10). Considering it is unclear whether there are differences in the types and degrees of influencing factors of adolescent NSSI between clinical samples and general population samples. And adolescents hospitalized in the psychiatric department who have NSSI behaviors are more likely to suffer from NSSI again. NSSI behaviors occur during hospitalization, which seriously affect the treatment effect of patients, reduce their confidence in treatment, prolong their hospitalization time, and increase the cost of medical treatment. The study of the common influencing factors of adolescent NSSI in psychiatric ward inpatient samples will help prevent adolescent self-injury and take targeted treatment strategies to help patients return to school and life as soon as possible.

Evidence has shown that the risk factors for NSSI also vary: early-to-mid adolescence, female sex, social or internet-based contact with NSSI, dysfunctional relationships such as bullying, and adverse events in childhood (11). Among the risk factors, childhood abuse and neglect, emotional behavior regulation disorders, and poor coping styles are closely related to NSSI behavior. Yates, Carlson, and Egeland (12), using data from the Minnesota Longitudinal Study of Risk and Adaptation, demonstrated that childhood experiences of abuse/neglect were associated with more frequent and severe NSSI up to 26 years of age. Martin *et al.* (13) also confirmed that childhood abuse and neglect could predict NSSI behavior. A cross-sectional study on 239 participants (aged 11 to 17) showed that the Strengths and Difficulties Questionnaire-Dysregulation Profile (SDQ-DP) was significantly correlated with NSSI behaviors (Wald =6.5477, P=0.0105) (14). Wan *et al.* (15) found that NSSI was significantly increased in girls with a low positive coping style and with  $\geq 3$  adverse childhood experiences (ACEs), and NSSI was increased in both girls and boys with a high negative coping style across all ACEs.

However, the current knowledge surrounding these relationships has been predominantly derived from Western countries and from school or community adolescent populations, with only a few studies performed among psychiatric adolescent inpatients in China (16,17). In China, especially in psychiatric hospital settings, few studies have

### Highlight box

#### Key findings

- A total of 77.82% (n=393) of the adolescent inpatients in psychiatric department had NSSI behavior.
- NSSI behavior was significantly associated with gender, age, close friends, peer discussion about self-injury, psychiatric diagnosis, emotional and behavioral difficulties, and coping styles.

#### What is known and what is new?

- The incidence of NSSI in adolescents in psychiatric ward is high.
- NSSI behavior was significantly associated with female, younger age (10–14 years old), peer discussion about self-injury, anxiety, emotional and behavioral difficulties, and negative coping styles. But having close friends and adopting positive coping styles are the protective factors of NSSI.

#### What is the implication, and what should change now?

- Measures should be taken to prevent and reduce the occurrence of NSSI behaviors among hospitalized adolescents in psychiatric department.

investigated the impact of child psychological abuse and neglect, emotional and behavioral difficulties, and coping styles on adolescents' NSSI behavior according to the DSM-5 diagnostic criteria. The objectives of this study were twofold: first, to explore the general characteristics of NSSI disorder and examine the association between childhood maltreatment, emotional and behavioral difficulties, coping styles and NSSI; second, to identify the influencing power of childhood maltreatment, emotional and behavioral difficulties, and coping styles on NSSI disorder. We present the following article in accordance with the STROBE reporting checklist (available at <https://tp.amegroups.com/article/view/10.21037/tp-22-588/rc>).

## Methods

### Participants

In this cross-sectional study, 520 adolescents with mental illness were recruited by convenience sampling from 21 September 2020 to 4 November 2021 in the Mental Health Center, Psychiatric Department, of West China Hospital of Sichuan University in China. Participants met the following criteria: (I) psychiatric inpatients, not limited to the type of psychiatric disorders; (II) aged 10–19 years; (III) had a relatively stable emotional state, normal reading, understanding, and expression ability, and could cooperate to complete the paper and pencil test; and (IV) participated voluntarily. The exclusion criteria were as follows: (I) duplicate registration and expatriate data; (II) serious physical disease and nervous system disease; and (III) difficulty completing the survey. This study was approved by the Biomedical Research Ethics Committee, West China Hospital of Sichuan University (No. 20201049). The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). All patients or patients' legal guardians provided informed consent.

### Measures

#### Sociodemographic characteristics

A self-administered questionnaire was established to collect sociodemographic data, including gender, age, only child or not, scolding by parents or not, corporal punishment by parents or not, with close friends or not, whether to discuss self-injury among peers, self-injury attitude, whether admitted to the psychiatric ward for the first time and current main psychiatric diagnosis.

### NSSI questionnaire

To determine the prevalence of NSSI, each participant was asked whether he/she had ever physically hurt him/herself intentionally using the question: "Adolescents have to deal with a lot of stress. When you have had problems to deal with, have you ever physically hurt yourself on purpose in the past year?" (18). The single-item assessment method was used to assess whether the adolescent patient had intentionally beaten him/herself, pulled his/her hair, hit his/her head or fist against other objects, pinched or scratched, bitten, cut, or stabbed, intentionally overdosed drugs, drank and smoked, and deliberately swallowed foreign bodies in the past year. The number of occurrences was also recorded. According to the diagnostic criteria recommended by DSM-5, with reference to the recommendations of clinical experts and the interpretation of relevant literature, the researcher finally determined that the NSSI disorder in this study is: adolescent patients who have NSSI behaviors for more than 5 times in the past 1 year are called NSSI disorder (6).

### Child Psychological Abuse and Neglect Scale (CPANS)

The CPANS scale was compiled by Deng *et al.* (19). There are 31 items in the scale, including 2 subscales of psychological abuse and psychological neglect. Each item adopts a 5-level scoring system, 0 represents no such situation, 1 represents few, 2 represents sometimes, 3 represents often, and 4 represents always. The psychological abuse subscale includes 3 dimensions of scolding, intimidation, and interference, with a total of 14 items, mainly reflecting the psychological abuse experienced in childhood. The mental neglect subscale consists of 3 dimensions, emotional neglect, educational neglect, and physical neglect, with a total of 17 items, mainly reflecting the situation of neglect in childhood. The average score of psychological abuse and neglect is equal to the total score divided by the number of items. If the average score is greater than or equal to 1, it indicates psychological abuse or neglect. The test-retest reliability of the total scale in this total scale was 0.82; the test-retest reliability of the subscale or dimension was 0.68–0.80, indicating that the scale has good cross-time stability. The Cronbach's  $\alpha$  coefficients of the total scale and subscale were both above 0.8, and Cronbach's  $\alpha$  coefficients of each dimension were 0.56–0.71 in this study.

### Self-report Strengths and Difficulties Questionnaire (self-report SDQ)

The Self-report SDQ was prepared by Goodman (20)

according to DSM-4 and International Classification of Diseases 10th revision (ICD-10) to assess children's emotional and behavioral problems. The SDQ includes a total of 25 items. Each item is scored at 3 levels of 0–2, with 0 points for inconformity, 1 point for slight conformity, and 2 points for complete compliance. Among them, items 7, 11, 14, 21, and 25 are reverse scored. The SDQ includes 5 factors: emotional symptoms, conduct problems, hyperactivity, peer problems, and prosocial behavior. The questionnaire requires adolescents to complete the questionnaire according to their emotional and behavioral performance in the past 6 months. Among them, emotional symptoms, conduct problems, hyperactivity, and peer communication problems constitute the “total difficulty score”. The higher the score, the more serious the children's emotional behavior problems are and the greater the difficulties are. The higher the score of the prosocial behavior item, the higher the level of prosocial behavior and the more advantages. The SDQ showed good measuring characteristics in school-age children in China and could be used to evaluate the emotional behavior of children in China (21).

### **Coping Style Scale for Middle School Students (CSSMSS)**

The CSSMSS scale is used to assess the cognitive evaluation of the environment or life events and the measures taken to balance their psychological state in middle school students (22). The scale has 36 items, including 7 dimensions: problem solving, seeking social support, reasonable explanation, endurance, evasion, venting emotion, and fantasy denial. Among them, problem solving, seeking social support and reasonable explanation belong to the “problem-oriented coping” subscale, and endurance, evasion, venting emotion, and fantasy denial belong to the “emotion-oriented coping” subscale. The scale adopts a 4-level score, “1= not used; 2= occasionally used; 3= sometimes used; 4= often used”. The dimension scores can be added by the item scores. The higher the coping style score represented by each dimension, the higher the frequency of individuals using this method. The addition of dimensions belonging to the same subscale is the subscale score. The Cronbach's  $\alpha$  coefficient of the scale was 0.92, and the test-retest reliability was 0.84.

### **Data collection**

During the implementation of the questionnaire survey,

the investigators were trained uniformly to avoid measurement bias. After explaining the purpose and significance of the study, the adolescent inpatients in the psychiatric ward who voluntarily participated in the study completed a questionnaire face-to-face, and the instructions were read out in a relatively quiet place. At the same time, researchers gave explanations one-on-one. After completing the questionnaire, researchers field recalled the questionnaire. A total of 520 questionnaires were distributed. After the survey, 505 valid questionnaires were collected after eliminating the damaged, fuzzy, and identical questionnaires, and the effective response rate was 97.12%.

### **Statistical analysis**

Sociodemographics were expressed as frequencies and percentages (%), and the scores of the CPANS, SDQ, and CSSMSS were described as the means  $\pm$  standard deviations ( $M \pm SD$ ). Chi-square test was used to compare the incidence of NSSI in adolescent psychiatric patients with different sociodemographics. The  $t$ -test was used to compare the total scores and dimension scores of the CSSMSS, SDQ, and CSSMSS between the NSSI group and the non-NSSI group. With the occurrence of NSSI as the dependent variable and the statistically significant factors in univariate analysis as the independent variables, the influencing factors of NSSI in psychiatric adolescent inpatients were analyzed by a binary logistic regression model. For the ordered variables, when the direct substitution into the regression equation was meaningless or the doubt effect did not show an equidistant and proportional relationship among the grades, the dummy variables were processed, and then the regression analysis was carried out. All the variables were entered in the model using the forward Wald method. All statistical differences were considered significant when the  $P < 0.05$  for both directions. All statistical analyses were performed in SPSS 21.0 (IBM Corp., Armonk, NY, USA).

### **Results**

*Table 1* displays the psychiatric adolescent patients' sociodemographic characteristics. The mean age of the participants was 14.54 years ( $SD = 1.75$ ). Approximately 80.00% ( $n=404$ ) of the participants were female. A total of 77.82% ( $n=393$ ) of the participants had NSSI behavior. Gender, age, parental scolding, close friends, peer discussion of self-injury, attitude towards self-injury, and psychiatric

**Table 1** Comparison of the incidence of NSSI behavior among adolescents hospitalized in psychiatric department with different characteristics (n=505)

Variables	n (%)	NSSI group, n (%)	Non-NSSI group, n (%)	$\chi^2$	P value
Gender					
Male	101 (20.00)	61 (12.08)	40 (7.92)	22.212	0.000
Female	404 (80.00)	332 (65.74)	72 (14.26)		
Age, years					
10–14	268 (53.07)	223 (44.16)	45 (8.91)	9.602	0.002
15–19	237 (46.93)	170 (33.66)	67 (13.27)		
Whether it is an only child					
Yes	222 (43.96)	176 (34.85)	46 (9.11)	0.488	0.485
No	283 (56.04)	217 (42.97)	66 (13.07)		
Location of registered residence					
City	325 (64.35)	256 (50.69)	69 (13.66)	0.474	0.491
Rural	180 (35.64)	137 (27.13)	43 (8.51)		
Scolded by parents					
Never	18 (3.56)	12 (2.38)	6 (1.19)	10.669	0.031
Occasionally	124 (24.55)	88 (17.43)	36 (7.13)		
Sometimes	153 (30.30)	117 (23.17)	36 (7.13)		
Often	146 (28.91)	119 (23.56)	27 (5.35)		
Always	64 (12.67)	57 (11.29)	7 (1.39)		
Corporal punishment by parents					
Never	185 (36.44)	134 (26.53)	51 (10.10)	5.524	0.238
Occasionally	173 (34.26)	139 (27.52)	34 (6.73)		
Sometimes	96 (19.01)	78 (15.45)	18 (3.56)		
Often	34 (6.73)	29 (5.74)	5 (1.00)		
Always	17 (3.37)	13 (2.57)	4 (1.00)		
Whether there had close friends					
No	100 (19.80)	90 (17.82)	10 (1.98)	10.715	0.001
Yes	405 (80.20)	303 (60.00)	102 (20.20)		
Whether self-injury was discussed among peers					
Yes	135 (26.73)	120 (2.37)	15 (2.97)	13.076	0.000
No	370 (73.27)	273 (54.06)	97 (19.21)		
Self-injury attitude					
Affirmative	56 (11.09)	51 (10.10)	5 (1.00)	19.961	0.000
Against	173 (34.26)	116 (22.97)	57 (11.29)		
Neutral	276 (54.65)	226 (44.75)	50 (9.90)		

Table 1 (continued)

Table 1 (continued)

Variables	n (%)	NSSI group, n (%)	Non-NSSI group, n (%)	$\chi^2$	P value
Whether admitted to the psychiatric ward for the first time					
Yes	333 (65.94)	263 (52.08)	70 (13.86)	0.759	0.384
No	172 (34.06)	130 (25.74)	42 (8.32)		
Current main psychiatric diagnosis					
Depression	282 (55.84)	235 (46.53)	47 (9.31)	29.807	0.000
Anxiety	27 (5.35)	18 (3.56)	9 (1.78)		
Schizophrenia	22 (4.36)	16 (3.17)	6 (1.19)		
Childhood emotional disorder	55 (10.89)	36 (7.13)	19 (3.76)		
Bipolar disorder	66 (13.07)	58 (11.49)	8 (1.58)		
Other	53 (15.05)	30 (10.50)	23 (4.55)		

NSSI, non-suicidal self-injury.

diagnosis had significant differences in the influence of NSSI behavior among psychiatric hospitalized adolescents ( $P < 0.05$ ).

Table 2 shows the comparison of total score and each dimension score of CPANS, SDQ, and CSSMSS between the NSSI group and non-NSSI group. The results showed that the total score, the total mean score, and the scores of all dimensions of psychological abuse and psychological neglect in the NSSI group were significantly higher than those in the non-NSSI group ( $P < 0.01$ ). Except for the prosocial behavior dimension, the total scores of the SDQ and other dimensions in the NSSI group were significantly higher than those in the non-NSSI group ( $P < 0.05$ ). Moreover, the results indicated that the total scores of the problem-oriented coping, problem solving, seeking social support, and reasonable explanation dimensions of the CSSMSS in the NSSI group were significantly lower than those in the non-NSSI group, and the scores of emotion-oriented coping, tolerance, venting, fantasy, and denial in the NSSI group were significantly higher than those in the non-NSSI group ( $P < 0.05$ ).

Table 3 shows the comparison of positive rates of psychological abuse, psychological neglect, and emotional behavior difficulties between the NSSI group and non-NSSI group. The results indicated that the positive rates of psychological abuse, psychological neglect, and emotional and behavioral difficulties were significantly different between the NSSI group and the non-NSSI group ( $P < 0.05$ ).

Table 4 shows the results of logistic regression analysis of influencing factors of NSSI behavior among psychiatric

adolescent inpatients through stepwise logistic regression analysis of multiple factors. The assignment method of the argument was as follows: gender: male =0, female =1; age: 15–19 years =0, 10–14 years =1; close friends: no =0, yes =1; discuss self-injury among peers: no =0, yes =1; psychological abuse: no =0, yes =1; psychological neglect: no =0, yes =1; whether the total score of difficulties is abnormal: no =0, yes =1. Dummy variables were assigned as follows: parents scold: never =0, occasionally/sometimes/often/always =1; self-injurious attitude: yes =0, no/neutral =1, current main psychiatric diagnosis: depression =0, anxiety/schizophrenia/childhood emotional disorder/bipolar disorder/other =1. The results showed that psychiatric adolescent inpatients with females, 10–14 years old, engaging in peer discussion about self-injury, with emotional and behavioral difficulties, or negative coping styles might be prone to exhibit NSSI behavior ( $P < 0.05$ ), while having close friends, positive coping styles might be protective factors against NSSI behavior ( $P < 0.05$ ). We also found that compared with depression, adolescents with anxiety disorder and other mental disorders were more likely to have NSSI behaviors ( $P < 0.05$ ), but there was no significant difference in the occurrence of NSSI behaviors in depression, schizophrenia, childhood emotional disorder, and bipolar affective disorder ( $P > 0.05$ ).

## Discussion

NSSI usually begins in early adolescence (10). Adolescents are also a high-risk group for this behavior (23), and

**Table 2** Comparison of total score and each dimension score of CPANS, SDQ, and CSSMSS between NSSI group and non-NSSI group (n=505)

Variables	NSSI group (M ± SD)	Non-NSSI group (M ± SD)	t	Mean difference	95% CI	P value
<b>CPANS</b>						
Scolding	8.90±4.439	6.51±4.131	5.112	2.394	(1.474, 3.315)	0.000
Intimidation	8.24±4.184	6.22±3.999	4.542	2.016	(1.144, 2.888)	0.000
Interference	9.03±5.984	6.22±5.323	4.781	2.805	(1.648, 3.962)	0.000
Emotional neglect	13.23±6.399	11.22±6.009	2.966	2.006	(0.677, 3.335)	0.003
Educational neglect	5.30±3.721	4.08±3.310	3.127	1.217	(0.453, 1.982)	0.000
Physical neglect	4.61±3.250	3.84±3.596	2.170	0.774	(0.073, 1.475)	0.000
Total score of psychological abuse	26.17±13.099	18.96±11.881	5.246	7.215	(4.513, 9.917)	0.000
Total mean scale of psychological abuse	1.87±0.936	1.35±0.849	5.246	0.515	(0.322, 0.708)	0.000
Total score of psychological neglect	23.14±11.780	19.14±10.802	3.224	3.997	(1.561, 6.433)	0.001
Total mean score of psychological neglect	1.36±0.693	1.13±0.637	3.224	0.235	(0.092, 0.378)	0.001
<b>SDQ</b>						
Emotional symptoms	7.50±2.671	5.30±2.822	7.577	2.195	(1.626, 2.764)	0.000
Conduct problems	4.01±1.933	3.27±1.801	3.639	0.742	(0.342, 1.143)	0.000
Hyperactivity	6.92±2.164	5.56±2.492	5.214	1.354	(0.841, 1.866)	0.000
Peer problems	5.73±1.651	5.27±1.464	2.832	0.457	(0.139, 0.776)	0.005
Prosocial behavior	6.45±2.547	6.29±2.639	0.608	0.167	(-0.373, 0.708)	0.543
Total difficulty score	24.15±6.070	19.40±6.358	7.226	4.748	(3.457, 6.039)	0.000
Impact factor	7.28±2.285	5.40±3.062	6.030	1.878	(1.263, 2.494)	0.000
<b>CSSMSS</b>						
Problem solving	15.06±5.027	17.20±5.074	-3.958	-2.135	(-3.195, -1.075)	0.000
Seeking social support	15.19±4.682	16.54±4.830	-2.681	-1.354	(-2.346, -0.362)	0.008
Reasonable explanation	8.25±2.819	9.51±2.974	-4.111	-1.257	(-1.858, -0.656)	0.000
Endurance	11.15±2.874	10.24±2.729	2.986	0.909	(0.311, 1.507)	0.003
Evasion	10.00±2.985	8.67±2.686	4.252	1.330	(0.716, 1.945)	0.000
Venting emotion	10.25±3.101	9.21±3.088	3.154	1.047	(0.395, 1.699)	0.000
Fantasy denial	13.41±4.233	11.52±4.364	4.155	1.897	(1.000, 2.794)	0.000
Problem-oriented coping	38.50±10.875	43.25±11.233	-4.045	-4.746	(-7.052, -2.441)	0.000
Emotion-oriented coping	44.82±9.909	39.63±10.148	4.857	5.183	(3.086, 7.279)	0.000

CPANS, Child Psychological Abuse and Neglect Scale; SDQ, Strengths and Difficulties Questionnaire; CSSMSS, Coping Style Scale for Middle School Students; NSSI, non-suicidal self-injury; M ± SD, mean ± standard deviation.

international lifetime prevalence rates in adolescents of 17–18% for at least one incidence of NSSI were found in 2 independent systematic reviews (24,25). This proportion would increase significantly in the clinical adolescent

sample. Previous studies found that among people with mental disorders, the incidence of NSSI behavior was as high as 60.0–80.9% (10,26,27). Similarly, one study has shown that emotional disorders were significantly related

**Table 3** Comparison of positive rates of psychological abuse, psychological neglect, and emotional behavior difficulties between the NSSI group and non-NSSI group (n=505)

Variables	n (%)	NSSI group, n (%)	Non-NSSI group, n (%)	$\chi^2$	P value
Psychological abuse					
Yes	382 (75.64)	311 (61.58)	71 (14.06)	11.723	0.001
No	123 (24.36)	82 (16.24)	41 (8.17)		
Psychological neglect					
Yes	338 (66.93)	272 (53.86)	66 (13.07)	4.164	0.041
No	167 (33.07)	121 (24.10)	46 (9.11)		
Emotional and behavioral difficulties					
Yes	368 (72.87)	312 (62.15)	56 (11.09)	38.081	0.000
No	137 (27.13)	81 (16.04)	56 (11.09)		

NSSI, non-suicidal self-injury.

**Table 4** Logistic regression analysis on influencing factors of NSSI behavior among psychiatric adolescents (n=505)

Independent variables	$\beta$ value	Standard error	Wald	OR	95% CI	P value
Gender	0.872	0.275	10.068	2.391	1.396–4.097	0.002
Age	0.629	0.248	6.440	1.876	1.154–3.049	0.011
Close friends	-1.035	0.393	6.930	0.355	0.164–0.768	0.008
Peer disclosure	0.681	0.324	4.412	1.977	1.047–3.734	0.036
Current main psychiatric diagnosis (depression)						
Anxiety	0.946	0.373	6.421	2.574	1.239–5.349	0.011
Schizophrenia	0.332	0.563	0.348	1.394	0.462–4.204	0.555
Childhood emotional disorder	0.681	0.605	1.264	1.975	0.603–6.470	0.261
Bipolar disorder	0.311	0.457	0.464	1.365	0.558–3.340	0.496
Other	1.603	0.531	9.102	4.970	1.754–14.085	0.003
Emotional and behavioral difficulties						
Problem-oriented coping	-0.033	0.012	7.346	0.968	0.945–0.991	0.007
Emotion-oriented coping	0.034	0.014	5.772	1.035	1.006–1.064	0.016

NSSI, non-suicidal self-injury; OR, odds ratio; 95% CI, 95% confidence interval.

to NSSI behaviors, and patients with emotional disorders had more NSSI behaviors, which were more serious and frequent (28). It is not difficult to see that NSSI behaviors in adolescents has become one of the thorny problems faced by psychologists. How to ensure the safety of adolescent inpatients during hospitalization, promptly identify the risk factors of NSSI, and prevent the occurrence of NSSI behavior have become the key tasks of psychiatric nurses.

Our study found that the rate of NSSI behavior among adolescents admitted to psychiatric hospitals was undoubtedly high, at 77.82%. On the one hand, patients with mental illness have more psychological vulnerability and impulsive self-injury than those with general diseases, and on the other hand, this study was conducted in one of the leading general hospitals in China, wherein adolescents with mental disorders are associated with



more severe conditions. Clearly, NSSI has become one of the major problems endangering the mental health of adolescents. Therefore, it is necessary to focus on the treatment of mental illness in adolescent patients with self-injury behavior to determine the general rules and internal mechanisms.

This study explored the association of a number of factors with the development of NSSI behavior in adolescent inpatients in psychiatric wards. As shown in *Table 1*, our study found that gender, age, parental scolding, self-injury attitudes, close friends, and peer disclosure, psychiatric diagnosis were among the factors that influenced NSSI behavior.

Firstly, there was a sex difference in the incidence of NSSI among adolescent inpatients in psychiatric wards. The risk of developing NSSI was 2.6 times higher in female adolescents than in their male counterparts, which is consistent with the research results of Gandhi *et al.* and Taliaferro *et al.* (29,30). The reason may be that female adolescents may be more susceptible to self-injury because they are more likely to experience a higher negative influence and have a lower ability to manage emotions, including the acceptance of emotions and controlling impulses (31).

Secondly, adolescents aged 10–14 years were 1.7 times more likely to develop NSSI than those aged 15–19 years, indicating that adolescents in early adolescence are more likely to develop NSSI behaviors. This was consistent with the relevant research results (32). There are 2 possible reasons for this. On the one hand, it is related to the emotional regulation function of NSSI. In early adolescence, when the development of the body and mind is unbalanced, adolescents suddenly face a sharp increase in learning burden and tend to have complex and sensitive peer relationships, and the accumulation of stress events leads to difficulty in emotion regulation and self-injury behavior. With the advancement of age, cognitive function gradually matures, the ability to communicate gradually improves, the skills for overcoming setbacks gradually increase, the ability of self-emotion regulation is improved gradually, and the incidence of NSSI is decreased (33). On the other hand, it is related to the interpersonal regulation function of NSSI. Individuals can use NSSI behavior as a means to express pain, punish others, influence others, and so on. Adolescence is a time when the complexity of an individual's social needs is rapidly increasing, and the coping levels of adolescents may not be adequate to meet such needs; therefore, they tend to rely on the interpersonal function of NSSI behavior to meet their social needs, and in

late adolescence and adulthood, individuals become socially and emotionally mature, interpersonal relationships become stable, and NSSI behavior wanes (34).

Thirdly, parental scolding was closely related to NSSI behavior among adolescent inpatients in the psychiatric ward. Despite increasing visibility, NSSI is still highly stigmatized and met with fear and confusion by parents (35). Fearful or negative reactions from parents and family members may exacerbate psychological distress among youth, increase secrecy, and limit help-seeking, further increasing a sense of isolation (36).

Fourth, attitude toward self-injury was also shown to be one of the important factors influencing NSSI behavior. Whether the attitude toward self-injury was affirmative, against, or neutral was shown to affect whether adolescents choose NSSI behavior to deal with stressful events.

Fifth, our study found that the presence of close friends was an influence factor for the NSSI behavior of psychiatric adolescent inpatients. It is widely understood that peer relations are a major determinant of well-being and mental health in childhood and adolescence (37). Recent research suggests that supportive close friendships can buffer against the harmful consequences of negative family relationships on mental health and that close friendship strength during adolescence is related to physical and mental health over a decade later (38).

Sixth, peer discussion on self-injury was a risk factor for the NSSI behavior of psychiatric adolescent inpatients. This result may be consistent with our clinical experience. Previous studies have reported that discussing self-injury among adolescents would promote the occurrence of NSSI behavior. Evidence has shown that knowing a peer who self-injures increases the likelihood that a young person will self-injure (39). And our study found that disclosure of NSSI facilitated further recognition from peers and promote NSSI behavior. In view of the secretive and repetitive nature of NSSI behaviors, it is necessary to encourage adolescents to disclose the behavior to their adults (36).

Seventh, we also found that compared with depression, adolescents with anxiety disorder and other mental disorders were more likely to have NSSI behaviors. Psychiatric medical workers should focus on the types of psychiatric disorders that are prone to NSSI behavior, and prevent them from NSSI behavior again in advance.

Meanwhile, the results of single-factor analysis suggested that childhood psychological abuse and neglect may contribute to NSSI behavior. This was in line with the latest evidence-based findings. A systematic review of 71 studies

showed that overall childhood maltreatment was associated with NSSI [odds ratio (OR) 3.42, 95% confidence interval (CI): 2.74–4.26], and effect sizes for maltreatment subtypes ranged from 1.84 (1.45–2.34) for childhood emotional neglect to 3.03 (2.56–3.54) for childhood emotional abuse (40).

Furthermore, numerous studies have described the effect of poor emotional regulation strategies, poor emotional cognition, behavioral impulsivity, or self-criticism on the development of NSSI behaviors (41,42), which leads to enquiries of the existence of affective regulation vulnerability (43) at the root of these behaviors. In this study, the results indicated that the psychiatric adolescent inpatients in the NSSI group had more difficulties in emotional regulation, behavioral problems, attention, peer relationships, and psychological stress. This was consistent with the findings of other relevant studies (44,45). These results suggest that difficulties in attention, discipline, and peer interaction were more common among adolescents in the NSSI group, whereas prosocial behaviors such as helping, sharing, and caring were not significantly different between the 2 groups. This may be due to children in China are usually encouraged to be modest and disciplined self-effacing cultural stance, as adolescents are more likely to expose problems and ignore their own advantages (46).

Moreover, compared with the non-NSSI group, the NSSI group had lower scores in problem solving, seeking support, and reasonable explanation and higher scores in endurance, avoidance, venting, and fantasy denial. Thus, the possible causes of NSSI may be deviations in problem-solving, seeking support, and other problem-centered coping styles, which are usually called positive coping styles, and are usually associated with a high level of positive cognition and behavioral adjustment in the face of stress events. In addition, emotion-centered coping styles, including tolerance, venting, avoidance, fantasy denial and so on, are called negative coping styles, which are closely related to the risk of anxiety and depression (47). Adolescents in the NSSI group were more likely to adopt negative coping styles and less likely to adopt positive coping styles when facing stressful events. As shown in *Table 4*, problem-oriented positive coping styles were found to be protective factors for NSSI behavior among adolescents admitted to psychiatric hospitals, and emotion-oriented negative coping styles were risk factors for NSSI behavior among adolescents admitted to psychiatric hospitals.

Therefore, this study found that gender, age, close friends, peer disclosure, psychiatric diagnosis, emotional and behavioral difficulties, and coping styles were independent

influencing factors for NSSI behavior in psychiatric adolescent inpatients. However, we also found that the 4 independent variables of parental scolding, self-injury attitude, psychological abuse, and psychological neglect did not enter the regression equation, suggesting that the influence of childhood maltreatment and neglect on NSSI may be mediated by other related factors.

## Conclusions

In summary, the detection rate of NSSI in psychiatric adolescent inpatients was relatively high, and it can be investigated based on gender, age, close friends, peer disclosure, psychiatric diagnosis, emotional behavior regulation, and coping style. The results of this study are helpful for researchers and clinicians in the field of psychiatry to understand the current situation and influencing factors of NSSI of adolescent inpatients in psychiatric wards, and can provide reference for targeted prevention and intervention of NSSI behavior of adolescent inpatients with mental diseases. The limitation of this study was that it was based on cross-sectional survey data within the psychiatric ward of a comprehensive hospital, and the existence of selection bias cannot be ruled out. The occurrence and frequency of NSSI were all calculated based on retrospective surveys, and the results need to be further demonstrated in conjunction with prospective studies.

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## Footnote

*Reporting Checklist:* The authors have completed the

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*Data Sharing Statement:* Available at <https://tp.amegroups.com/article/view/10.21037/tp-22-588/dss>

*Conflicts of Interest:* All authors have completed the ICMJE uniform disclosure form (available at <https://tp.amegroups.com/article/view/10.21037/tp-22-588/coif>). The authors have no conflicts of interest to declare.

*Ethical Statement:* The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The study was approved by the Biomedical Research Ethics Committee, West China Hospital of Sichuan University (No. 20201049). The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). All patients or patients' legal guardians provided informed consent.

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