

Differences in Non-suicidal Self-injury Behaviors between Unipolar Depression and Bipolar Depression in Adolescent Outpatients*

Ting-wei WANG^{1, 2}, Jian GONG¹, Yang WANG³, Zhen LIANG⁴, Ke-liang PANG⁵, Jie-si WANG⁶, Zhi-guo ZHANG⁴, Chun-yan ZHANG², Yue ZHOU¹, Jun-chang LI², Yan-ni WANG^{1#}, Yong-jie ZHOU^{2#}

¹School of Public Health, Lanzhou University, Lanzhou 730000, China

²Shenzhen Mental Health Center, Shenzhen Kangning Hospital, Shenzhen 518000, China

³College of Management, Shenzhen University, Shenzhen 518000, China

⁴School of Biomedical Engineering, Health Science Center, Shenzhen University, Shenzhen 518000, China

⁵School of Pharmaceutical Sciences, IDG/McGovern Institute for Brain Research, Tsinghua University-Peking University Joint Center for Life Sciences, Tsinghua University, Beijing 100000, China

⁶CAS Key Laboratory of Mental Health, Institute of Psychology, Chinese Academy of Sciences, Beijing 100000, China

© Huazhong University of Science and Technology 2023

[Abstract] Objective: Non-suicidal self-injury (NSSI) has a higher prevalence in adolescents with depressive disorders than in community adolescents. This study examined the differences in NSSI behaviors between adolescents with unipolar depression (UD) and those with bipolar depression (BD). **Methods:** Adolescents with UD or BD were recruited from 20 general or psychiatric hospitals across China. The methods, frequency, and function of NSSI were assessed by Functional Assessment of Self-Mutilation. The Beck Suicide Ideation Scale was used to evaluate adolescents' suicidal ideation, and the 10-item Kessler Psychological Distress Scale to estimate the anxiety and depression symptoms. **Results:** The UD group had higher levels of depression (19.16 vs.17.37, $F=15.23$, $P<0.001$) and anxiety symptoms (17.73 vs.16.70, $F=5.00$, $P=0.026$) than the BD group. Adolescents with BD had a longer course of NSSI than those with UD (2.00 vs.1.00 year, $Z=-3.39$, $P=0.001$). There were no statistical differences in the frequency and the number of methods of NSSI between the UD and BD groups. Depression ($r=0.408$, $P<0.01$) and anxiety ($r=0.391$, $P<0.01$) were significantly and positively related to NSSI frequency. **Conclusion:** Adolescents with BD had a longer course of NSSI than those with UD. More importantly, NSSI frequency were positively and strongly correlated with depression and anxiety symptoms, indicating the importance of adequate treatment of depression and anxiety in preventing and intervening adolescents' NSSI behaviors.

Key words: non-suicidal self-injury; unipolar depression; bipolar depression; depression; anxiety; adolescent

Non-suicidal self-injury (NSSI) is defined as the intentional, direct self-damage of body tissue without suicidal ideation by using a socially unacceptable way^[1-3]. Adolescents is more vulnerable to NSSI, and the prevalence of NSSI in adolescents was estimated to reach 17.2% worldwide in 2014^[4] and 24.9%–29.2% in China from 2015 to 2016^[5, 6]. In the past several

decades, the incidence of NSSI among adolescents had been increasing and became a major global and public health concern^[7]. For example, NSSI among adolescents increased by 75% in Ireland between 2007 and 2016^[8], and a 68% increase occurred among the UK adolescents during 2011–2014^[9].

Depression is consistently identified as the most critical risk factor for NSSI among adolescents and young adults^[10, 11]. Adolescents who engage in NSSI tend to show higher levels of depression and hopelessness than community adolescents^[12], especially among repeated self-injurers^[13]. Both unipolar depression (UD) and bipolar depression (BD) are vital risk factors for NSSI. UD is characterized by low mood and reducing activity and concentration^[14], and BD by depressive and manic or hypomanic episodes^[15]. Depressive episodes are the most common mood states both in UD and BD^[16, 17].

Some studies found differences between UD and

Ting-wei WANG, E-mail: wangtw20@lzu.edu.cn

#Corresponding authors, Yan-ni WANG, E-mail: wangyann@lzu.edu.cn; Yong-jie ZHOU, E-mail: qingzhu1108@126.com

*This work was supported by the Sanming Project of Medicine in Shenzhen (No. SZSM202011014), Shenzhen Fund for Guangdong Provincial High-level Clinical Key Specialties (No. SZGSP013), Shenzhen Key Medical Discipline Construction Fund (No. SZXK072), and Shenzhen Science and Technology Research and Development Fund for Sustainable Development Project (No. KCXFZ20201221173613036).

BD in the frequency of depressive episodes, the severity of psychotic symptoms, and suicidal ideation^[18, 19]. A study in America^[20] found that depressive symptoms were more common in BD than in the major depressive disorder. Compared with UD, BD had more severe psychomotor retardation, greater difficulty thinking, more early morning awakening, more morning worsening of mood, and more frequent psychotic symptoms^[21]. A previous study observed differences between UD and BD in personality traits, such as extraversion and novelty seeking^[22]. Those traits were also associated with NSSI and suicide behaviors^[23, 24].

It was reported that BD had a higher rate of suicide than UD^[25]. Suicide attempts were more prevalent among adult patients with BD than with major depressive disorder^[26]. Hales *et al*^[27] observed that compared with UD patients, patients with BD reported more than twice of images of suicide or the aftermath of a death, which made them more likely to want to commit suicide. However, another research found that UD had higher risks of suicidal ideation and attempts than BD^[19]. A recent meta-analysis showed that suicide risk was similar between patients with bipolar types I and II^[28].

According to the etiological models of suicidal behavior, both NSSI and commit suicide seem to exist on the continuum of suicide behaviors^[13]. However, little was known about the differences of NSSI behaviors in the UD and BD. To fill the knowledge gap, we conducted the case series study in adolescents with BD or UD to elucidate the differences of NSSI behaviors in the UD and BD adolescents in the Chinese Han population.

1 SUBJECTS AND METHODS

1.1 Participants and Data Collection

In this case series study, outpatients were recruited from 20 general or psychiatric hospitals in 9 provinces across China between August 2020 and November 2020. The inclusion criteria were: (1) 12 to 18 years old, (2) was diagnosed with BD or UD by senior psychiatrists according to the Diagnostic criteria and Statistical Manual of Mental Disorders Fifth Edition (DSM-5), (3) reporting at least five days of NSSI behaviors in the past 12 months^[29], and (4) in the depressive episode of UD or BD. The exclusion criteria were as follows: (1) have a history of intellectual disability and mental retardation, (2) the presence of any severe chronic physical disease, infectious diseases, or immune system diseases, (3) have a history of traumatic brain injury, epilepsy, other severe neurological or organic brain disease, or (4) have a history of severe mental disorders such as schizophrenia. To ensure the concordance and reliability of the investigation, all the investigators had attended the training course before

interview. A trained investigator was present in case participants had any confusion about these scales.

The protocol of this study was approved by the Ethics Committee of the Institutional Review Board (IRB) of Shenzhen Kangning Hospital (IRB: 2020-K021-01). Written informed consent was obtained from participants and their legal guardians.

1.2 Demographic Characteristics

We used a self-administered questionnaire to collect demographic data, including sex, age, education, residential area, living with parents or grandparents or others.

1.3 Measurement

We used the Chinese version of Functional Assessment of Self-Mutilation (FASM)^[30] to assess the methods, frequency, and functions of adolescents' NSSI behaviors. A list of 10 NSSI methods were specially assessed^[30]. The score of NSSI frequency of every method was rated on five grades: 0 (0 times), 1 (1 time), 2 (2–5 times), 3 (6–10 times), 4 (≥ 11 times), and the reasons for self-injury were documented to a three-factor structure of functions: social avoidance, emotional regulation, attention seeking, according to Qu *et al*^[30]. The NSSI frequency was calculated by summing the scores of 10 NSSI methods. The frequency of severe NSSI was calculated from the item "received treatment or not" with a score of 0 (no) and 1 (yes), ranging from 0 to 10. The function of NSSI consists of 15 items, rated on a four-point Likert scale, ranging from 0 (never) to 3 (often). Social avoidance contains 4 items with a score ranging from 0 to 12, emotion regulation 5 items with a score ranging from 0 to 15, and attention seeking 6 items with a score ranging from 0 to 18. The Cronbach's α of the scale in this study was 0.765.

The self-report Beck Suicide Ideation Scale (BSI)-part I^[31] was used to assess participants' suicidal ideation. The items of BSI- part I are rated on a 3-point Likert scale, and the scores range from 0 to 10. A higher score indicates that the adolescent has a higher active suicidal desire. The Cronbach's α of the scale in this study was 0.857.

The 10-item Kessler Psychological Distress Scale (K10 scale)^[32] was used to evaluate psychological distress, including 10 items to assess the frequency of non-specific psychological distress over the past month. The scales can be divided into two factors namely depression and anxiety. Specifically, depression includes items of hopeless, depress, effort, severe depress, and worthlessness, whereas anxiety includes items of tiredness, nervousness, severe nervousness, restlessness, and severe restlessness^[33]. The Cronbach's α of the scale in this study was 0.890.

1.4 Statistical Analysis

Kolmogorov-Smirnov one-sample test was used to examine the normal distribution of continuous

variables. Analysis of variance (ANOVA) for continuous variables, Chi-square test for categorical variables, and Mann-Whitney *U* test for non-normally distributed variables were utilized to compare differences in the characteristics of the two groups (UD and BD groups). Spearman correlation analysis was used to evaluate the correlation between the variables. All analyses were performed using SPSS version 23.0 software (SPSS Inc., USA). All tests were two-tailed, and statistical significance was defined at $P < 0.05$.

2 RESULTS

2.1 Demographic and Psychological Characteristics of Adolescents with UD versus BD

We recruited 525 adolescents with UD or BD who reported engaging in NSSI in the past 12 months. Table 1 shows the participants' demographic and psychological characteristics. Of the 525 participants, 99 were diagnosed with BD and 426 with UD. A higher proportion of girls was noted with the 5:1 girl (boy) ratio found. Compared with the BD group, adolescents with UD were more likely to be younger, having higher depression scores and anxiety scores (all $P < 0.05$). There were no significant differences in sex, residential area, whether only-child family or not, and BSI score between the two groups (all $P > 0.05$).

2.2 Differences of NSSI Behaviors by Adolescents with UD versus BD

The course of NSSI was longer in BD adolescents than in UD adolescents ($Z = -3.39$, $P = 0.001$). However, UD adolescents had a higher social avoidance score than BD adolescents ($Z = -2.06$, $P = 0.039$). There were no significant differences in NSSI frequency, the number of NSSI methods, age of onset of NSSI between the two groups (all $P > 0.05$, table 2).

2.3 Relationship between NSSI Frequency and Depression/Anxiety Score

As shown in table 3, spearman correlation analysis showed that depression score ($r = 0.408$, $P < 0.01$), anxiety score ($r = 0.391$, $P < 0.01$), and course of NSSI ($r = 0.211$, $P < 0.01$) were positively and strongly correlated with the NSSI frequency. There was a weak correlation between depression score and diagnosis ($r = 0.155$, $P < 0.01$). No correlation was found between diagnosis and NSSI frequency. Figures 1 and 2 demonstrates the correlation between the NSSI frequency and depression score or anxiety score.

3 DISCUSSION

To the best of our knowledge, this was the first multi-center study in China to identify the difference in NSSI behaviors between adolescents with UD and

Table 1 Demographic and psychological characteristics of adolescents by depression type

Variable	Total (n=525)	Unipolar depression (n=426)	Bipolar depression (n=99)	Z/F/ χ^2	P value
Sex, n (%)				2.02	0.155
Boy	89 (16.95)	77 (18.08)	12 (12.12)		
Girl	436 (83.05)	349 (81.92)	87 (87.88)		
Age (year), mean (SD)	15.08 (1.67)	14.95 (1.67)	15.66 (1.59)	14.87	<0.001
Residential area, n (%)				0.00	0.967
City	365 (69.52)	296 (69.48)	69 (69.70)		
Rural	160 (30.48)	130 (30.52)	30 (30.30)		
Only-child, n (%)	153 (29.14)	122 (28.64)	31 (31.31)	0.28	0.598
Living with, n (%)				3.37	0.067
Parents	418 (81.32)	364 (87.08)	90 (93.75)		
Grandparents/other	96 (18.68)	54 (12.92)	6 (6.25)		
BSI score, M (IQR)	12.00 (9.00, 13.50)	12.00 (9.00, 14.00)	11.00 (8.00, 13.00)	-1.42	0.157
K10 score, mean (SD)	36.36 (7.54)	36.89 (7.20)	34.07 (8.51)	11.48	0.001
Depression	18.82 (4.15)	19.16 (3.94)	17.37 (4.73)	15.23	<0.001
Anxiety	17.54 (4.18)	17.73 (4.09)	16.70 (4.47)	5.00	0.026

BSI: Beck Suicide Ideation Scale; K10: The 10-item Kessler Psychological Distress Scale

Table 2 Characteristics of NSSI behaviors in adolescents by depression type

Characteristic	Total (n=525)	Unipolar depression (n=426)	Bipolar depression (n=99)	Z/F	P value
Number of NSSI methods, M (IQR)	5.00 (4.00, 7.00)	5.00 (4.00, 7.00)	6.00 (3.00, 7.00)	-0.40	0.690
NSSI frequency, mean (SD)	14.81 (8.51)	14.88 (8.49)	14.53 (8.65)	0.14	0.709
Frequency of severe NSSI, M (IQR)	0.00 (0.00, 2.00)	0.00 (0.00, 2.00)	1.00 (0.00, 2.00)	-1.41	0.159
Age of onset of NSSI (year), Mean (SD)	13.10 (2.10)	13.09 (2.09)	13.13 (2.11)	0.03	0.873
Course of NSSI (year), M (IQR)	1.00 (1.00, 3.00)	1.00 (1.00, 3.00)	2.00 (1.00, 4.00)	-3.39	0.001
Function of NSSI, M (IQR)					
Social avoidance	2.00 (0.00, 4.00)	2.00 (0.00, 5.00)	1.00 (0.00, 4.00)	-2.06	0.039
Emotional regulation	9.00 (5.00, 11.00)	9.00 (6.00, 11.00)	8.00 (5.00, 11.00)	-0.87	0.385
Attention seeking	2.00 (0.00, 6.00)	2.00 (0.00, 5.25)	3.00 (0.00, 6.00)	-0.35	0.729

Table 3 Spearman correlation coefficients of the NSSI frequency, depression score, anxiety score and course of NSSI

	1	2	3	4	5	6
1 NSSI Frequency	1					
2 K10-Depression score	0.408**	1				
3 K10-Anxiety score	0.391**	0.604**	1			
4 Course of NSSI	0.211**	0.074	0.069	1		
5 Age	-0.097*	-0.117**	-0.108*	0.328**	1	
6 Diagnosis	0.017	0.155**	0.091*	-0.148**	-0.164**	1

Diagnosis: treating bipolar depression as 1, unipolar depression as 2; K10: The 10-item Kessler Psychological Distress Scale. * $P < 0.05$; ** $P < 0.01$

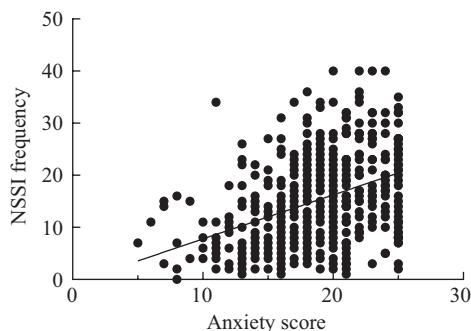


Fig. 1 Correlation between NSSI frequency and anxiety score

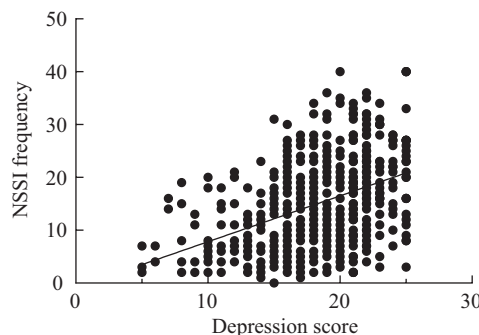


Fig. 2 Correlation between NSSI and depression score

those with BD. The results showed that adolescents with UD had higher depression and anxiety scores than those with BD. Adolescents with UD had a higher social avoidance score than those with BD. Nevertheless, we did not observe any significant differences in the frequency and the number of methods of NSSI between the two groups. The depression and anxiety were significantly and positively related with the NSSI frequency. Adolescents with BD had a longer course of NSSI than those with UD. No difference in the age of onset of NSSI was found between the two groups in our study, although a previous study observed that the age at onset of symptoms in UD was, on average, later than that in BD^[34]. We speculate that the discrepancy may be caused by a recall bias about the age at onset of symptoms.

Our findings showed that depression and anxiety were positively associated with NSSI frequency, meaning that adolescents with high levels of depression and anxiety might engage in more NSSI behaviors. Furthermore, our findings indicated that depressive symptom was more robustly associated with NSSI than anxiety. In line with our results, Brunner *et al*^[35] reported that individuals with NSSI behaviors had more significant degree of depression and anxiety than those without NSSI. Previous research in Germany reported that higher self-harm scores were related to more symptoms of anxiety and depression^[36]. Compared with anxiety, the depression symptom of individuals might have more significant influences on suicidal and NSSI behaviors. In a study on prisoners, depression (OR = 7.44) was a stronger predictor than anxiety (OR = 2.19) for predicting the occurrence of suicide^[37]. Ibrahim *et*

al^[38] analyzed the role of depression, anxiety, and stress in suicidal ideation among adolescents in Malaysia and found that only depression could significantly predict suicidal ideation. In contrast, anxiety and stress were associated with suicidal ideation but could not considerably predict suicidal ideation.

Our study found that the UD group had more severe depression and anxiety symptoms than the BD group. It was speculated that adolescents with UD engaged in more frequent NSSI than BD. Interestingly, our study found a weak correlation between depression score and diagnosis of UD/BD. The UD group showed a slightly higher NSSI frequency than the BD group, although there were no statistical differences between the two groups. The findings indicated that NSSI behaviors might be strongly correlated with the frequency of depressive episodes and the severity of depressive symptoms rather than the types of depression disorder. Mitchell *et al* found no differences between UD and BD in depression^[39]. Parker *et al*^[40] reported that the severity of depression symptoms was similar between UD and BD. Meanwhile, our findings indicated that the correlations between depression and NSSI frequency were not linear. Further studies were needed to explore the disproportional findings.

There were various theoretical models to explain why people engage in NSSI. In the past decades, multiple theoretical models of NSSI were developed to explain why people engage in NSSI. Nock *et al*^[41] presented a four-function model, including automatic-negative reinforcement, automatic-positive reinforcement, social-negative reinforcement, and social-positive reinforcement. Automatic-negative re-

inforcement suggests that individuals want to relieve tension and other negative emotions. Experiential Avoidance Model^[42] proposes that avoiding negative emotional experiences is a primary function of NSSI. In addition, Emotional Cascade Model^[43] holds that NSSI partially functions as a remission of negative emotions and ruminative attention. Hilt *et al*^[44] discovered that internal distress (i.e., depressive symptoms) was associated with automatic function and could predict the occurrence of NSSI. The general wisdom was that NSSI was a way to regulate emotion to reduce or avoid negative emotional states, such as anxiety, sadness, and guilt^[45]. Thus, those with a history of depression would more frequently and stably use NSSI as a way to control negative emotions^[46].

Compared with the BD adolescents, UD adolescents displayed a higher social avoidance score. Social avoidance is characterized by avoiding social demands, such as school, work, or other activities^[30], indicating that individuals with NSSI would cope with adversities through avoidant strategies. Social dysfunction in patients with depression is an inherent phenotype^[47]. The difference in social avoidance score between UD and BD in this study indicated that adolescents with UD were confronted with more interpersonal distress than those with BD.

In monkeys, the orbitofrontal cortex (OFC) was found to be involved in mood, and damage to the caudal OFC caused mood changes^[48]. In humans, feelings of euphoria and loss of emotion could occur after damage to the OFC^[49]. The OFC is a critical region associated with depression. The functional connectivity of lateral OFC was enhanced in patients with depression^[50]. Phillips *et al*^[51] found that people with BD displayed enhanced OFC, ventrolateral prefrontal cortex, and striatum activity in reward-related tasks. There was evidence that people engaging in NSSI increased activation of prefrontal regions, including OFC and other regions^[52-56]. The excessively enhanced activation of OFC might be the mechanism underlying the comorbidity of depression and NSSI.

Several limitations should be considered when interpreting the findings in this study. First, a high female: male ratio of about 5:1 was found in our research. Some studies observed differences in NSSI methods and frequency between females and males^[57, 58]. According to a meta-analysis, NSSI was more commonly seen among females than males^[57]. Second, the sample size of UD was small in our research. Further studies with more male and BD sample sizes are warranted to confirm our findings. Third, all the scales used in the current study were self-reporting questionnaires. Fourth, this was a cross-sectional study, limiting the interpretation of a causal relationship. Finally, cultural differences considerably influenced adolescents' NSSI behaviors and emotional

problems. For example, a study on patients with NSSI between India and Belgium found that different cultural backgrounds led to differences in NSSI^[59]. This study was conducted in mainland China, limiting the interpretation of the findings in other countries with different cultures.

In conclusion, our study demonstrated that depression and anxiety were positively and robustly correlated with NSSI frequency, indicating that depression and anxiety might act as vital indicators for NSSI behaviors. Our finding accentuated the adequate need for treatment of depression and anxiety in preventing and intervening adolescents' NSSI behaviors.

Conflict of Interest Statement

All authors declare that there are no conflicts of interest.

REFERENCES

- 1 Nock MK. Self-injury. *Annu Rev Clin Psychol*, 2010, 6:339-363
- 2 Zhou J, Zhang J, Huang Y, *et al*. Associations between coping styles, gender, their interaction and non-suicidal self-injury among middle school students in rural west China: A multicentre cross-sectional study. *Front Psychiatry*, 2022,13:861917
- 3 Yu L, Zhao J, Zhao T, *et al*. Multicenter analysis on the non-suicidal self-injury behaviors and related influencing factors—A case study of left-behind children in northeastern Sichuan. *J Affect Disord*, 2022, 320:161-168
- 4 Swannell SV, Martin GE, Page A, *et al*. Prevalence of nonsuicidal self-injury in nonclinical samples: systematic review, meta-analysis and meta-regression. *Suicide Life Threat Behav*, 2014,44(3):273-303.
- 5 Wan Y, Chen J, Sun Y, *et al*. Impact of Childhood Abuse on the Risk of Non-Suicidal Self-Injury in Mainland Chinese Adolescents. *PLoS One*, 2015,10(6):e0131239
- 6 Tang J, Yang W, Ahmed NI, *et al*. Stressful Life Events as a Predictor for Nonsuicidal Self-Injury in Southern Chinese Adolescence: A Cross-Sectional Study. *Medicine (Baltimore)*, 2016,95(9):e2637
- 7 McManus S, Gunnell D, Cooper C, *et al*. Prevalence of non-suicidal self-harm and service contact in England, 2000-14: repeated cross-sectional surveys of the general population. *Lancet Psychiat*, 2019, 6(7):573-581
- 8 Griffin E, McMahon E, McNicholas F, *et al*. Increasing rates of self-harm among children, adolescents and young adults: a 10-year national registry study 2007–2016. *Soc Psychiatry Psychiatr Epidemiol*, 2018, 53(7):663-671
- 9 Morgan C, Webb RT, Carr MJ, *et al*. Incidence, clinical management, and mortality risk following self harm among children and adolescents: cohort study in primary care. *BMJ*, 2017,18(359):j4351
- 10 Castaldo L, Serra G, Piga S, *et al*. Suicidal behaviour and non-suicidal self-injury in children and adolescents seen at an Italian paediatric emergency department. *Ann Ist Super Sanita*, 2020,56(3):303-314
- 11 Wang Y, Zhou X, Cao B, *et al*. The psychological

- characteristics and risk factors of suicidal attempt among mood disorders adolescents accompany with non-suicidal self-injury: A multi-center study. *J Affect Disord*, 2022, 298:301-307
- 12 Guertin T, Lloyd-Richardson E, Spirito A, *et al.* Self-mutilative behavior in adolescents who attempt suicide by overdose. *J Am Acad Child Adolesc Psychiatry*, 2001,40(9):1062-1069
- 13 Duarte TA, Paulino S, Almeida C, *et al.* Self-harm as a predisposition for suicide attempts: A study of adolescents' deliberate self-harm, suicidal ideation, and suicide attempts. *Psychiatry Res*, 2020,287:112553
- 14 I. MV, Cieslik EC, Serbanescu I, *et al.* Altered Brain Activity in Unipolar Depression Revisited: Meta-analyses of Neuroimaging Studies. *JAMA Psychiat*, 2017,74(1):47-55
- 15 Phillips ML, Kupfer DJ. Bipolar disorder diagnosis: challenges and future directions. *Lancet*, 2013, 381 (9878):1663-1671
- 16 Mitchell PB, Goodwin GM, Johnson GF, *et al.* Diagnostic guidelines for bipolar depression: a probabilistic approach. *Bipolar Disord*, 2008,10(1 Pt 2):144-152
- 17 Han KM, De Berardis D, Fornaro M, *et al.* Differentiating between bipolar and unipolar depression in functional and structural MRI studies. *Prog Neuropsychopharmacol Biol Psychiatry*, 2019,91:20-27
- 18 Sampaio-Junior B, Tortella G, Borrione L, *et al.* Efficacy and Safety of Transcranial Direct Current Stimulation as an Add-on Treatment for Bipolar Depression: A Randomized Clinical Trial. *JAMA Psychiatry*, 2018,75(2):158-166
- 19 Patel RS, Onyeaka H, Youssef NA. Suicidal ideation and attempts in unipolar versus bipolar depression: analysis of 131,740 adolescent inpatients nationwide. *Psychiatry Res*, 2020,291:113231
- 20 Moreno C, Hasin DS, Arango C, *et al.* Depression in bipolar disorder versus major depressive disorder: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Bipolar Disord*, 2012, 14(3):271-282
- 21 Smith DJ, Craddock N. Unipolar and bipolar depression: different of the same? *Br J Psychiatry*, 2011,199(4):272-274
- 22 S Janowsky D, Morter S, Hong L, *et al.* Myers Briggs Type Indicator and Tridimensional Personality Questionnaire differences between bipolar patients and unipolar depressed patients. *Bipolar Disord*, 1999, 1(2):98-108
- 23 Carballo JJ, Llorente C, Kehrmann L, *et al.* Psychosocial risk factors for suicidality in children and adolescents. *Eur Child Adolesc Psychiatry*, 2020,29(6):759-776
- 24 Mars B, Heron J, Klonsky ED, *et al.* Predictors of future suicide attempt among adolescents with suicidal thoughts or non-suicidal self-harm: a population-based birth cohort study. *Lancet Psychiat*, 2019,6(4):327-337
- 25 Goodwin FK, Jamison KR. *Manic-Depressive Illness. Bipolar Disorders and Recurrent Depression.* Oxford (Oxford University Press), 2009,70:435
- 26 Tondo L, Lepri B, Baldessarini RJ. Suicidal risks among 2826 Sardinian major affective disorder patients. *Acta Psychiatr Scand*, 2007,116(6):419-428
- 27 Hales SA, Deeprose C, Goodwin GM, *et al.* Cognitions in bipolar affective disorder and unipolar depression: imagining suicide. *Bipolar Disord*, 2011,13(7-8):651-661
- 28 Novick DM, Swartz HA, Frank E. Suicide attempts in bipolar I and bipolar II disorder: a review and meta-analysis of the evidence. *Bipolar Disord*, 2010,12(1):1-9
- 29 Mittal Vijay A, Walker Elaine F. *Diagnostic and Statistical Manual of Mental Disorders.* Psychiatry Res, 2011,189:158-159
- 30 Qu D, Wang Y, Zhang Z, *et al.* Psychometric Properties of the Chinese Version of the Functional Assessment of Self-Mutilation (FASM) in Chinese Clinical Adolescents. *Front Psychiatry*, 2022,12:755857
- 31 A.T. Beck, M. Kovacs, Weissman A. Assessment of suicidal intention: the Scale for Suicide Ideation. *J Consult Clin Psychol*, 1979, 47(2):343-352
- 32 Kessler RC, Andrews G, Colpe LJ, *et al.* Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychol Med*, 2002,32(6):959-976
- 33 Ren Q, Li Y, Chen DG. Measurement invariance of the Kessler Psychological Distress Scale (K10) among children of Chinese rural-to-urban migrant workers. *Brain Behav*, 2021,11(12):e2417
- 34 Akiskal HS, Walker P, Puzantian VR, *et al.* Bipolar outcome in the course of depressive illness: phenomenologic, familial, and pharmacologic predictors. *J Affect Disord*, 1983,5(2):115-128
- 35 Brunner R, Kaess M, Parzer P, *et al.* 3038- Characteristics of non-suicidal self-injury and suicide attempts among adolescents in Europe: results from the european research consortium seyle. *Eur Psychiatry*, 2013, 28(S1):1-1
- 36 Müller A, Claes L, Smits D, *et al.* Prevalence and Correlates of Self-Harm in the German General Population. *PLoS One*, 2016,11(6):e0157928
- 37 Ayhan G, Arnal R, Basurko C, *et al.* Suicide risk among prisoners in French Guiana: prevalence and predictive factors. *BMC Psychiatry*, 2017,17(1):156
- 38 Ibrahim N, Amit N, Suen MW. Psychological factors as predictors of suicidal ideation among adolescents in Malaysia. *PLoS One*, 2014,9(10):e110670
- 39 Mitchell PB, Wilhelm K, Parker G, *et al.* The clinical features of bipolar depression: a comparison with matched major depressive disorder patients. *J Clin Psychiatry*, 2001,62(3):212-216; quiz 17
- 40 Parker G, Roy K, Wilhelm K, *et al.* The nature of bipolar depression: implications for the definition of melancholia. *J Affect Disord*, 2000,59(3):217-224
- 41 Nock MK, Prinstein MJ. A functional approach to the assessment of self-mutilative behavior. *J Consult Clin Psychol*, 2004,72(5):885-890
- 42 Chapman AL, Gratz KL, Brown MZ. Solving the puzzle of deliberate self-harm: the experiential avoidance model. *Behav Res Ther*, 2006,44(3):371-394
- 43 Selby EA, Franklin J, Carson-Wong A, *et al.* Emotional cascades and self-injury: investigating instability of rumination and negative emotion. *J Clin Psychol*, 2013,69(12):1213-1227
- 44 Hilt LM, Cha CB, Nolen-Hoeksema S. Nonsuicidal

- self-injury in young adolescent girls: moderators of the distress-function relationship. *J Consult Clin Psychol*, 2008,76(1):63-71
- 45 Klonsky ED. The functions of deliberate self-injury: a review of the evidence. *Clin Psychol Rev*, 2007, 27(2):226-239
- 46 Barrocas AL, Giletta M, Hankin BL, *et al.* Nonsuicidal self-injury in adolescence: longitudinal course, trajectories, and intrapersonal predictors. *J Abnorm Child Psychol*, 2015,43(2):369-380
- 47 Porcelli S, Kasper S, Zohar J, *et al.* Social dysfunction in mood disorders and schizophrenia: Clinical modulators in four independent samples. *Prog Neuropsychopharmacol Biol Psychiatry*, 2020,99:109835
- 48 Rolls ET. The functions of the orbitofrontal cortex. *Brain Cogn*, 2004,55(1):11-29
- 49 Hornak J, Rolls E, Wade D. Face and voice expression identification in patients with emotional and behavioural changes following ventral frontal lobe damage. *Neuropsychologia*, 1996,34(4):247-261
- 50 Rolls ET. The orbitofrontal cortex and emotion in health and disease, including depression. *Neuropsychologia*, 2019,128:14-43
- 51 Phillips ML, Swartz HA. A critical appraisal of neuroimaging studies of bipolar disorder: toward a new conceptualization of underlying neural circuitry and a road map for future research. *Am J Psychiatry*, 2014, 171(8):829-843
- 52 Brown RC, Plener PL, Groen G, *et al.* Differential Neural Processing of Social Exclusion and Inclusion in Adolescents with Non-Suicidal Self-Injury and Young Adults with Borderline Personality Disorder. *Front Psychiatry*, 2017,8:267
- 53 Groschwitz RC, Plener PL, Groen G, *et al.* Differential neural processing of social exclusion in adolescents with non-suicidal self-injury: An fMRI study. *Psychiat Res-Neuroim*, 2016,255:43-49
- 54 Osuch E, Ford K, Wrath A, *et al.* Functional MRI of pain application in youth who engaged in repetitive non-suicidal self-injury vs. psychiatric controls. *Psychiatry Res*, 2014,223(2):104-112
- 55 Plener PL, Bubalo N, Fladung AK, *et al.* Prone to excitement: adolescent females with Non-suicidal self-injury (NSSI) show altered cortical pattern to emotional and NSS-related material. *Psychiatry Res*, 2012,203(2-3):146-152
- 56 Vega D, Ripollés P, Soto À, *et al.* Orbitofrontal overactivation in reward processing in borderline personality disorder: the role of non-suicidal self-injury. *Brain Imaging Behav*, 2018,12(1):217-228
- 57 Bresin K, Schoenleber M. Gender differences in the prevalence of nonsuicidal self-injury: A meta-analysis. *Clin Psychol Rev*, 2015,38:55-64
- 58 Lloyd-Richardson EE, Perrine N, Dierker L, *et al.* Characteristics and functions of non-suicidal self-injury in a community sample of adolescents. *Psychol Med*, 2007,37(8):1183-1192
- 59 Gandhi A, Luyckx K, Adhikari A, *et al.* Non-suicidal self-injury and its association with identity formation in India and Belgium: A cross-cultural case-control study. *Transcult Psychiatry*, 2021,58(1):52-62

(Received Apr. 26, 2022; accepted May 24, 2023)