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A Case Control Study of Suicides in China with and Without Mental Disorder

Jie Zhang[1,2] and **Liang Zhou**[3]

[1]Central University of Finance and Economics, Beijing, China

[2]State University of New York College at Buffalo, New York, USA

[3]Central South University, Hunan, China

Abstract

Background—Chinese suicide samples have provided opportunities to study the differences between suicides with and without psychiatric diagnoses.

Aims—To examine the differences between suicides with and without mental disorders.

Methods—Sixty-six suicides and 66 living controls were studied with psychological autopsy interviews in rural China. Those who died by suicide with (n = 45) and without (n = 21) mental disorders were compared on demographic characteristics, suicidal behavior, social support, life events, and depressive symptoms (as measured by the Hamilton Depression Rating Scale, HAMD).

Results—Suicides with and without psychiatric diagnoses had significant differences in many demographic and social factors. In comparison with suicides with psychiatric diagnoses, suicides without psychiatric diagnoses were younger, were better educated, had higher income, were more likely to kill themselves using pesticides or other poisons, were less likely to have a history of prior suicide attempt, had less long-term life events and more recent life events, and scored lower on HAMD.

Conclusions—These two groups might be from two different populations. This finding has important implications for more effective and targeted suicide prevention strategies in China.

Keywords

suicide; psychological autopsy; mental disorder; China

Introduction

Psychiatric screening of suicide deaths using psychological autopsy methods appears to be required in any etiological research since the majority of suicides are believed to have mental disorders (Conwell et al., 1996; Harris & Barraclough, 1997; Robins, Murphy, Wilkinson, Gassner, & Kayes, 1959; Zhang, Conwell, Zhou, & Jiang, 2004). Over 90% of suicides in the West are diagnosed with at least one psychiatric illness including alcohol and/or substance use disorders (Conwell et al., 1996), while almost 70% of the suicides in China have been found to have at least one such illness (Phillips, Li,& Zhang, 2002; Zhang, Li et al., 2004). However, over 95% of individuals with a psychiatric illness do not complete

School of Public Health, Central South University, Changsha, Hunan, China 410078, Tel. +86 731 408-5456, zhouliang@xysm.net or zhouliang1976@gmail.com.

suicide (IOM, 2002, p. 69), indicating that factors other than mental health also play important roles. The significant number of suicides not diagnosed with any psychiatric problem, especially among Chinese suicides, has been noted previously (Zhang, Conwell et al., 2004). It is not clear whether, and to what extent, suicides without diagnosed mental illness share characteristics with those with diagnosed mental illness. Knowledge of the demographic characteristics and behavioral assessment of suicides with and without psychiatric diagnoses will help with designing appropriate measures and treatments.

In this study we compared 66 completed suicides and 66 living controls from rural China in terms of demographic characteristics and social factors to examine their similarities and differences. We hypothesized that suicides with and without diagnoses are from two different populations, and different prevention measures and treatment strategies need to be conceptualized and designed accordingly.

Methods

Data were obtained from a case-control psychological autopsy project conducted in China in 2001 through 2003.

Cases and Controls

The samples of 66 suicides and 66 controls were from Dalian in northeast China. The area includes six districts and four counties with a total population of over five million, a little over half of whom are rural residents. We did consecutive sampling in Jinzhou District and two townships in Zhuanghe County. Approved by the Institutional Review Board at both the Chinese and US institutions, various channels were used to collect the names of suicides. In Jinzhou, public health personnel were approached for the list of suicides in the district that had happened in the past year. In Zhuanghe, the research team went to all the villages in the two selected townships, visited villagers, and identified recent suicides. Villagers and their cadres introduced more suicide cases within and outside the villages to the researchers. Controls matched to the suicide for gender and close in age were nominated by the local contact people in the same village or neighborhood.

Informants

For each of the 66 suicide cases, there were two informants who were either next of kin or the best friend of the suicide. For each living control, two informants and the control himself/ herself served as the sources of information. Interviews with living controls provided the basis of validity tests.

The total number of interviews was 330. The response rate in the suicide case sample was 100%. Only two cases out of 66 controls declined the interview. Both were replaced. The high response rates are accounted for by Chinese culture, which values conformity and respects authority. Each interview lasted about 2.5 h.

Source of Information and Interviewer Training

In China, the absence of a medical examination system and lack of psychiatric care means that the major source of information for suicides is informants interviewed with psychological autopsy methods. We used standardized measures for the interview and some standardized combination methods to integrate the information from two informants. In selecting informants, we tried to identify two people, one next of kin and the other a best friend, for both cases and controls. In this way we sought to maximize information from different contexts and perspectives.

The six-member interview team consisted of epidemiologists, psychologists, and psychiatrists from the Dalian Medical University in Dalian, China. Three members on the interviewing team had been trained in the United States for at least half a year in both epidemiology and psychiatry, including in use of the Structured Clinical Interview for DSM-III-R (SCID) as an interview tool in the diagnosis of mental disorders.

Interview Procedures

We conducted interviews 2 to 6 months after the suicide. Since most Chinese households in rural areas do not have a telephone, we used a home visit without announcement as the initial contact, to maximize the response rate. With our agreement, the county or village cadres and medical staff from the county hospital or village clinics approached the victim's family to brief them about the research project.

Instruments: Mental Disorders

The SCID (Spitzer, Williams, Gibbon, & First, 1988), was used to establish psychiatric diagnoses for cases and controls. We used a Chinese version of the SCID (Gu & Chen, 1993) based on Taiwanese and Hong Kong samples (Zhang et al., 2003). The SCID was used to generate diagnoses of Axis I Disorders including alcohol abuse and dependence, anxiety disorders, affective disorders, and primary psychoses (schizophrenia).

Although all the interviewers were trained mental health professionals, experienced psychiatrists were employed to make the psychiatric diagnoses for both cases and controls based on two independent interviews from two different informants, supplemented, on occasions, by a meeting with the interviewer.

Those decedents who did not meet diagnostic criteria for any mental disorder were divided into three groups based on the number and duration of psychiatric symptoms: absence or mild, which meant no symptom was detected or the number of symptoms was less than half of the symptoms required to meet diagnostic criteria for any mental disorder in DSM-III-R; moderate: the number of symptoms was between half and the full complement of symptoms required to meet diagnostic criteria for a DSM-III-R mental disorder; and severe: symptom criteria for any mental disorder were fulfilled, while the duration requirement or any other diagnostic criteria of the mental disorder was not met.

Other Measures

Other measures included (1) demographic information (incl. gender, age, marital status, education, and family annual average income); (2) social factors; (3) suicidal behavior, and (4) depressive symptoms. The Duke Social Support Index (DSSI) and Paykel's Interview for Recent Life Events (IRLE) were used to measure social support and life events. Measurements of suicidal behavior included previous suicide attempts, details of the methods of suicide, and Beck's Suicide Intent Scale (SIS). The Hamilton Depression Rating Scale (HAMD) was used to assess symptoms of depression. All these instruments had shown good reliability and validity in our previous study (Zhang et al., 2003).Marital status and employment were dichotomized for the purpose of this analysis: marital status (married = 1, all others including never married, widowed, and divorced = 0); employment (employed = 1, unemployed = 0).

Statistical Analyses

Descriptive analyses, *t*-test, and χ^2 were used to compare demographic variables, social factors, and depressive symptoms among controls and suicides with and without a psychiatric diagnosis. Unconditional logistic regression was used to control for age and gender. All statistical analyses were carried out using SPSS, version11.0.

Data Analyses and Results

Forty-five of 66 suicides were diagnosed with mental disorders, and 21 (31.8%) did not meet DSM-III-R diagnostic criteria for a mental disorder. Among the 21 suicides without psychiatric diagnosis, 16 (76.2%) cases had absent or mild symptoms, 2 (9.5%) cases were classified as having moderate symptoms, and 3 (14.3%) cases who met the symptom criteria for a specific mental disorder failed to meet diagnostic criteria because of the short duration of symptoms.

Demographic Characteristics

Table 1 compares demographic variables between suicides with and without mental disorders. Suicides without mental disorders were significantly younger, better educated, and had a higher income than suicides with mental disorders.

Suicidal Behaviors

Table 2 compares suicidal behaviors between suicides with and without mental disorders. Suicides without mental disorders were more likely to use pesticides or other poisons as a means of suicide than suicides with mental disorders, although pesticides and other poisonous farming chemicals were equally available at home for both groups. There were no statistically significant differences in SIS total scores between the two groups. Suicides without mental disorders were less likely than suicides with mental disorders to have had a history of prior suicide attempts.

Social Factors

Table 3 compares life events, social support, and depressive symptoms in suicides with and without mental disorders, and controls. The total numbers of life events in the previous year was not significantly different between the suicides with and without mental disorders. However, the suicides with mental disorders were more likely to have had longer-term life difficulties than those without a mental disorder, whereas the suicides without mental disorders were more likely than the suicides with mental disorders to have had recent life events, i.e., within 1 month prior to death. Suicides had experienced significantly more short term and longer-term life events than the living controls. The most common life events for suicides with mental disorders were fights with family members (8/45, 17.8%), decreased income (5/45, 11%), and physical illness (4/45, 8.9%). The most common life events for the suicides without mental disorders were fights with family members (6/21, 28.6%), a loss of face (5/21, 23.8%), and criticism or punishment by teacher, superior, or parents (2/21, 9.5%).

As a group, suicides scored significantly lower than controls on all three social support domains. Depressive symptoms, as measured by HAMD, were significantly higher in suicides with, than without, mental disorders.

Multiple Regression

Multiple logistic regression, controlling for age and sex, showed that differences in education and depressive symptoms between suicides with, and without, psychiatric diagnosis remained significant.

Discussion

We found mental disorders in 68.2% of a sample of 66 suicides, slightly higher than previously reported data from China (Phillips et al., 2002; Zhang, Li et al., 2004), but still

significantly lower than the 90% reported in Western societies (Brown, 1997; Conner, Duberstein, & Conwell, 2001; Ji, Kleinman, & Becker, 2001; Phillips & Liu, 1996).

There has been some discussion about the possible social and cultural reasons for this phenomenon. Phillips and colleagues (2002) and Zhang, Conwell and colleagues (2004) have both argued that the most likely explanations are that many Chinese suicides were impulsive and responsive to some social life event. Phillips also suggested that individuals who were acutely stressed might experience a variety of transient psychological symptoms, while not meeting criteria for a psychiatric diagnosis because of the short duration of their symptoms. Our results did not support this speculation: Most of the suicides without mental disorders in our study had less than half the symptoms required for DSM-IV. Only three (14.3%) cases were not diagnosed only because of the short duration of their symptoms. Furthermore, depressive symptoms (measured by HAM-D) 1 week prior to death or interview showed that the scores of suicides without mental disorders (10.9) were lower than those of suicides with mental disorders (30.3), but very close to those of living controls (7.4). These issues require further examination because none of these researchers described suicides without mental disorders or compared them with suicides with mental disorders.

We found that, compared with suicides with mental disorders, those without disorders were younger, better educated, and had higher family income. Demographically (by age, educational level, and income), suicides without disorders were more like the living controls than like suicides with mental disorders, suggesting that suicides with and without disorders may be two different populations.

Suicidal behavior measurements also differed between the two suicide groups. Most suicides without disorders (85.7%) died by pesticides or other poisons compared to 53.3% of suicides with mental disorders. Generally, the use of suicide methods are believed to be related to the accessibility and acceptability of the methods. In our study over 70% of families kept pesticides in their homes. The difference in use of suicide methods is interesting and needs further investigation. Suicides with disorders had more extensive histories of suicide attempts than suicides without mental disorders. However, we did not find a significant difference in suicide intent (measured by the SIS) between the two suicide groups.

The total number of life events in the year prior to death was similar for the two suicide groups, but more long-term life events were found in suicides with mental disorders and more recent life events were found in suicides without disorders. Life events in suicides with, and without, disorders may differ in time and categories.

Our findings suggesting that suicides with and without psychiatric diagnoses showed significant differences in a number of demographic and social measures as well as in depressive symptoms suggest that these two groups may be from two different populations. These findings are consistent with studies that have reported differences in demographic variables and psychiatric symptoms between mental disorders patients with and without suicidal behavior (Addington & Addington, 1992; Goldstein et al., 2005; Kuo, Tsai, Lo, Wang, & Chen, 2005). A recent report on a schizophrenia sample from rural area in China also found that schizophrenia patients with suicide attempts were younger and higher educated compared with those without suicide attempts (Ran et al., 2005).

This finding has important implications for more effective and specific suicide prevention strategies in China, and, maybe, elsewhere in the world. For example, decreasing the availability of farming pesticides and improving social support networks may be more efficient for the prevention of suicide by people without mental disorders, while providing mental health services may be more important for people with mental disorders.

Our study is limited by the small sample size. Nevertheless, this study draws attention again to the minority of suicides who are not mentally ill, and suggests the need for replication with larger samples.

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Biographies

Jie Zhang, PhD, is a Professor of Sociology at State University of New York College at Buffalo in the United States and at Central University of Finance and Economics in China.

He is currently conducting a large-scale psychological autopsy study of rural young suicides in China with a NIMH R01 grant. His research interests focus on culture and suicide.

Liang Zhou, MD, PhD, currently is an Associate Professor in the Department of Social Medicine, Public Health School, Central South University, China. His research interests lie in adopting public health approaches toward suicide prevention in China, and suicide research in alcohol abuse and dependent population.

Table 1

Demographic characteristics of the suicides with and without psychiatric diagnoses and the living controls

	Suicides with diagnosis (*n* = 45)	**Suicides without diagnosis (*n* = 21)**	**Controls (*n* = 66)**	***p*-value 1**	***p*-value 2**
Gender [*n* of males (%)]	35 (77.8)	13 (61.9)	48 (72.7)	.177	.403
Age [mean years (*SD*)]	49.9 (17.3)	36.0 (12.4)	44.9 (16.7)	.002	.007
Marital status [no. of married (%)]	30 (66.7)	13 (61.9)	53 (80.3)	.705	.136
Education years [mean years (*SD*)]	5.2 (2.8)	6.6 (1.8)	7.4 (3.8)	.038	.002
Family income [mean RMB (*SD*)]	1850 (1604)	3640 (5925)	3622 (3038)	.029	.016
Employment [no. of unemployed (%)]	14 (31.1)	8 (38.1)	17 (25.8)	.340	.537

p-value 1: comparison between suicides with and without psychiatric diagnoses, *p*-value 2: comparison between suicides and living controls.

Table 2

Suicidal behaviors of the suicides with and without psychiatric diagnoses

	Suicides with diagnosis (*n* = 45)	**Suicide without diagnosis (*n* = 21)**	***p***
Using pesticides or other poisons (%)	24 (53.3)	18 (85.7)	.014
Pesticides stored at home (%)	35 (77.8)	15 (71.4)	.575
SIS total score [mean (*SD*)]	7.8 (2.1)	7.2 (2.6)	.302
Previous attempts [mean (*SD*)]	0.8 (1.2)	0.3 (0.8)	.045

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Table 3

Life events, social support, and depressive symptoms of suicides and living controls

	Suicides with diagnosis (*n* = 45)	**Suicides without diagnosis (*n* = 21)**	**Living controls *n* = 66)**	***p*-value 1**	***p*-value 2**
Life events in recent one year [mean (*SD*)]	4.63 (3.2)	5.05 (4.2)	2.44 (2.0)	.668	.000
Long-term life events [mean (*SD*)]	2.42 (1.4)	1.43 (0.8)	0.82 (0.4)	.007	.000
Individuals with life events in recent one month [number (%)]	17 (38)	16 (76)	5 (7.6)	.004	.000
Individuals with life events in recent one week [number (%)]	10 (22)	19 (90)	2 (3.0)	.000	.000
Social support: Interaction	6.93 (2.1)	7.58 (2.4)	8.71 (1.8)	.380	.000
Social support: Perception	13.86 (3.1)	14.09 (3.3)	17.77 (2.8)	.509	.000
Social support: Instrumental	22.01 (2.4)	21.22 (1.9)	23.15 (1.2)	.540	.000
Total score of HAMD	30.3 (14.4)	10.9 (6.7)	7.4 (5.1)	.000	.000

p-value 1 = comparison between suicides with and without psychiatric diagnoses, *p*-value 2 = comparison between suicides and living controls.

Table 4

Results of logistic regression analysis examining the differences between suicides with and without psychiatric diagnosis

Independent variable		*b*	*SE*	Wald χ^2	*p*	Exp(B)	95%CI
Education	1–5 years > 6 years	–1.401	0.766	3.345	.067	0.246	0.055–1.106
Suicide means	Using pesticides or other poisons Others	1.538	0.974	2.496	.114	4.656	0.691–31.385
Depressive symptoms	HAMD < 22 HAMD > 22	4.065	1.141	12.700	.000	58.249	6.229–544.684
Constant		0.041	0.571	no	.005	.943	