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Who Are Likely to Attempt Suicide again? A Comparative Study between the First and Multiple Timers¹

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Abstract

Background—Various explanations account for suicide incidents, and some patients continue to attempt afterwards and others never again. The suicide mortality rate increases with the number of serious attempts. The prevention of secondary attempt of suicide should be an important approach to reduce suicide mortality. However, the characteristics of the targeted population of repeated suicide attempters are understudied.

Methods—This was a cross-sectional data collection from hospital emergency room from patients who had either attempted suicide for the first time ($n=721$) or for two or more times ($n=70$). The subjects were between 14–53 years old and comprised 293 males and 498 females. In-depth interview was conducted for each suicide attempter with a semi-structural protocol. Demographic and social-psychological characteristics were compared between the two groups of suicide attempters. Logistic regression was used to identify independent predictors of multiple attempts.

Findings—The two groups only differed in religion factor among demographic characteristics and multiple suicide attempters group have a higher percentage of subjects who reported to have a religion affiliation than first time suicide attempters. Multiple attempters were more likely to have family suicide history, physical illness, mental disorder, higher scores on Beck Hopelessness Scale (BHS) and Suicide Intent Scale (SIS) and lower scores on Duke Social Support Scale (DSSI). In the final regression model, family history of suicide, mental disorder, hopelessness and social support emerged as significant predictors of multiple suicide attempts.

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Conclusion—Suicide attempters that have mental disorder, family history of suicide, higher level of hopelessness and lower level of social support are more likely to re-attempt suicide again. Social and clinical interventions may have to also focus on this sub-group of patients with these characteristics to effectively reduce suicide mortality rate.

Keywords

suicide attempters; suicide intent; repeat suicide attempt; multiple suicide attempt; first timer

INTRODUCTION

The World Health Organization reported that a previous suicide attempt was the single most important risk factor for suicide in general populations and there may be more than 20 suicide attempts for each adult completed suicide (WHO, 2014). Previous studies have also confirmed that history of suicide attempt was a predictive factor of subsequent suicide attempts (Bertolote et al., 2010; Brown et al., 2000; Morris et al., 1992; Nordström et al., 1995).

There is a close relationship between attempted suicide and completed suicide, and an attempter is more likely than someone who has never attempted suicide to die of suicide in the future. With increased number of suicide attempts, the risk of reattempting suicide resulting in death increases (Harris & Barraclough, 1997). There were many important differences between first and multiple timers suicide attempters (Pagura et al., 2008). Thus, the study of the features of repeated suicide attempters may be useful to prevent more future suicide attempts and reduce suicide mortalities.

There have been studies in the West comparing the characteristics between first time suicide attempters and repeated suicide attempters. Studies have shown that multiple suicide attempters, among others, tend to possess the following characteristics: younger in age (Kir et al., 2014), female gender (Zahl & Hawton, 2004), unmarried (Choi et al., 2013), unemployed (Mechri et al., 2005), not living at home (Morris et al., 1992), family history of suicidal behavior (Jeglic et al., 2005; Lizardi et al., 2009), chronic illness (Vajda & Steinbeck, 2000); mental disorders (e.g., depression, personality disorder, schizophrenia, substance abuse, anxiety) (Chandrasekaran & Chandrasekaran, 2008; Esposito et al., 2003; Kochanski-Ruscio et al., 2014; Stein et al., 1998), feelings of hopelessness (Chandrasekaran & Chandrasekaran, 2008), serious suicide ideation (Forman et al., 2004), less social support (Chandrasekaran & Chandrasekaran, 2008), chronic or acute negative life events (e.g., marital and family relationship, work and study performance, economic situation, interpersonal relationship) (Forman et al., 2004; Hong et al., 2011; Kattimani et al., 2015), poor coping skills (Rudd et al., 1996), and prior suicide attempts (Hultén et al., 2001).

However, despite the fact that China has a higher attempted suicide rate, research on repeated suicides in China is relatively rare. Most studies on Chinese suicide attempts are usually focused on the evaluation or comparison of the few factors of repeated suicide attempts. The present study aims to identify the major characteristics that differentiate multiple suicide attempters from first time attempters in rural China. We hypothesized that some major characteristics of multiple suicide attempters identified based on Western

studies, may be different from multiple suicide attempters in rural China, due to different socio-economic background and cultural contexts. In addition, based on previous studies, we hypothesized that multiple suicide attempters have more severe psychopathological and suicidality factors compared to first-time suicide attempters.

METHODS

Participants

The participants were selected from two provinces of China: Shandong and Hunan. Shandong is a more developed industrial and agricultural province in northern China and Hunan is an agriculturally developed province in southern China. A total of 13 counties in Shandong and Changsha City in Hunan were randomly selected. The data on suicide attempters were derived from two hospitals in each survey site based on its popularity and large inpatients enrollment. In each emergency room of each hospital, we employed a coordinator to be responsible for assisting in identifying and interviewing process with the patients who met our selection criteria. A serious suicide attempt was defined as one that required hospital admission for over 24 hours, via a medical emergency room (Beautrais, 2003), and met one of the following treatment criteria: (1) treatment in specialized medical unit (including the intensive unit); (2) surgery under general anesthesia (superficial cuts that did not require surgical repair are excluded); (3) extensive medical treatment, including gastric lavage, antidotes for drug overdoses, telemetry, or repeated tests or observations). Participants were divided into two subgroups comprising first timer suicide attempters and multiple timer suicide attempters based on the question: "How many times have you attempted suicide in the past." A total of 791 participants were selected comprising 721 (91.2%) single suicide attempters and 70 (8.8%) multiple suicide attempters during the study period from May 2012 to July 2013. Participants' age is between 14–53 years old with 293 males and 498 females.

The study has been conducted according to the ethical principles defined by Institutional Review Board (IRB) of the US University where the Principal Investigator (PI) is affiliated with and the Research Ethical Committee (REC) of the Chinese university. Informed consent was signed by each participant prior to each interview.

Data collection

The suicidal patients were first contacted by the medical staff in the emergency room or the village doctor if they were at home. Introduction of the study, its social and medical significance and the benefits of the study, and patients' rights, were read and informed to the potential participant. Once agreed and the informed consent was signed, a face-to-face interview with our trained interviewers was scheduled. It usually took place within two months after the suicide incident. The interview was conducted individually by our trained interviewers and all trained interviewers majored in mental health or public health and have been further trained intensively for two weeks on the use of study instruments by experts. Venues for interviews could be arranged to be held in the hospital ward, the patients' home, or the village committee office, etc. For those who were too weak to answer questions, family members can assist to answer certain questions. Each interview took about 1.5 hours.

Measurements

The relevant socio-demographic data included age, gender (female=0, male=1), marital status (never married=0 [including single but dating, non-marital cohabitation], ever married=1 [including married, separated, remarried, divorced and widowed]). Education level was measured by number of years that subjects had attended a formal school environment. Occupation was encoded as peasant or non-peasant (not peasant=0, peasant =1 [including self-employed, public service staff, factory worker, student, teacher, village doctor, etc.]). Religion was dichotomized as (no=0 [Atheist], yes=1 [Taoism, Islam, Protestantism, Catholicism, Buddhism and others]). Easy access to pesticide is asked by whether pesticide was stored at home (no=0, yes=1). Suicide methods were categorized by using pesticide or poison, and others (others=0 [(which include hanging, drowning, jumping from height, overdose, wrist cutting, gas, suffocation, electric shock, run over by train, etc.), pesticide/poison=1). Family history of suicide is dichotomous (no=0, yes=1), and physical illness as well (no=0, yes=1). The place where suicidal attempt was made was dichotomized (outdoor=0, home=1).

The Chinese version of the Structured Clinical Interview for DSM-IV (SCID) (First et al., 2002) was used for psychiatric diagnoses of mental disorder and which was determined by specialized psychiatrists in consensus meeting with written information obtained by the interviewers for each team, and using guidelines in accordance to DSM-IV Axis I mental disorders. The respondents were encoded dichotomously (no=0, yes=1).

Psychopathology data were collected using the appropriate instruments. Dickman Impulsivity Inventory (DII) is used to assess the impulsiveness tendency (Dickman, 1990). It comprises 23 items and is divided into Dysfunctional Impulsivity (12-item DI) and Functional Impulsivity (11-item FI). DI is the tendency to act with relatively little forethought when it was not optimal and FI was the tendency to act with relatively little forethought when this was optimal and beneficial (Dickman, 1990). The response to each item was no (0) or yes (1), with the total score range of 0–23. In this study, we used the 12-item DI so the score range is 0–12. The higher the score, the higher is the tendency to be impulsive. The inventory has good reliability and validity for Chinese population (Gao et al., 2011; Zhang et al., 2012), and for this study, the Cronbach reliability alpha is 0.749.

Beck Hopelessness Scale (BHS) is a 20-item self-report inventory that was designed to measure the extent of respondents' negative attitudes or pessimism about the future (Beck & Steer, 1993). Its responses range from 1 (completely fit me) to 5 (completely opposite to me), with total score range of 20–100. A higher score indicates higher level of hopelessness and a higher suicide risk. It's a good instrument with good validity and reliability for suicide attempters in rural China (Zhang et al., 2015), with a Cronbach reliability alpha of 0.93 in this study.

Duke Social Support Index (DSSI) is a 23-item scale that was used to measure social network of an individual and support provided by that network (Landerman et al., 1989). DSSI has three subscales: Social Interaction (4 items), Perceived Social Support (7 items) and Instrumental Social Support (12 items). Social Interaction and Perceived Social Support subscales use a 3-point Likert scale and Instrumental Social Support was dichotomous. The

DSSI total score is the sum of the three subscales and it ranges from 11–45. The higher the score, the more social support the individual is deemed to obtain. DSSI was a well-constructed measure for social support in Chinese population (Jia & Zhang, 2012; Zhang et al., 2003), with a Cronbach reliability alpha of 0.875 in this study.

The Interview for Recent Life Events (IRLE) (Paykel, 1997; Paykel et al., 1971) is a 45-item scale which was used to measure the number of life events that happened in the past one year before suicide incidence or the interview for controls. We added 19 culturally specific items in consideration of characteristics of rural China. Participants were asked if one life event was positive or negative, and only negative life events were involved in this study. It was categorized into yes and no (no=0, yes=1). Pilot study showed that revised IRLE had high reliability and validity for China (Zhang et al., 2003).

Beck Suicide Intent Scale (SIS) is a 15-item self-administrated instrument that assess the factual aspects of the suicide attempt (Beck et al., 1974). This scale has objective part (items 1–8) and subjective part (items 9–15), and objective circumstances related to suicide attempt assesses circumstantial evidence of intent and self-report addresses suicide attempters' expectations and perceptions. Each statement has a response range of 0–2 and the total score ranges from 0–30. The Chinese version of SIS has demonstrated good reliability and validity (Zhang et al., 2003).

Data analysis

Data were entered and analyzed using SPSS 22.0. The univariate analysis was carried out using t-test for continuous variables and Chi-square test for categorical variables. Multivariate logistic regression analysis was performed to find out the predictors of multiple suicide attempts. All variables that showed significance in univariate analysis ($p < 0.05$) were entered into multivariate logistic regression model using a backward stepwise method. Although some variables showed no statistical significance, we included all the independent variables that were related to suicide behaviors into the multivariate model based on previous studies. The statistical level was set at 0.05 in both univariate and multivariate analysis. Unequal variance due to sample size difference (about 10:1) has been corrected in significance tests.

FINDINGS

A total of 791 medically serious suicide attempters was selected during the study period. Of them, 721 (91.2%) were single suicide attempters while 70 (8.8%) were multiple suicide attempters. The differences in socio-demographic characteristics between first timers and multiple timers are shown in Table 1. The results showed that the two groups only differed significantly in religion ($p < 0.05$), and did not differ on any other demographic factors ($p > 0.05$).

Overall, the difference was statistically significant between the two groups on method of suicide attempt, family history of suicide, physical illness, mental disorder, hopelessness, social support including social interaction and perceived social support ($p < 0.05$). It was expected that the repeat suicide attempters scored higher in suicide intent than the first

timers in both objective circumstances related to suicidal attempt and self-report ($p<0.05$). Please see Table 2 below for the statistical results of the comparison on these factors.

Multivariate logistic regression analysis was conducted to examine the independent factors related to multiple suicide attempts. All variables that were statistically significant ($p<0.05$) from univariate analysis and that were identified in prior studies (i.e. age, gender, marital status, education, etc.) were entered into the regression model. The probability for stepwise was 0.05 (entry) and 0.10 (removal). Family history of suicide (OR=3.750, 95%CI 1.643–8.561), mental disorder (OR=4.223, 95%CI 2.065–8.633), and higher BHS score (OR=1.067, 95%CI 1.047–1.086) were significant risk factors that predicted multiple suicide attempts ($p<0.05$). Factor that served as protective factor against multiple suicide attempts was social support (OR=0.942, 95%CI 0.903–0.982). Please see Table 3 for results of the Logistic Regression analysis.

DISCUSSION AND CONCLUSION

This study first tried to compare the socio-demographic and psychopathological characteristics between first time suicide attempter and multiple suicide attempters, and attempted to identify factors that can predict multiple suicide attempts among medically serious suicide attempters in rural China. Previous studies have identified many risk factors associated with suicidality in Western countries, however, it remained unclear which factors can predict multiple suicide attempters to re-attempt suicide again. Our results showed that multiple suicide attempters were characterized by higher possibility of having a religious belief, not using pesticide or poisons as suicide methods, having a family member who has attempted suicide, having physical illness and mental disorder, having a higher level of hopelessness, being socially isolated and having severe suicidal intent, compared to first suicide attempters. This study also demonstrated that other risk factors predicting multiple suicide attempts included family history of suicide, mental disorder and higher level of hopelessness, whereas social support was identified as a protective factor against multiple suicide attempts.

An interesting finding was that a higher proportion of repeated suicide attempters reported to have a religious belief, as compared to first time attempters. Although in general, lower proportion of Chinese population reported to have a religious belief (6.4% for our sample), repeated suicide attempters may try to seek out a religion as a coping method. One study from rural China found that religious belief showed a higher risk for suicides than controls (Zhang et al., 2010). In China, religion is a mixture of feudal superstition, local customs and myth, and the myth of incarnation may sanction suicide as an acceptable solution (Chen et al., 2012). Suicide attempters might experience more chronic and stressful life events even after first attempted suicide. One finding indicated that suicide attempters with high religiosity have a higher degree of suicide intent than those with low religiosity (Zhang & Xu, 2007). Measures should be taken to promote friendly atmosphere of mutual care and understanding among rural people.

Repeat attempters differed from first time attempters when compared on psychopathologic factors. Although there were significant differences in suicide methods, using pesticide or

other poisons were still the most common methods of suicide (Menon et al., 2016), which was contrary to the findings that one fifth of suicide repeaters attempted subsequent suicides with more violent and lethal methods such as hanging and jumping from height (Pompili et al., 2011). Repeated attempters were found to maintain highly lethal methods in the following fatal attempts (Chen et al., 2016; Pan et al., 2013). Other methods used indirectly indicated availability of methods is important in methods alteration. Multiple attempters were more likely to have a family history of attempted suicide, physical illness, mental disorder, lack of social support, stronger suicide intent (Chandrasekaran & Chandrasekaran, 2008) and expectancy of lethality (Blasco-Fontecilla et al., 2014). Attempting suicide may be a way for some people to cope with (or try to escape from) a temporary crisis, but realized the risk factors or stressors do not go away after the first suicide attempt and continued to exist. Moreover, multiple suicide attempts could result in negative social stigma and in turn the stigma could lead to adverse effect on various aspects of multiple attempters' lives (Sudak et al., 2008). There was no significant relationship with impulsivity, and this may be due to the possibility that multiple attempts including first attempts may increase their impulsivity scores. A strong impulsivity is a stable personality rather than a temporary crisis (Evans et al., 1996), and multiple attempters reported higher scores on impulsivity (Boisseau et al., 2013; Colborn et al., 2015), so an impulsivity assessment of patients admitted for attempted suicide may help to identify individuals who are at high risk for repeated suicide attempts.

Family history of suicidal behaviors can increase an individual's risk for suicidal behavior (Roy & Janal, 2005). Suicide attempters with family suicide behaviors were more likely to have suicide attempts than those who have no family history of suicide (Jeglic et al., 2005; Morris et al., 1992; Reynolds & Eaton, 1986). Familial suicidal behavior can also result in the development of negative problem solving tendency (Jeglic et al., 2005; Trémeau et al., 2005). Repeated suicide attempters may also have lower connectivity with other family members, and experience low family functionality, low intimacy, lack of necessary social and recreational activities, and lower effective communication and emotional support with other family members. Oppressive family environment may further lead a repeated suicide attempter to attempt another suicide in face of stressful events.

There have been many studies supporting close connection between mental disorders such as mood disorder, psychotic disorder, adjustment disorder, substance abuse, etc., and suicide attempts (Menon et al., 2016; Pagura et al., 2008). The rate of mental disorders in suicide attempters (10%) was much lower compared to those found in western countries, of which, sometimes can be as high as 80–90%. This might be due to the differences in prevalence of mental disorders in general population.

High and modest levels of hopelessness heightened suicide risk in individuals with mental disorders (David Klonsky et al., 2012). Hopelessness was also often accompanied by psychopathological factors such as depression among multiple attempters compared to first time attempters (Chandrasekaran & Chandrasekaran, 2008; Choi et al., 2013; Forman et al., 2004). Repeated suicide attempters may be more desperate than first time attempters to commit suicide. Although our findings indicated that hopelessness was an independent

predictor in the model, we cannot infer a conclusive relationship between the two predictors because of inclusion of mental disorders as a variable in the model.

A majority of suicide attempters need social support to a great extent (Bille-Brahe et al., 1999). Repeat attempters have less social support in both social interaction and perceived social support than first-time attempters, but, one study showed low social support may have a stronger relationship in first timers than in repeaters (Pompili et al., 2011). Social support can be used as mediator or moderator, and it can also be independent of the suicide attempt. Generally social support of suicide attempters is worse than those with non-suicidal behavior. Life events can change the structure and function of social support in terms of stability, frequency and size, and such changes may be related to suicidal behavior (Heikkinen et al., 1994). Suicide attempt can be potentially prevented through effective use of social support system.

Several limitations are identified in our current study. Firstly, this was not a longitudinal study and serious suicide attempters were only selected from two provinces, so the conclusions may not be generalized to all the suicide attempters in terms of tendency to make a future attempt. Secondly, we have categorized the subjects into either first-time attempters or multiple attempters during the time the survey was implemented, but some unknown portion of first attempters may become multiple attempters in the future (Forman et al., 2004; Rudd et al., 1996). Future study might be a prospective study design and distinguish the single attempter group from multiple attempters. Thirdly, the number of participants was not equivalent between first time attempters and multiple attempters, and we did not further subdivide multiple suicide attempters according to numbers because of small sample size. Future research may consider increasing the sample size. Fourthly, due to probable information bias that may be caused by interview time and place, there may be possibility for some unaccounted-for factors which may influence the findings and reported group differences. Various potential confounders may be taken into account for future research.

Despite these limitations, this study has great significance for developing effective suicide preventive measures and providing us with useful information in regard to repeated suicide attempters in rural China. The results demonstrated that multiple suicide attempters have higher suicidal intent than first time suicide attempters, family history of suicide, mental disorder and higher level of hopelessness, whereas, effective social support may protect them against future suicide attempts. The relationship among predicting factors can be further explored in future studies.

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Table 1
Comparison of socio-demographic factors between the first and multiple suicide attempters (n=791)

Variable	Total (n=791)	First timers (n=721)	Multiple timers (n=70)	t/χ^2	p
	M $\pm$ SD/n (%)	M $\pm$ SD/n (%)	M $\pm$ SD/n (%)		
Age	31.63 $\pm$ 8.00	31.60 $\pm$ 8.02	31.97 $\pm$ 3.83	-0.369	0.712
Gender				0.077	0.781
Male	293 (63.0)	266 (36.9)	27 (38.6)		
Female	498 (37.0)	455 (63.1)	43 (61.4)		
Marital status				1.185	0.276
Never married	174 (22.0)	155 (21.5)	19 (27.1)		
Ever married	617 (78.0)	566 (78.5)	51 (72.9)		
Education year	6.90 $\pm$ 3.26	6.87 $\pm$ 3.22	7.19 $\pm$ 3.71	-0.682	0.497
Occupation				0.027	0.869
Peasants	422 (53.4)	384 (53.3)	38 (54.3)		
Not Peasants	369 (46.6)	337 (46.7)	32 (45.7)		
Religion				9.523	0.002
Yes	49 (6.4)	38 (5.5)	11 (15.7)		
No	717 (93.6)	658 (94.5)	59 (84.3)		
Pesticide stored at home				0.189	0.664
Yes	478 (60.4)	434 (60.2)	44 (62.9)		
No	313 (39.6)	287 (39.8)	26 (37.1)		

Table 2

Comparison of suicide attempt and psychopathologic characteristics between first timer and multiple timer (n=791)

Variable	Total (n=791)	First timer (n=721)		Multiple timer (n=70)		t/χ^2	p
	M±SD/n (%)	M±SD/n (%)	M±SD/n (%)	M±SD/n (%)	M±SD/n (%)		
Suicide method						7.207	0.007
Pesticides/Poisons	634 (81.8)	585 (83.0)		49 (70.0)			
Others	141 (18.2)	120 (17.0)		21 (30.0)			
Family history of suicide						15.136	0.000
Yes	56 (7.1)	43 (6.0)		13 (18.6)			
No	728 (92.2)	671 (94.0)		57 (81.4)			
Physical illness						9.155	0.002
Yes	133 (16.8)	112 (15.8)		21 (30.0)			
No	648 (81.9)	599 (84.2)		49 (70.0)			
Mental disorder						37.426	0.000
Yes	81 (10.2)	59 (8.2)		22 (31.4)			
No	709 (89.7)	661 (91.8)		48 (68.6)			
Suicide place						2.050	0.152
Home	721 (92.8)	659 (93.2)		62 (88.6)			
Outside of home	56 (7.2)	48 (6.8)		8 (11.4)			
Impulsivity						-0.404	0.687
Dysfunctional Impulsivity	9.65±3.22	9.63±3.18		9.81±3.67			
Hopelessness	4.89±2.03	4.85±2.01		5.33±2.28		-1.701	0.093
Social support	56.15±20.50	54.39±20.24		74.23±13.11		-11.408	0.000
Social interaction	35.35±6.46	35.60±6.40		32.76±6.58		3.537	0.000
Perceived social support	7.68±2.17	7.73±2.16		7.14±2.15		2.162	0.031
Instrumental support	17.28±3.54	17.43±3.47		15.73±3.89		3.885	0.000
Negative life events	10.39±2.75	10.44±2.72		9.89±2.96		1.602	0.110
SIS total score	627 (79.3)	571 (79.2)		56 (80.0)		0.025	0.874
Objective circumstances	9.68±4.89	9.47±4.81		11.83±5.22		-3.889	0.000
Self-report	4.22±2.48	4.13±2.40		5.13±3.05		-2.671	0.009
	5.46±3.28	5.34±3.27		6.70±3.14		-3.327	0.001

Table 3

Logistic regression analysis for predictors of multiple suicide attempters (n=791)

Variables	Multiple suicide attempters				
	β	S.E.	Wald	p	Exp (β)
Family history of suicide	1.322	0.421	9.852	0.002	3.750
Mental disorder	1.440	0.365	15.583	0.000	4.223
Social support	-0.060	0.022	7.747	0.005	0.942
Hopelessness	0.064	0.009	48.223	0.000	1.067
Constant	-5.131	1.586	10.461	0.001	0.006
Nagelkerke $R^2 = 0.333$, Hosmer-Lemeshow goodness-of-fit Test $\chi^2 = 6.581$, $p = 0.582$					95% CI for Exp (β)
					1.643 – 8.561
					2.065 – 8.633
					0.903 – 0.982
					1.047 – 1.086