Published in final edited form as:

Psychiatry Res. 2010 June 30; 178(1): 97–100. doi:10.1016/j.psychres.2009.01.021.

Influencing factors for depression among Chinese suicide survivors

Ning Li^a and Jie Zhang^{b,c,*}

^a Department of Epidemiology and Health Statistics, School of Public Health, Shandong University, China

^b Central University of Finance and Economics, China

^c Department of Sociology, State University of New York College at Buffalo, United States

Abstract

One hundred and nine suicide survivors and 128 informants of community controls were investigated in this study to explore how Chinese suicide survivors were affected by the suicide deaths. Variables measured in the survey included demographic status, mental health status, personality, etc. Univariate and multivariate analyses were employed in data analyses to explore possible influencing factors for depression among Chinese suicide survivors. 'Lived with suicide victim' was found to be the most important influencing factor. Suicide survivors were more depressed than general populations but the characteristics of Chinese suicide survivors were still not clear. Interventions for Chinese suicide survivors are essential, but before that more researches are needed to get a comprehensive understanding of Chinese suicide survivors.

Keywords

suicide survivor; depression; influencing factors; Chinese

1. Introduction

Suicide as a major public health problem causes about 1 million deaths around the world each year and in developed countries suicide accounts for the largest share of intentional injury burden (WHO, 2005). Deaths from suicides not only bring their families and friends heavy economic burden, but also affect them with psychological trauma (Phillips et al., 2002; Yang and Lester, 2007). A survivor of suicide is a family member or friend of a person who dies by suicide (American Association of Suicidology). In the US, approximately 31,000 people die by suicide each year and it is estimated that for every suicide there are 6 to 10 suicide survivors (American Association of Suicidology). In China, suicide is the fifth most important cause of death and each year about 287,000 people die by suicide which makes more than 1.5 million people suicide survivors (Phillips et al., 2002).

From the studies in western countries, it is known that suicide survivors are more likely to suffer from complicated grief and are at high risk for mental problems and suicide (Brent et

* Corresponding author. Department of Sociology, State University of New York College at Buffalo, 1300 Elmwood Avenue, Buffalo, NY 14222, United States. Tel: +1 716 878 6425; Fax: 716 878 4009. E-mail address: zhangj@buffalostate.edu.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

al., 1993; Brent et al., 1993; Brent et al., 1996; Jordan, 2001; Saarinen et al., 2002; Mitchell et al., 2004). But in China, there are scarcely any published reports on Chinese suicide survivors and little is known about the status of Chinese suicide survivors. According to Dr. Phillips' psychological autopsy study in China (Phillips et al., 2002), being a suicide survivor is an important risk factor for suicide and interventions for suicide survivors are imperative. Before any intervention is carried out, the characteristics of Chinese suicide survivors should be studied thoroughly and this paper is focused on the mental health status of Chinese suicide survivors.

2. Methods

2.1. Subjects and data collection

All the information in this study was collected in a psychological autopsy study conducted in Dalian, a northeast city in China. Psychological autopsy is a way for the reconstruction of suicidal death through interviews with survivors (Beskow et al., 1990). Psychological autopsy studies are widely used in suicide researches in Western countries. In recent years the number of suicide researches and psychological autopsy studies in China has increased rapidly, but few were specifically designed for suicide survivors. The aim of this psychological autopsy study was to explore the risk factors for Chinese suicide and to describe how Chinese suicide survivors were affected. Suicide cases were selected consecutively from two rural counties. General populations at the same location who were matched with suicide victims in gender and closeness in age were randomly selected as community controls. Sixty-six suicides were sampled in our study and 66 living individuals were identified as the community controls. For each suicide case we had two informants, most of whom were family members or friends of the decedents. For each community control, two informants and the control him/herself were investigated. All the information was collected by face-to-face interview which took about 2.5 hours each and before the interview began, a consent form was read and signed by each respondent. The measures and procedures for data collection were approved by the Institutional Review Board of the State University of New York College at Buffalo and by Dalian Medical University in China. For more details, please refer to our prior publications (Zhang et al., 2002; Zhang et al., 2003).

The information of the suicide survivors and the information of the community controls' informants was used in this study. Some informants of the suicide victims were medical personnel and didn't meet the criteria of being a suicide survivor. After excluding these data, we had 109 suicide survivors and 128 informants of community controls left in our study. Table 1 shows the basic information of the suicide survivors and the informants of community controls.

2.2. Instruments

The questionnaire used in this study included the demographic variables such as age, gender, marital status, etc., and two western developed scales. The depression level of the respondents was measured by the Center for Epidemiologic Studies Depression Scale (CES-D) (Radloff, 1977). There were 20 items on how the respondents felt in the past week. These 20 items were scored like this: 0 (less than 1 day), 1 (1-2 days), 2 (3-4 days), 3 (5-7 days). Therefore, the maximum of the total CES-D score is 60 and the minimum is 0.

NEO Five-Factor Inventory (NEO-FF-I) was another western developed instrument employed in this study. It consisted of 60 items which were derived from the 240 items of the NEO personality Inventory (NEO PI-R) (Costa and McCrae, 1992; Yang et al., 1999). The five dimensions in NEO-FF-I were: (N) Neuroticism, (E) Extraversion, (O) Openness to Experience, (A) Agreeableness, and (C) Conscientiousness. The Chinese version of CES-D

and NEO-FF-I were tested before this study with excellent reliability and validity (Zhang et al., 2003; Zhang and Norvilitis, 2002).

Because another aim of this project was to explore the risk factors for Chinese suicide, besides the above two scales, the questionnaire also included scales of life events, coping skills, and social support. However, these parts of data were not used in this study for suicide survivors.

2.3. Data analyses

The total CES-D score was computed as the sum of the scores of the 20 items. Depression level measured by CES-D was categorized as: 1) no depression (CES-D score ≤ 15); 2) possible depression ($16 \leq$ CES-D score ≤ 19); and 3) depression (CES-D score ≥ 20) (Zhang, 1993). Table 2 shows the frequency of these three categories of CES-D status. The median of the total CES-D score for suicide survivors was 9 while for the informants of community controls it was 2. Suicide survivors were more depressed than the informants of community controls ($z=5.038$, $P<0.001$).

t-Test as well as Mann-Whitney Test were used to explore the relationship between the total CES-D score and dichotomous variables such as gender, location, marital status, etc. Oneway ANOVA was employed to explore the relationship between the total CES-D score and polytomous variables such as education level, relation with suicide victims, health status of suicide victims, etc. Correlations between the total CES-D score and continuous variables such as family income, education years, time interval between investigation and suicide, etc. were calculated to explore possible influencing factors for depression among Chinese suicide survivors.

After univariate analyses, multivariate analyses were conducted and logistic regressions were used in this section. The total CES-D score was categorized as: 1) no depression (CES-D score ≤ 15); and 2) possible depression and depression (CES-D score ≥ 16), and this dichotomous variable served as the dependant variable in the logistic regressions. Logistic regressions were performed twice, firstly among suicide survivors and informants of community controls and then among suicide survivors only. All these statistical analyses were conducted by SPSS 13.0.

3. Results

3.1. Sample Characteristics

This sample consists of 109 suicide survivors and 128 informants of community controls. The mean age of suicide survivors is 48.95 (S.D. =13.37) which is significantly higher than that of the informants of community controls ($M=43.16$, S.D. =12.77, $t=4.00$, $df=235$, $P<0.001$). Forty three (39.35%) of the suicide survivors are male while 33(25.78%) of the informants of community controls are male. The gender proportion is different among suicide survivors and community controls' informants ($\chi^2=5.05$, $P=0.025$). Five (4.59%) of the suicide survivors live in urban area while for the community controls' informants the number is 17(13.28%) which constitutes a significant difference ($\chi^2=5.28$, $P=0.022$) between the location of suicide survivors and that of community controls' informants. More details are presented in table 1.

3.2. Possible influencing factors for depression

3.2.1. Relation to suicide victim—According to the relation to suicide victim, all the suicide survivors engaged in this study were classified as parents, spouses, siblings, children, other relatives, and friends or neighbors. The ANOVA analyses results showed that

the total CES-D score of these six groups were different, $F(5, 104) = 8.910, P < 0.001$. The spouse survivors got the highest score and the parent survivors were the next. Post Hoc analyses showed that the total CES-D score of spouse survivors were higher than that of sibling survivors, children survivors, other relatives, and friends or neighbors ($P < 0.001, P < 0.001, P < 0.001, P = 0.008$), but the difference between the total CES-D score of spouse survivors and that of parent survivors was not significant ($P > 0.05$).

3.2.2. Lived with suicide victim—Survivors who lived with suicide victim got higher total CES-D score than survivors who did not live with suicide victim and the difference was significant ($z = 3.535, P < 0.001$).

3.2.3. To what extent the survivors knew suicide victim—The extent how the survivors knew suicide victim was classified as extremely well, very well, well, not much, not at all. According to the above classification, all the suicide survivors were divided into five groups and the total CES-D score of the five groups were different, $F(4, 105) = 4.172, P = 0.004$. Survivors who knew suicide victim extremely well got higher total CES-D score than the other groups except survivors who knew suicide victim well ($P = 0.023, P < 0.001, P = 0.017$). The difference between the total CES-D score of survivors who knew suicide victim extremely well and that of survivors who knew suicide victim well was not significant ($P = 0.095$).

3.2.4. Time interval between investigation and suicide—Correlation between total CES-D score and time interval showed that the longer the interval between investigation and suicide, the lower the total CES-D score ($r = -0.322, P = 0.001$).

3.2.5. Family income—Correlation between total CES-D score and survivors' family income showed that the higher the family income, the lower the total CES-D score ($r = -0.273, P = 0.004$).

3.3 Multivariate analyses

Multivariate analyses were firstly conducted among suicide survivors and community controls' informants and then among suicide survivors to search possible influencing factors for depression.

When logistic regressions were firstly conducted among suicide survivors and community controls' informants, group (suicide survivors or community controls' informants) was identified as the most important influencing factor (Forward Stepwise [Conditional], entry 0.05, removal 0.10, Nagelkerke $R^2 = 0.274$). Some variables were excluded from the models in this step. These variables were those related to the suicide death, such as 'lived with suicide victim' and 'the time interval between suicide and investigation'. When multivariate analyses were performed among suicide survivors only, these factors were put into the logistic regression models. The results of the logistic regressions among suicide survivors showed that 'lived with suicide victim' was the most important influencing factor for depression with an OR of 5.573 (Forward Stepwise [Conditional], entry 0.05, removal 0.10, Nagelkerke $R^2 = 0.383$). More details were presented in Table 3 and Table 4.

4. Discussion

In western countries, many researches were focused on suicide survivors, who were found to be depressed after the death of suicide for a long time, and some comparative studies indicated that survivors of suicide were more depressed than survivors of other types of death (Brent et al., 1993; Brent et al., 1993; Brent et al., 1993; Brent et al., 1994; Séguin et

al., 1995; Brent et al., 1996; Brent et al., 1996). In this study we didn't have a control group of survivors of other types of death; therefore we paid more attention on the suicide survivors group and in our future studies we will consider using survivors of other types of deaths as the control group.

The results indicated that suicide survivors were more depressed than general populations. Spouse survivors were more depressed than survivors of other relations to suicide victim and 'Lived with suicide victim' was found the most important influencing factor for depression among Chinese suicide survivors. Generally speaking, people who live with suicide victim are the most intimate relatives of suicide so it is reasonable if these survivors get higher level of depression than the other survivors; and popularly when people get married they always live with their spouses, so it is rational to find that spouse survivors suffer from more severe depression than other suicide survivors. There may be some interactions between some variables such as 'relation to suicide victim', 'lived with suicide victim', and 'to what extent the survivors knew suicide victim'. However, because of the sample size we failed to testify these interactions. In future researches, we need to consider the above variables synthetically and try to integrate them because the information from them may overlap.

'Time interval between suicide and investigation' was another important influencing factor for depression among Chinese suicide survivors. As time goes by, the trauma caused by the loss of a loved one is diluted. In our recent investigation on suicide survivors in rural China, we found that even shortly after the suicide death, some suicide survivors had to continue to work because of financial difficulties, and they even didn't have time to mourn. Whether such a situation will help survivors cope with the sudden death or it will intensify the long-term impact of suicide is not clear, and it is quite worth more attention in future. This present study has several limitations. One limitation is that the suicide survivors and the informants of community controls are not matched in some demographics because this would have cost much more time and expenditure. Another limitation is that the reason of the suicide death is not mentioned in our interview which may be an important risk factor for depression of suicide survivors. Moreover, because of the limited length of the questionnaire, some variables were not included such as 'whether the survivors found the body of suicide victim' and 'whether the suicide victim made threats'. We will cover these variables in our future studies.

However, being a suicide survivor is an important risk factor for suicide (Phillips et al., 2002) and depression as a common problem among suicide survivors is another significant risk factor for suicide. Therefore, interventions for suicide survivors are very essential in suicide prevention program in China. The number of suicide researches in China has increased rapidly in recent years, but few were focused on suicide survivors and little is known on Chinese suicide survivors. Therefore, we need to carry out more studies on Chinese suicide survivors to get enough knowledge for future interventions.

Acknowledgments

This study is supported by the NIMH grant (R03 MH60828-01A1).

References

- American Association of Suicidology. <http://www.suicidology.org/>
- Beskow J, Runeson B, Asgard U. Psychological autopsies: Methods and ethics. *Suicide and Life-Threatening Behavior*. 1990; 20:307–323. [PubMed: 2087767]
- Brent DA, Moritz G, Bridge J, Perper J, Canobbio R. Long-term impact of exposure to suicide: a three-year controlled follow-up. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1996; 25:646–653. [PubMed: 8935212]

- Brent DA, Moritz G, Bridge J, Perper J, Canobbio R. The impact of adolescent suicide on siblings and parents: a longitudinal follow-up. *Suicide and Life-Threatening Behavior*. 1996; 26:253–259. [PubMed: 8897664]
- Brent DA, Perper J, Moritz G, Allman C, Liotus L, Schweers J, Roth C, Balach L, Canobbio R. Bereavement or depression? The impact of the loss of a friend to suicide. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1993; 32:1189–1197. [PubMed: 8282664]
- Brent DA, Perper J, Moritz G, Friend A, Schweers J, Allman C, McQuiston L, Boylan MB, Roth C, Balach L. Adolescent witness to a peer suicide. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1993; 32:1184–1188. [PubMed: 8282663]
- Brent DA, Perper J, Moritz G, Liotus L, Schweers J, Canobbio R. Major depression or uncomplicated bereavement? A follow-up of youth exposed to suicide. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1994; 33:231–239.
- Brent DA, Perper J, Moritz G, Liotus L, Schweers J, Roth C, Balach L, Allman C. Psychiatric impact of the loss of an adolescent sibling to suicide. *Journal of Affective Disorders*. 1993; 28:249–256. [PubMed: 8227761]
- Costa, PT.; McCrae, RR. NEO PI-R professional manual. Odessa, FL: Psychological Assessment Resources, Inc.; 1992.
- Jordan JR. Is suicide bereavement different? A reassessment of the literature. *Suicide and Life-Threatening Behavior*. 2001; 31:91–102.
- Mitchell AM, Kim Y, Prigerson HG, Mortimer-Stephens M. Complicated grief in survivors of suicide. *Crisis*. 2004; 25:12–18. [PubMed: 15384652]
- Phillips MR, Yang G, Zhang Y, Wang L, Ji H, Zhou M. Risk factors for suicide in China: a national case-control psychological autopsy study. *The Lancet*. 2002; 360:1728–1736.
- Radloff LS. The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*. 1977; 3:385–401.
- Saarienen PI, Hintikka J, Lehtonen J, Lönnqvist JK, Viinamäki H. Mental health and social isolation among survivors ten years after a suicide in the family: a case-control study. *Archives of Suicide Research*. 2002; 6:221–226.
- Séguin M, Lesage A, Kiely MC. Parental bereavement after suicide and accident: a comparative study. *Suicide and Life-Threatening Behavior*. 1995; 25:489–492. [PubMed: 8928203]
- WHO. The World Health Report. Geneva, Switzerland: World Health Organization; 2005.
- Yang B, Lester D. Recalculating the economic cost of suicide. *Death Studies*. 2007; 31:351–361. [PubMed: 17378112]
- Yang J, McCrae RR, Costa PT, Dai X, Yao S, Cai T, Gao B. Cross-cultural personality assessment in psychiatric populations: The NEO-PI-R in the People's Republic of China. *Psychological Assessment*. 1999; 11:359–368.
- Zhang, M. Handbook of rating scales in psychiatry. Changsha, China: Hunan Science and Technology Press; 1993.
- Zhang J, Conwell Y, Wiczorek WF, Jiang C, Jia S, Zhou L. Studing Chinese suicide with proxy-based data: reliability and validity of the methodology and instruments in China. *Journal of Nervous and Mental Disease*. 2003; 191:450–457. [PubMed: 12891092]
- Zhang J, Norvilitis JM. Measuring Chinese psychological well-being with Western developed instruments. *Journal of Personality Assessment*. 2002; 79:492–511. [PubMed: 12511017]
- Zhang J, Wiczorek W, Jiang C, Zhou L, Jia S, Sun Y, Jin S, Conwell Y. Studying suicide with psychological autopsy: social and cultural feasibilities of the methodology in China. *Suicide and Life-Threatening Behavior*. 2002; 32:370–379. [PubMed: 12501962]

Table 1

Sample demographics

	Suicide survivors (n=109)		Informants of general population (n=128)		Statistics	P
	n	(%)	n	(%)		
Gender						
Male	43	(39.45)	33	(25.78)	5.049 ^c	0.025
Female	66	(60.55)	95	(74.22)		
Location						
Urban	5	(4.59)	17	(13.28)	5.284 ^c	0.022
Rural	104	(95.41)	111	(86.72)		
Marital Status						
Currently Married	84	(77.06)	115	(89.84)	7.141 ^c	0.008
Currently Unmarried	25	(22.94)	13	(10.16)		
Relation						
Parents	15	(13.76)	11	(8.59)	11.904 ^c	0.036
Spouses	28	(25.69)	31	(24.22)		
Siblings	10	(9.17)	7	(5.47)		
Children	6	(5.50)	12	(9.38)		
Other relatives	36	(33.03)	31	(24.22)		
Friends or neighbors	14	(12.84)	36	(28.13)		
Age (yrs) ^a	48.95	(13.37)	43.16	(12.77)	3.997 ^d	<0.001
CES-D total score ^b	9.0		2.0		5.038 ^e	<0.001
Family income (10,000RMB*) ^b	0.65		1.0		-2.860 ^e	0.004
Education level (yrs) ^b	6.0		7.0		-3.332 ^e	0.001
Neuroticism ^b	34		28		-6.625 ^e	<0.001
Extraversion ^b	39		41.5		-2.006 ^e	0.045
Openness ^b	33		34		-2.111 ^e	0.035
Agreeableness ^b	43		46		-4.073 ^e	<0.001

	Suicide survivors (n=109)		Informants of general population (n=128)		Statistics	P
	n	(%)	n	(%)		
Conscientiousness ^b	43		46		-5.779 ^e	<0.001

* 1USD dollar=6.87RMB.

^aMean (S.D.).

^bMedian.

^cChi Square test.

^dt-Test.

^eMann-Whitney Test.

Table 2

Description of subjects on total CES-D score

CES-D status	Suicide survivors n=109		Informants of community controls n=128	
	N	%	N	%
No depression	66	60.55	112	87.50
Possible depression	5	4.59	4	3.12
Depression	38	34.86	12	9.38
Total	109	100	128	100

Table 3

Influencing factors for depression among suicide survivors and informants of community control (logistic regression)

Factors	B	S.E.	Wald	Sig.	Exp(B)
Group	1.245	0.367	11.526	0.001	3.475
Family income	-0.858	0.268	10.292	0.001	0.424
Neuroticism	0.097	0.031	9.667	0.002	1.102
Agreeableness	0.084	0.038	4.961	0.026	1.087
Constant	-7.879	2.367	11.092	0.001	<0.001

Table 4

Influencing factors for depression among suicide survivors only (logistic regression)

Factors	B	S.E.	Wald	Sig.	Exp(B)
Family income	-1.020	0.416	6.015	0.014	0.361
Age of suicide	-0.041	0.015	7.625	0.006	0.960
Time interval	-0.118	0.066	3.166	0.075	0.889
Live with suicide	1.718	0.484	12.581	0.000	5.573
Constant	2.428	0.945	6.594	0.010	11.332