

The Prevalence of Non-Suicidal Self-Injury and Its Risk Factors Among Patients with Depression or Bipolar Disorder in China

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Abstract

The purpose of this study was to investigate the prevalence of non-suicidal self-injury and its risk factors among patients with depression or bipolar disorder in China. 394 inpatients ($M_{age}=29.71$; $SD_{age}=11.95$) with depression or bipolar disorder were recruited from two psychiatric hospitals in Beijing, China. A General Demographic Data Form, the Non-suicidal Self-injury Questionnaire (NSSI-Q), Impulsivity Items and the Adverse Childhood Experiences-International Questionnaire (ACE-IQ) were completed by all patients. Of the 394 patients examined, 245 (62.2%) of this sample reported NSSI in past year. The most common methods of NSSI for female was "pinching" (23.1%) and "scratching" (22.8%), while for male it was "hitting hard objects" (12.7%). By multivariate regression analysis, young age, single in marital status, left-behind experience, impulsivity and ACEs were risk factors for NSSI. Our study points to the fact that there has been an unfortunate information in prevalence of NSSI among patients with depression or bipolar disorder in China. It is not only necessary to raise the awareness of NSSI among families and the society, but also to formulate targeted assessments and intervention. Moreover, future research should focus not only on individuals being hospitalized, but should be representative of individuals treated at home or in the community because there are no national statistics on NSSI among such patients in China.

Background

Non-suicidal self-injury (NSSI) is generally defined as "the direct, deliberate destruction of one's own body tissue without the intention of suicidal intent" (Nock and Favazza, 2009), including cutting or scratching the skin, burning/branding with cigarettes/lighters, scalding, striking oneself or other hard objects, banging limbs/head and hair pulling, et al (Brophy and Holmstrom, 2016). Based on previous studies, DSM-5 provides a more accurate definition of NSSI, that is, in the last year, an individual has been engaged in a behavior that intentionally causes bleeding, bruising, or pain on the body surface for 5 or more days, but only causes slight or moderate physical injury (Guha, 2014). As one of the major public health problems recognized globally, NSSI has raised significant concerns among health professionals, researchers, social workers and welfare workers, teachers, other professionals and affected families (Brown and Plener, 2017).

Prevalence estimates of NSSI vary widely as due to a number of factors including the time since last episode of NSSI, the number of NSSI episodes to be recognized, research tools, as well as different study areas and populations (Baiden et al., 2017a). Benjet (Benjet et al., 2017) found in a sample of 1,071 Mexican residents of young adults that lifetime prevalence rates of NSSI was 18.56%, and the 12-month prevalence rates was 3.19%. In Canada, estimates of prevalence range from as low as 7% (Duggan et al., 2015) of student samples to as high as 77% (Preyde et al., 2014) of clinical samples. As a coping strategy for maladaptive individuals (Guerreiro et al., 2013), NSSI are more prone to be seen in clinical populations, especially in patients with depression or bipolar disorder who have poor ability of emotional regulation and coping (Kim et al., 2015). A recent study (Weintraub et al., 2017) observed that about 52% and 37% of patients with bipolar disorder and depression had NSSI at least once, respectively. Chinese researcher also found that 59 out of 153 Chinese patients with depression (38.6%) had committed NSSI in the past year (Fang and Li, 2019). Although there have been a small number of relevant studies in China, the

evidence of NSSI prevalence is still sparse and heterogeneous due to sample source and different definitions of NSSI(Wan et al., 2015; Zhang et al., 2016). It is necessary to carefully design studies to help better understand the epidemiology of NSSI in Chinese patients with depression or bipolar disorder.

The high incidence of NSSI has led to a variety of serious consequences, including physical injury(Bentley et al., 2014), negative emotional experiences and a decline in learning ability, work efficiency(Klonsky, 2009). The high incidence and severe consequences of NSSI have prompt researchers to explore the risk factors relate to NSSI in order to propose targeted interventions to reduce the occurrence of NSSI. When it comes to risk factors, different researchers hold different views. A study showed that young individuals were more prone to conduct NSSI(Casey et al., 2008). However, the evidence on whether NSSI changes with age is insufficient. Moreover, there is contradictory evidence as to whether there are gender differences in NSSI with some studies reporting a higher prevalence among female(Bresin and Schoenleber, 2015) and others finding no gender differences(Plener et al., 2009). Also, Calhoun emphasized that NSSI was uniquely associated with marital status, employment status, socio-economic status. Nevertheless, findings should be cited with caution(Calhoun et al., 2017). Tschan found that NSSI was associated with the educational level of parents(Tschan et al., 2015a). Besides, there may also be a link between impulsivity and NSSI(Weintraub et al., 2017), which may be more pronounced in individuals with depression or bipolar disorder than in the general population(Lombardo et al., 2012). To date, the existing literature is inconsistent with regard to whether the incidence of NSSI is related to adverse childhood experiences (ACEs). A study(Baiden et al., 2017a) presented that ACEs may be a predictor of NSSI later in life. However, Glassman have failed to observe a significant correlation between ACEs and NSSI(Glassman et al., 2007), while another study presented that ACEs was found to be associated with NSSI(Maniglio, 2011).

Whereas studies from other countries have investigated the prevalence of NSSI and risk factors of NSSI(Swannell et al., 2016; Serafini et al., 2017; Calhoun et al., 2017), including the exploration of patients with depression or bipolar disorder(Baiden et al., 2017a; Weintraub et al., 2017). So far, few studies within the Chinese context have investigated the prevalence of NSSI and the risk factors for NSSI among patients with depression or bipolar disorder. Almost all of the few existing studies on NSSI in China are from the general population or relied on student samples where the characteristics are far from representative of patients with depression or bipolar disorder. The purpose of this study aimed to: 1) examine the prevalence of NSSI among patients with depression or bipolar disorder in China, and 2) determine the risk factors for NSSI.

Methods

PARTICIPANTS

The participants for this cross-sectional study consisted of adult patients who were hospitalized at one of the two Chinese biggest psychiatric hospitals in Beijing (Beijing Anding Hospitals and Beijing HuiLongGuan Hospital), China, between September 2019 and May 2020. Inclusion criteria were: 1) The patients who were aged 18 to 60 years old met the diagnostic of depression or bipolar disorder according to ICD-10 criteria by two or more psychiatrists; 2) The patients were clinically stable (emotional stability, good symptom control,

good interpersonal relations) ; 3) The patients were able to read and write in simplified Chinese; 4) The patients were willing to join our study after providing informed consent. Exclusion criteria were the presence of any condition that may affect the ability to complete the questionnaire and the accuracy of the results, including accompanied by other mental illnesses, delirium, dementia, hearing disorders, mental retardation or denial of informed consent.

PROCEDURES

Totally, 394 adult patients were recruited. The researcher explained the purpose, content and procedure of the research to the subjects, and promised that the research results would only be used for academic research. Subjects voluntarily participated in this research and each provided written informed consent. The questionnaire information was collected face-to-face, one-on-one, by trained researchers in a quiet room in the ward after being given a verbal and written explanation of the study and having acquired informed consent. And the questionnaire was completed by the subjects themselves. If the respondents have questions about the questionnaire, the researchers can help them understand by informing them of the original intention of the question in a non-judgmental way. Additionally, the quality control procedures in the research process are also very important. Measures were taken for quality assurance, such as intensive researcher training, detailed field explanations, continuous feedback and independent supervision of supervisors and field researchers. The questionnaire was collected by the researcher on the spot after completion.

INSTRUMENTS

DEMOGRAPHIC DETAILS

A General Demographic Data Form by self-designed was employed to collect basic information of each patient, including gender, age, marital status, employment status, monthly family income, residence, education level of patients and their parent, left-behind experience, substance abuse experience (medical records), family type (joint family or nuclear family or single family), family structure (single child family or multiple children family), and the clinical features of patients (diagnosis, duration of illness, times of recurrence, details see Table 1).

Table 1

Demographic characteristics, impulsivity and ACEs between NSSI Group and Non-NSSI Group.

Variables	NSSI Group	Non-NSSI Group	Comparisons		
	(n = 245)	(n = 149)	χ^2	df	P-value
Age (years)					
18 ~ 30	190	55	66.339	2	< 0.001
31 ~ 45	38	61			
46 ~ 60	17	33			
Gender					
Male	71	48	0.460	1	0.498
Female	174	101			
Education of patients					
Elementary school and below	2	4	3.989	3	0.263
Junior school graduate	30	17			
High school graduate	57	26			
University and above	156	102			
Employments status					
Employed	95	88	20.011	2	< 0.001
Unemployed	145	54			
Retire	5	7			
Marital status					
Single	186	57	58.519	2	< 0.001
Married	45	80			
Divorced or widowed	14	12			
Monthly family income (US dollar)					
400 ~ 700	64	55	6.153	2	0.046
700 ~ 1000	71	43			
>1000	110	51			
Residence					
Urban	163	96	0.182	1	0.670

Variables	NSSI Group	Non-NSSI Group	Comparisons		
	(n = 245)	(n = 149)	χ^2	df	P-value
Rural	82	53			
Left-behind experience					
Yes	71	28	5.111	1	0.024
No	174	121			
Substance abuse experience					
Yes	57	19	6.578	1	0.010
No	188	130			
Family type					
Nuclear family	132	86	7.376	3	0.061
Joint family	43	24			
Single family	70	39			
Family structure					
Single child family	128	71	0.782	1	0.376
Multiple children family	117	78			
Education of father					
Elementary school and below	37	37	9.708	3	0.021
Middle school graduate	71	36			
High school graduate	41	33			
University and above	96	43			
Education of mother					
Elementary school and below	48	48	8.542	3	0.036
Middle school graduate	58	34			
High school graduate	58	28			
University and above	81	39			
Diagnosis					
Depression	135	73	1.387	1	0.239
Bipolar Disorder	110	76			

Variables	NSSI Group	Non-NSSI Group	Comparisons		
	(n = 245)	(n = 149)	χ^2	df	P-value
Duration of illness (years)					
<3	143	86	3.030	3	0.387
3 ~ 5	43	19			
5 ~ 10	34	22			
>10	25	22			
Times of recurrence					
0	60	42	4.683	5	0.456
1 ~ 3	112	62			
3 ~ 5	33	26			
>5	40	19			
Impulsivity					
Yes	84	29	9.952	1	0.002
No	161	120			
Adverse childhood experiences					
Yes	241	127	25.925	1	<0.001
No	4	22			

NON-SUICIDAL SELF-INJURY QUESTIONNAIRE (NSSI-Q)

The Non-suicidal Self-injury Questionnaire was compiled by Wan et al.(Wan et al., 2011) in the investigation of nationwide large sample of NSSI. In 2018, Wan et al.(Wan et al., 2018) further developed the tool. There are 12 items in the questionnaire, which are divided into two dimensions: Items 1 to 7 involve NSSI without obvious tissue injury, which refers to that the NSSI carried out by individuals does not cause obvious and serious tissue damage; items 8 to 12 involve NSSI with obvious tissue injury, which refers to NSSI by individuals may result in bleeding, scratches and other tissue damage. Participants were asked to answer questions, "In the past year, have you ever engaged in the following behaviors to deliberately injure yourself but without suicidal intent?" The questionnaire investigated the occurrence of 12 categories of NSSI of the respondents in the past year, including pinching, scratching, hitting hard objects with head/fist, hitting themselves with fists or hard objects, biting, pulling his/her hair, stabbing, cutting, scalding, etc. It is a 5-point Likert scale ranging from "never" (score 0) to "always" (score 4), with a total score of 0 ~ 48. A dichotomous variable of NSSI status was computed based on the 12 items. It was coded 0 when participants chose "never" as the answer of all items, and was coded 1 when participants reported

having engaged in one or more NSSI acts. NSSI-Q showed satisfactory reliability and validity as a self-report measure for NSSI(Wan et al., 2018). In this study, the Cronbach's α of the questionnaire was 0.82.

IMPULSIVITY

Impulsivity was measured by the question: "Most of time in your life, no matter what the situation was, no matter who you were with, have you often done things impulsively?" For the assessment of impulsivity, it is derived from the borderline personality disorder assessment module using the *NIAAA Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV*(McMahon et al., 2018). Good convergent and divergent validity were previously embodied in this item(Chamorro et al., 2012).

ADVERSE CHILDHOOD EXPERIENCES-INTERNATIONAL QUESTIONNAIRE (ACE-IQ)

ACEs were assessed using the Adverse Childhood Experiences International Questionnaire (ACE-IQ) developed by the World Health Organization(WHO, 2016), which covers 3 domains of childhood adversities, including childhood maltreatment, family/household dysfunction and violence outside the home. Collectively, these 3 domains on behalf of 13 categories of ACEs, which covers family dysfunction; physical, sexual and emotional abuse and neglect; peer violence; witnessing community violence, and exposure to collective violence. Each respondent was asked if they had experienced various adverse events during their childhood (prior to the age of 18). In this present study, the frequency scoring method was used to generate a conservative estimate of ACE exposure that closer to international standards. ACE scores were recorded as total counts for the number of questions to which respondents answered that they had experienced an ACE. The existence of any of the 13 categories of ACEs is considered to be the existence of ACEs. The ACE-IQ has good reliability and validity (Ho et al., 2019; Almuneef et al., 2017; Kidman et al., 2019; Kim, 2017). The Cronbach's α of the questionnaire was 0.72 in this current study.

STATISTICAL ANALYSIS

Descriptive statistics for all the variables were first conducted using percentages for the categorical variables. Mean, standard deviation, and range were computed for continuous variables. The prevalence of NSSI was examined and presented in terms of frequency and the proportion of those encountering it (%). Social-demographic characteristics, impulsivity and ACEs of participants between NSSI group and Non-NSSI group were compared by using the χ^2 test or t-test. Taking NSSI as dependent variable, variables with statistical significance ($P < 0.05$) were taken as independent variables for multivariate logistic regression. Age, employments status, marital status, monthly family income, education of parents were set as dummy variables in line with the requirement of logistic regression. In addition, based on clinical experiences and literature review, it was found that the gender was closely related to the occurrence of NSSI(Tang et al., 2018). Therefore, gender was included in logistic regression for further analysis. All the variables were entered in the model using the enter method. All statistical differences were considered significant when the $P < 0.05$ for both directions. All statistical analyses were performed in SPSS for Windows, Version 21.0.

Results

The sample composed of 394 adult patients (Male = 119, Female = 275), with a mean age of 29.71 years ($SD = 11.95$). Male and female patients did not differ in age (29.81 ± 12.17 vs. 29.49 ± 11.46 ; $t = -0.25$; $P = 0.80$), or diagnosis ($\chi^2 = 1.28$; $P = 0.86$). The response rate was 96%. 16 patients who were eligible for inclusion in this research refused their consent to participate in the research. No patients returned incomplete or not analyzable questionnaires.

THE DEMOGRAPHICS, CLINICAL FEATURES, IMPULSIVITY AND ACEs

The average age of 394 respondents (119 male, 275 female) were 29.71 years, and they were from north China (65.5%), northeast China (7.9%), etc, most of them were female (69.8%). The majority of the respondents (98.5%) had accomplished junior school or above and 50.5% of the respondents were unemployed. In addition, the monthly family income of 161 participants exceeded 8000 yuan. More than half of the respondents (61.7%) were single and from urban areas (65.7%). 99 (25.1%) and 76 (19.3%) respondents had left-behind experience and substance abuse experience respectively. The education level of the parents of the respondents was mostly university or above, especially the fathers (35.3%). 218 participants (55.33%) were from the nuclear family. The number of participants from single child family (50.5%) and those from multiple children family (49.5%) accounted for about half each. Clinical diagnoses of the patients were depression (52.8%) and bipolar disorder (47.2%), of whom the majority were within 3 years of illness (58.1%) and within 1–3 times of recurrence (44.2%). 28.7% of participants reported impulsivity, and the vast majority of participants (93.4%) reported ACEs.

THE PREVALENCE OF NSSI AND COMPARISONS OF DEMOGRAPHICS, CLINICAL FEATURES, IMPULSIVITY AND ACEs BETWEEN GROUPS

The final sample comprised 245 adult patients accompanied with NSSI (62.2%) and 149 adult patients unaccompanied with NSSI (37.8%). Among 245 participants with NSSI, 174 (71%) were female and 186 (75.9%) were single. Moreover, 57 (14.4%) had engaged in one type of NSSI and 188 (47.6%) had attempted more than one type of NSSI, respectively. "Deliberately pinching oneself" (23.1%) was the most common way of NSSI for female, while "Deliberately hitting hard objects such as walls, tables, windows and floors with fists" (12.7%) was the most common way of NSSI for male, as detailed in Fig. 1.

We also compared the demographics and clinical features of the NSSI group and the Non-NSSI group to explore the relationship. Chi-square test showed that age, employments status, marital status, monthly family income, left-behind experience, substance abuse experience, and education of mother and father were statistically different between the two groups (all $P < 0.05$). Furthermore, impulsivity ($P = 0.002$) and ACEs ($P < 0.001$) also had a significant effect on NSSI, as presented in Table 1.

RISK FACTORS ASSOCIATED WITH NSSI OF PARTICIPANTS

As revealed in Table 1, the variables that showed significance in the above comparison of 394 participants were further analyzed by multivariate regression analysis. Of course, as mentioned above, we also included gender in multivariate logistic regression based on the evidence from clinical and academic experience. As presented in Table 2, 5 variables - age, marital status, left-behind experience, impulsivity and ACEs - emerged as significant correlates of NSSI in the final model. First, the incidence of NSSI was significantly lower in 31 ~ 45 years old group (odds ratio [OR] = 0.324, $P = 0.002$, 95% confidence interval [CI] 0.160 ~ 0.656) and 46 ~ 60 years old group ($OR = 0.254$, $P = 0.006$, 95% CI 0.096 ~ 0.675) (using 18 ~ 30 years old group as the reference category). Next, low risks for NSSI remained associated with married in marital status ($OR = 0.444$, $P = 0.028$, 95% CI 0.215 ~ 0.918) (using single group as the reference category) and no history of left-behind ($OR = 0.538$, $P = 0.041$, 95% CI = 0.297 ~ 0.974) (using left-behind experiences group as the reference category). In addition, the incidence of NSSI was significantly lower in no impulsivity group ($OR = 0.455$, $P = 0.008$, 95% CI = 0.254 ~ 0.815) (using impulsivity group as the reference category). Finally, those who did not have ACEs were less likely to engage in NSSI than those who have ($OR = 0.130$, $P = 0.001$, 95% CI = 0.039 ~ 0.429) (using ACEs group as the reference category).

Table 2
Risk factors for patients' NSSI.

Variables	B	S.E.	Wald	P-value	OR	95% CI	
						Lower B	Upper B
Age (years)							
18 ~ 30 ^a	-	-	-	-	-	-	-
31 ~ 45	-1.127	0.359	9.825	0.002	0.324	0.160	0.656
46 ~ 60	-1.369	0.497	7.567	0.006	0.254	0.096	0.675
Marital status							
Single	-	-	-	-	-	-	-
Married	-0.811	0.370	4.804	0.028	0.444	0.215	0.918
Divorced or widowed	0.127	0.550	0.053	0.818	1.651	0.387	3.333
Left-behind experience							
Yes	-	-	-	-	-	-	-
No	-0.620	0.303	4.188	0.041	0.538	0.297	0.974
Impulsivity							
Yes	-	-	-	-	-	-	-
No	-0.787	0.297	7.013	0.008	0.455	0.254	0.815
Adeverse childhood experiences							
Yes	-	-	-	-	-	-	-
No	-2.044	0.611	11.197	0.001	0.130	0.039	0.429
^a Reference group							

Discussion

In terms of NSSI, there have been a few clinical studies involving patients with depression or bipolar disorder in Western countries (Baiden et al., 2017a; Thomassin et al., 2016), however no such study was conducted in Chinese populations. This is the first study to investigate the prevalence of NSSI and risk factors for NSSI among patients with depression or bipolar disorder of all ages in China. Moreover, our findings indicated that a large number of patients with depression or bipolar disorder had conducted NSSI in this sample, and certain demographics, impulsivity and ACEs was associated with NSSI among patients with depression or bipolar disorder in China.

In the present study, our results of prevalence of NSSI was 62.2%, which was slightly lower than the prevalence of NSSI (77%) in a Canadian study among clinical populations (Preyde et al., 2014). Equally, Weintraub et al. (Weintraub et al., 2017) found that about 37% of patients with depression and 52% of patients with bipolar disorder had at least one NSSI, which was also higher than the results of this study (34.3% and 27.9%, respectively). The discrepancies in estimates of the prevalence of NSSI may be related to different sample sources and numbers, various assessment tools, wording of instructions, time frame for raising questions and data collection procedures. In regard to the method of NSSI, patients of different genders tried NSSI in different ways. Barrocas (Barrocas et al., 2012) found 'hitting against hard objects' to be the most common way that male injury themselves, while Brunner (Brunner et al., 2013) found 'cutting' to be the most common way that female injury themselves. These findings of ways of NSSI are generally consistent with this present study. Explanations for gender differences are yet to be examined and may be due to personality differences and cultural differences (Tresno et al., 2013).

It has been suggested that demographic characteristics and clinical features (age, gender, marital status and diagnosis, etc) should be considered when interpreting results of any NSSI research (Brown and Plener, 2017). Contrary to expectation, there was no statistical significance between patient's gender, education, residence and the incidence of NSSI ($P=0.498$, $P=0.263$, $P=0.679$), which are contrary to Tang's study (Tang et al., 2018). On the one hand, this study included patients with depression and bipolar disorder. Compared with the general population, their ability of emotion regulation and coping with life events is limited (Chapman et al., 2006). On the other hand, this present study recruited patients from two psychiatric hospitals in Beijing, most of whom came from Beijing or the affluent urban families from other cities. Most included patients had better educational opportunities and higher level of education.

Also, age was closely related to NSSI ($P<0.001$). Possible explanations for this is that the individual's emotional regulation ability and adaptive strategies tend to be stable with age (Benson et al., 2019). Moreover, our result was similar to the previous studies (Neufeld et al., 2015) that marital status ($P<0.001$), employment status ($P<0.001$) and monthly family income ($P=0.046$) were significant predictors of NSSI. It is widely known that family support obtained by stable marriage status was most salient in onset, maintenance and cessation of NSSI (Tatnell et al., 2014). Equally, stable employment status and high family income also represent adequate financial and emotional support for individuals, reducing the risk of NSSI (Arshad et al., 2020). We also found that there was a significant difference in parents' education between two groups ($P=0.021$, $P=0.036$), which was mostly matched with another study (Tschan et al., 2015). Explanations may be that parents with higher education are more likely to impose stricter requirements on their children, especially in China where parental authority is emphasized (Lin and Fu, 1990). It suggests that positive parenting behaviors that can reduce the odds of next year NSSI onset need to be promoted (Victor et al., 2019). Furthermore, significant differences in left-behind experience ($P=0.024$) and substance abuse experience ($P=0.010$) were observed between two groups, which was consistent with previous study (Dharmawardene and Menkes, 2017; Wang and Liu, 2020). And we strengthened the findings of other studies (Brown et al., 2018; Liu et al., 2018) that impulsivity ($P=0.002$), ACEs ($P<0.001$) were tied up with NSSI.

Multivariate regression analysis further proved that young, single, left-behind experience, impulsivity and ACEs were risk factors leading to NSSI of patients with depression and bipolar disorders. First of all, this study showed that younger participants (18 ~ 30 years old) had a higher risk of NSSI, which is consistent with Preyde's findings that NSSI is more prevalent in young patients with psychiatric disorders due to their difficulty in regulating emotions and interpersonal relationships(Preyde et al., 2014). Next, our results confirmed that single participants had a high risk of developing NSSI, which is matched with Neufeld's results that unmarried participants were 1.27 times more likely to develop NSSI than married participants(Neufeld et al., 2015). One possible explanation for this is the protective effect of marriage, which provides social, economic and emotional support to individuals and reduces their sense of isolation by providing them with opportunities to interact with society and the community, and spouses of married patients with mood disorder can monitor their partners' health-related behaviors for a long time, providing health support for them and encouraging them to develop healthy lifestyle(Kyung-Sook et al., 2018).

Not only that, results also displayed that participants with left-behind experience are more likely to develop NSSI, which is similar to another Chinese study(Wang et al., 2019). The left-behind experience is common in China, which is closely related to China's special national conditions. Actually, many residents of undeveloped areas in China choose to find jobs and earn money in developed areas, especially rural residents. A newly report of China's migrant workers showed that nearly 159 million rural residents were moving to developed cities in search of works, among which 126 million parents left their children in their hometown(Cheng and Sun, 2015). As mentioned earlier, Many Beijing natives were included in this study. Among the Beijing natives included, their parents left their hometown and children early to earn money in Beijing, and then gradually settled down in Beijing. Therefore, those children of parents who migrate to urban areas become 'left-behind children'(Duan and Zhou, 2005). However, the left-behind experience has a negative impact on the physical and mental development of individuals(Li et al., 2018). For instance, individuals with left-behind experience cannot get timely psychological counseling and emotional support due to the long-term absence of their parents(Wang et al., 2019), thus developing maladaptive coping strategies and NSSI is one of them(Guerreiro et al., 2013).

Apart from above factors, our results also proposed that impulsivity remained a significant influence on NSSI, this finding is similar to a published works by Lin et al.(Lin et al., 2017). Individuals with strong impulsivity tend to act impulsively in the face of negative emotions, because the short-term gain of emotional regulation is the most important goal at present(Cyders and Smith, 2008). Since NSSI has been proved to be an effective method for individuals to regulate negative emotions, individuals with strong impulsivity are more willing to participate in NSSI to obtain the direct benefits of NSSI (i.e. emotional regulation)(Armey et al., 2011). At the same time, it is suggested that NSSI is a rapid, effective, and easily implemented method of regulating one's negative emotion(Lin et al., 2017). Consequently, impulsivity may be strongly related to NSSI. That could be these explanations for the findings.

In recent years, several studies found that patients reporting ACEs were more likely to engaged in NSSI(Baiden et al., 2017a; Brown et al., 2018), which is basically consistent with this present study. What's more, Baiden' team found ACEs can be strongly associated to NSSI among patients, especially the patients with depression and bipolar disorder(Baiden et al., 2017a). Although heritability is often emphasized, NSSI

is associated with environmental factors(Maciejewski et al., 2014). As a series of negative life events related to the family and social environment, ACEs will seriously affect the individual's psychological development and adaptability, and reduce the individual's ability of emotional regulation(Choi and Oh, 2014). Not only that, the patients with a diagnosis depression or bipolar disorder already have weak ability of emotional regulation(Van Rheenen et al., 2015). Therefore, patients with ACEs can relieve their negative emotions by adopting NSSI. This also explains why ACEs has a subtle effect on the occurrence of NSSI in patients with depression and bipolar disorder.

Conclusions

The current study examined the prevalence of NSSI and investigated the risk factors for based on data from a sample of two psychiatric hospitals in Beijing. Our study reported that NSSI are experienced by a significant number of patients with depression or bipolar disorder in this sample, and NSSI were associated with some factors, including age, marital status, impulsivity, etc. NSSI affect victims' physical and mental health, and can place a heavy financial burden on families and society. Some implications for public policy were manifested in this study. The risk of NSSI in patients with mental disorders, especially who are young, single, impulsive and have left-behind experience, ACEs should be assessed. Awareness of NSSI should be improved among families and society. Likewise, training for health care workers and educators are needed, to help them identify and intervene as early as possible. It is necessary to formulate targeted interventions, as well as provide timely social support for patients with NSSI and his family. In terms of methodology, future research should enrich access to information, including interviews with patients and their family members, medical records or other documents to confirm these reports of NSSI and ACEs obtained by using self-rating scales. And future studies can also focus on the relationship between NSSI and its possible risk factors among patients with other types of mental disorders and compare them, rather than focusing on one or two mental disorders alone in order to find the differences.

Abbreviations

NSSI (Non-suicidal self-injury)

ACEs (adverse childhood experiences)

Declarations

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The recruitment, consent, and field procedures were approved by the Research Ethics Board of Peking Union Medical College (2019-18-K7). Written informed consent was obtained from individual or guardian participants.

CONSENT FOR PUBLICATION

Not applicable.

AVAILABILITY OF DATA AND MATERIALS

All data generated or analysed during this study are included in this published article.

COMPETING INTERESTS

The authors declare that they have no competing interests.

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AUTHOR'S CONTRIBUTIONS

LW and HZ designed the study, JL and YY collected the data, LW analyzed and interpreted the data, and was a major contributor in writing the manuscript. All authors read and approved the final manuscript.

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Figures

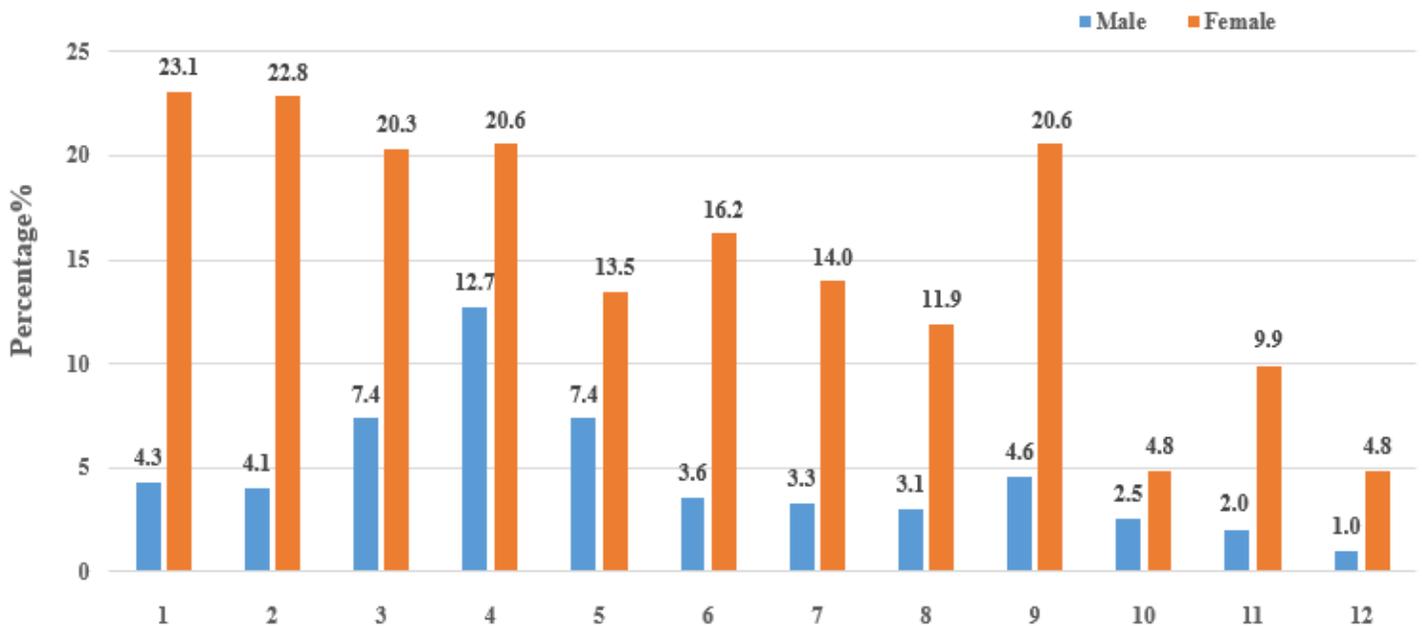


Figure 1

Frequency of 12 kinds of NSSI among male and female participants. NOTE: 1=deliberately pinching oneself; 2=deliberately scratching oneself; 3=deliberately hitting hard objects with head; 4=deliberately hitting hard objects with fist; 5=deliberately hitting oneself with a fist, palm, or hard object; 6=deliberately

biting oneself; 7=deliberately pulling own hair; 8=deliberately stabbing oneself; 9=deliberately cutting oneself; 10=deliberately scalding oneself; 11=deliberately rubbing own skin; 12=deliberately carving words on the skin (excluding tattoos).

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