



Research paper

Psychological and behavioral characteristics of suicide attempts and non-suicidal self-injury in Chinese adolescents



Zhen-Zhen Liu^a, Hua Chen^a, Qi-Gui Bo^b, Ren-Hong Chen^c, Feng-Wen Li^d, Lei Lv^e, Cun-Xian Jia^{a,*}, Xianchen Liu^{a,f,g,**}

^a Department of Epidemiology, Shandong University School of Public Health and Shandong University Center for Suicide Prevention Research, Jinan 250012, China

^b Centers for Disease Control and Prevention of Lijin County, Lijin 257400, China

^c Centers for Disease Control and Prevention of Yanggu County, Yanggu 252300, China

^d Centers for Disease Control and Prevention of Zoucheng City, Zoucheng 273500, China

^e Education bureau of Yanggu County, Yanggu 252300, China

^f School of Psychology, South China Normal University, Shipai, Guangzhou 510631, China

^g The University of Tennessee Health Science Center, Memphis, TN 38163, United States

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ABSTRACT

Background: Suicide attempts (SA) and non-suicidal self-injury (NSSI) are prevalent in adolescents and important risk factors of suicide death. Both SA and NSSI are associated with multiple psychosocial, behavioral, biological and genetic factors. This study examined similarities and differences in psychological vulnerability and internalizing and externalizing problems between adolescents with SA and NSSI.

Methods: Participants consisted of 11,831 students and had a mean age of 14.97 (SD = 1.46) years. Students completed a structured questionnaire to report their demographic information, psychological characteristics, internalizing and externalizing problems, SA and NSSI. Based on the history of NSSI and SA in the last year, the sample was divided into four groups: non-self-harm (NSH), NSSI only, SA only, and NSSI+SA. Multivariate analyses of covariance and post-hoc pairwise comparisons were performed for multiple comparisons.

Results: Compared with NSH group, adolescents with either NSSI or SA scored significantly higher on trait anger, impulsiveness, hopelessness, internalizing and externalizing problems. NSSI+SA group and SA only group scored significantly higher than NSSI only group but both did not score significantly different on most psychological and behavioral variables.

Limitations: Limitations include reliance on self-reported measures and cross-sectional survey.

Conclusions: Psychological and behavioral profiles between adolescents with SA and NSSI are similar but are more severe in suicide attempters. The findings highlight the necessity of assessing psychological and behavioral problems for prevention and early intervention of adolescent self-harm.

1. Introduction

Self-harm (SH) in adolescents, including suicide attempts (SA) and non-suicidal self-injury (NSSI), is a major public health concern. Both SA and NSSI are common in adolescents. A recent meta-analysis estimated a global rate of 17.2% of NSSI among adolescents (Swannell et al., 2014). Lifetime prevalence of SA among adolescents is estimated to be 3.2–8.9% (Brausch and Gutierrez, 2010; Muehlenkamp and Gutierrez, 2007; Taliaferro et al., 2012; Zetterqvist et al., 2013). Both SA and NSSI are significant predictors of suicide death (Cooper et al., 2005; Hamza et al., 2012; Runeson et al., 2016).

The relationship between NSSI and SA is complicated. NSSI is a significant predictor of SA (Chesin et al., 2017; Victor and Klonsky, 2014). NSSI and SA can happen in isolation and can also co-occur (Asarnow et al., 2011; Groschwitz et al., 2015; Hamza et al., 2012). NSSI and SA share many similar risk factors (Gould et al., 2003; Hukkanen et al., 2003; Lynam et al., 2011; Muehlenkamp et al., 2010; Nock et al., 2006). However, a growing body of evidence suggests that NSSI and SA are different in terms of suicide intent, methods to harm self, age of onset, and both have different psychosocial and epidemiological characteristics (Cloutier et al., 2010; Groschwitz et al., 2015; Jacobson et al., 2008; Muehlenkamp, 2005). NSSI has recently been

* Correspondence to: Shandong University School of Public Health, No. 44, Wenuxuan Rd, Lixia Dist, Jinan 250012, China.

** Corresponding author at: School of Psychology, South China Normal University, Shipai, Guangzhou 510631, China.

E-mail addresses: jiacunxian@sdu.edu.cn (C.-X. Jia), xliu69@uthsc.edu (X. Liu).

proposed as a new diagnostic category within DSM-V (Groschwitz et al., 2015).

Multiple psychosocial factors are associated with SA and NSSI, including psychiatric disorders, psychological vulnerability, family history, poor family environment, and life stressors (Gould et al., 2003; Lewinsohn et al., 1994; Liu et al., 2017a; Liu and Tein, 2005). Depression and borderline personality disorder (Gould et al., 2003; Nock et al., 2006), physical or sexual abuse (Muehlenkamp et al., 2010), externalizing behaviors (Hukkanen et al., 2003; Nock et al., 2006), hopelessness (Boergers et al., 1998; James et al., 2017; Lamis et al., 2014), trait anger (Boergers et al., 1998; Daniel et al., 2009; Park et al., 2010), and impulsiveness (Lynam et al., 2011; Renaud et al., 2008; Wang et al., 2014) are common risk factors of both SA and NSSI. There are two types of individuals who are more likely to attempt suicide or harm themselves: one is characterized by aggressive and violent outbursts and the other by depression or withdrawal (Shaffer, 1974). Impulsivity, anger, hopelessness, internalizing and externalizing problems have been regarded as vulnerable characteristics that interact with stressors predisposing an individual to engage in suicidal behavior or self-harm (Boergers et al., 1998; Brodsky et al., 2001; Daniel et al., 2009; James et al., 2017; Mann et al., 1999; Sourander et al., 2001). Based on the history of self-harm, adolescents can be divided into 4 groups: non-self-harm (NSH), NSSI only, SA only, and SA + NSSI. Adolescents with different histories of self-harm may have different psychological and behavioral profiles. However, little is known about the similarities and differences in behavioral/psychological characteristics between different types of self-harm in the general population of adolescents. To our knowledge, four studies examined the differences in psychosocial characteristics between SA and NSSI. The four studies consistently found that SA and NSSI adolescents were different in the levels of depressive symptoms (Brausch and Gutierrez, 2010; Muehlenkamp and Gutierrez, 2007; Zetterqvist et al., 2013), hopelessness (Brausch and Gutierrez, 2010), impulsivity (Liang et al., 2014), and health risk behaviors (Liang et al., 2014), with SA adolescents scored significantly higher on these psychopathological measurements. However, the 4 studies compared current psychosocial characteristics of individuals with a lifetime history of NSSI or SA. Current psychological and behavioral characteristics may not reflect the psychological and behavioral status when individuals who attempted suicide or engaged in NSSI several years ago.

In the current study of a large sample of Chinese adolescent students ($N = 11,831$), based on the history of last-year self-harm, we divided adolescents into 4 groups: SA only, NSSI only, SA + NSSI, and non-self-harm (NSH). The objectives of the study were 1) to compare demographic characteristics of Chinese adolescents with SA only, NSSI only, SA + NSSI, or NSH; 2) to compare psychological features (e.g., trait anger, impulsiveness, hopelessness) of Chinese adolescents with different types of self-harm; and 3) to compare internalizing and externalizing problems of Chinese adolescents with different types of self-harm.

2. Methods

2.1. Participants and procedure

In November–December 2015, a baseline survey of the Shandong Adolescent Behavior and Health Cohort (SABHC) was conducted in 3 rural counties (Zoucheng, Yanggu, and Lijin) of Shandong Province, China. Shandong is a representative province of China, located in the east coast of China and the lower reaches of the Yellow River. Shandong has a total population of 97.89 million, with 54.62 million being rural residents in 2014 (Shandong Provincial Bureau of Statistics, 2015). Detailed procedure is available elsewhere (Chen et al., 2017; Liu et al., 2017b). Briefly, within the 3 counties, five middle schools and three high schools were selected, based on the geographic location, social demographics, the representativeness of adolescent students in the

region, convenience for follow-up, prior study collaboration, and budget to conduct the study. With the permission from the 8 target schools' principals, all 7th-graders and 10th-graders in the target schools were requested to participate in this study, half 8th-graders, 9th-graders and 11th-graders were randomly sampled with classes as units for the survey.

Adolescent Health Questionnaire (AHQ) (Liu et al., 2015, 2008), a self-administered paper-and-pencil questionnaire, was used to collect data. After getting permission from the class teachers for the sampled classes, trained master-level public health workers administered the AHQ to the students in their classrooms during regular school hours. Before filling out the questionnaire, participants were instructed to read the instructions carefully and informed that the survey was anonymous and their participation was voluntary without any penalties for non-participation. About 45 min were required to complete the questionnaire. The study was approved by the research ethics committee of Shandong University School of Public Health.

2.2. Measures

2.2.1. Adolescent and family demographical factors

Adolescent factors included sex, age, self-perceived physical health (good, fair, or poor), number of good friends. Family socioeconomic status was assessed by father's education (primary school, middle school, high school, college or above) and perceived family economic status (good, fair, poor) as compared with other families in the community and parental marital status (married, divorced or widowed).

The number of negative life events during the past year was measured by a modified version of the Chinese Adolescent Self-Rating Life Events Checklist (ASLEC) (Liu et al., 1997a). The modified ASLEC has 50 life events from multiple social stress domains: family (e.g., "physical punishment by parents"), school (e.g., "failure in a test"), interpersonal (e.g., "break up with a close friend"), and personal physical diseases. A respondent answers "yes" or "no" to the question of whether the particular event "happened to you?" The ASLEC has been reported to have satisfactory two-week test-retest reliability ($r = 0.70$) and construct validity (Liu et al., 1997b).

Family history of suicide was assessed by the suicide death or attempt of family members (parents, grandparents, siblings and other relatives). Family history was considered as positive if any family member committed suicide or had attempted suicide.

2.2.2. Measure of NSSI and SA

The AHQ has 4 questions about NSSI and SA over the entire lifetime and during the past twelve months. Lifetime NSSI and SA was assessed by "I have ever deliberately tried to hurt myself but I was not trying to kill myself." and "I have ever attempted to kill myself" respectively. The same questions in the past 12 months were used to assess last year NSSI and SA. All of the questions were adapted from our previous survey (Liu, 2004; Liu and Tein, 2005; Liu et al., 2008) and Teen Health 2000 (Roberts et al., 1998) and had a "yes/no" answer. If a respondent answered "yes" on the question, he or she was considered to have the behavior. The Cronbach α was 0.66 with the current sample.

2.2.3. Measure of behavioral problems

The Youth Self-Report (YSR) of Child Behavior Checklist was used to measure adolescent behavioral problems (Achenbach, 1991; Liu et al., 1997a). The YSR comprises 103 problem items to which the respondent can answer "0" if the problem is not true of him or herself, "1" if the item is somewhat or sometimes true, and "2" if it is very true or often true. The participant is asked to score each item that describes him or her now or within the past six months. By summing 1s and 2s on all problem items, eight syndromes (anxious/depressed, withdrawn, somatic complaints, delinquent behavior, aggressive behavior, attention problems, social problems, and thought problems) and two second-order factors (internalizing and externalizing) can be assessed. The

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