

Case-Control Study of the Relationship of Depressive Symptoms to Suicide in a Community-Based Sample of Individuals with Schizophrenia in China

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ABSTRACT

Case-control study of the relationship of depressive symptoms to suicide in a community-based sample of individuals with schizophrenia in China

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BACKGROUND: Suicide is the leading cause of premature death among people with schizophrenia. Most studies on completed suicide among persons with schizophrenia suggest that suicide is associated with a history of depression, symptoms of agitation, worthlessness and hopelessness.

METHODS: To test the relationship between depressive symptoms in schizophrenia and suicide, we conducted a secondary analysis from a large psychological autopsy study in mainland China that used a version of the structured clinical interview for DSM-IV (SCID) adapted

for interviewing Chinese. The original dataset included 519 suicides and 536 unintentional injury decedents. From this, we identified a community-based sample of 74 suicides (cases) and 25 accidental deaths (controls) among persons with schizophrenia. Our hypothesis stated subjects dying from suicide would have more depressive symptoms and depression-associated problems. A 'depression symptom severity score' based on the number, severity, and persistence of depressive symptoms 2 weeks before death was derived from the structured psychiatric examination; a dysfunction due to depressive symptoms score' was assessed, based on informants' reports about the effect of depressive symptoms on decedents' functioning in the month before death; and a 'chronic stress score' was assessed based on duration and severity of the psychological effect of negative life events over the prior year.

RESULTS: Subjects who died by suicide had a mean age of 44 (SD = +/- 15) years; 70% were female and 68% lived in rural settings. Control subjects had a mean age of 46 (SD = +/- 17) years; 63% were female and 71% were from rural settings. Those who died by suicide had a significantly higher prevalence of most of the 9 symptoms of a DSM IV Major Depression Syndrome, a higher overall depression severity score, greater dysfunction due to depressive symptoms, and higher levels of chronic stress (all effects significant at p < 0.05).

DISCUSSION: This study of a community-based sample of individuals with DSM-IV schizophrenia who died by suicide in a non-western culture extends findings from Western culture studies that point to depressive symptoms as a risk factor for suicide in schizophrenia. Findings underline the importance of routine screening for depressive symptoms among patients with schizophrenia.

INTRODUCTION

Suicide is the leading cause of premature death among people with schizophrenia (Montross et al 2005), so understanding the risk factors for suicide in schizophrenia is a priority public health problem both in America and internationally. Recent studies on the literature indicate that completed suicides among persons with schizophrenia are associated with a history of depression, current depressive symptoms, a family history of depression and recent losses (Hawton et al., 2005; Palmer, 2005; Ran, 2002). However, most of these studies are based on clinical samples and do not have adequate control groups, so the

relevance of these potential risk factors remains uncertain. Large community-based psychological autopsy studies that include suicides among community members with schizophrenia can overcome some of these limitations, but there are no psychological autopsy studies of sufficient size to do this in the US.

To address these questions, our group conducted a secondary analysis of the psychological autopsy series of Phillips et al (2004) to examine the role of depression in completed suicide in patients with schizophrenia. This database consists of psychological autopsies of 519 people

METHODS

Sample

To test our hypotheses, we conducted a secondary analyses of 2 groups from the National Psychological Autopsy Study in China, described in Phillips (2004). The first group of subjects comprised 74 psychological autopsies of patients with schizophrenia who died from suicide. The second group comprised 25 subjects with the same diagnosis who died from accidental causes.

This study was approved by the institutional review boards of the Beijing Hui Long Guan Hospital and the Chinese Academy of Preventive Medicine. Detailed information on suicides and accidental deaths was collected in 23 geographically representative sites selected from 145 sites of China's National Disease Surveillance Points network. Four recorded causes of death were most likely to include suicides: suicide, non-suicidal injuries, undetermined injuries and mental illness. Deaths attributed to these causes that occurred in 3 of the sites from 8/1/95 to 8/31/00 and in the other 20 sites from 1/1/97 to 8/31/00 were reported to the research group at 3-month intervals. All deaths with undetermined injury or mental illness as the recorded cause were selected for further investigation to determine cause of death. In addition, deaths with suicide or non-suicidal injury as the recorded cause occurring prior to March 1, 1998 were consecutively sampled starting in March 1998.

Trained mental health professionals took 2-3 h to complete the interviews. These interviews were performed with 2 informants: 1) family members and 2) close associates. Close associates were interviewed separately. When combining the two interviews, the mean value was used for continuous measures and categorical variables were coded 'up' if needed; for instance, if the results for the two interviews varied for a specific depressive symptom, the more 'severe' status was assigned.

We also investigated use of psychotropic medications in the month before death as well as numbers of negative life events. For each negative life event that occurred in the

in China who committed suicides and 536 injury deaths. The subjects had many different types of psychiatric conditions. Univariate analyses were conducted to test four hypotheses: compared to controls with schizophrenia who die of accidental causes, persons with schizophrenia who die of suicide are more likely to 1) have experienced recent thoughts of death and past history of suicide attempt, 2) have experienced recent DSM IV symptoms of depression, 3) have a past history of depression and family history of depression, 4) have a recent negative life event.

year before death, or that occurred earlier but continued to have a psychological effect on the deceased during these 12 months, the respondent indicated the time the life event occurred; the respondent's perception of what effect the negative life event had on the deceased, the time over the last year of life that the psychological effect lasted, and the magnitude of the psychological effect (from none to very severe, coded as 0-4).

Other social-environment and life-event variables were gathered such as whether a person had attempted suicide previously and their quality-of-life score the month before death. To assess quality of life in the month before death, we asked respondents to rate 6 characteristics of the deceased (physical health, psychological health, economic circumstances, work, family relationships, and relationships with non-family associates) on a scale of 1 (very poor) to 5 (excellent). We then converted the sum of the 6 scores to a scale of 0-100.

Statistical methods

SPSS (version 11.0) software was used to conduct the analysis. Descriptive statistics were obtained for all variables, including distributions, means, medians, variances and standard deviations. Analyses were based on standard univariate comparisons with 2 case groups: suicides and accidental deaths (controls). For continuous variables, comparisons were made using t tests. For categorical data, Chi square analysis or, if necessary, Fisher's exact test was used. Statistical significance was based on a 2 sided alpha = .05.

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Table 1. Subject characteristics

Characteristic	Treatment Group				Analysis	
	Accidental Control (N = 24)		Completed Suicide (N = 74)		t(df)	p
	Mean	SD	Mean	SD		
Age (years)	46.8	16.6	44.4	14.6	0.68 (96)	.620
Age of onset on symptoms	28.6	12.4	33.5	12.6	-1.65 (96)	.102
Duration of illness from onset to death (years)	18.3	13.1	10.9	12.2	2.50 (96)	.014
	N	%	N	%	t'(df)	p
Female gender	9	37.5	22	29.7	0.50 (1)	.429
Rural residence	16	66.7	50	68	0.01 (1)	.935
Received treatment from psychiatrist for mental health problem	18	75.0	51	69	0.32 (1)	.571
Used antidepressant in last month	0	0	3	4.1		1.00*
Used anti-psychotic in last month	11	45.8	41	55.4	0.67 (1)	.414
Family history of psychosis	3	12.5	10	13.5		1.00*
Had prior psychiatric treatment/admission	20	83.3	40	54	6.54 (1)	.011
Severity of illness in month before death						
None	0	0	1	1.4		.745*
Mild	1	4.2	4	5.4		
Moderate	5	20.8	23	31.0		
Severe	18	75.0	46	62.2		

*Based on Fisher's exact test or Freeman Halton extension of the Fisher's exact test. All other analyses are based on student's t-test or Chi square.

Table 2. Psychotic and negative symptoms

Measure	Treatment Group				Analysis	
	Accidental Control (N = 24)		Completed Suicide (N = 74)		t'(df)	p
	Present	Absent	Present	Absent		
Delusions						
Delusions of references	12	12	48	26	1.69	.194
Paranoid delusions	17	7	48	26	0.29	.591
Grandiose delusions	9	15	12	62	4.88	.027
Delusions of jealousy	4	20	22	52	1.29	.208
Delusions of control	1	23	12	62		.177*
Delusions of thought broadcasting	0	24	10	64		.113*
Other types of delusions	4	20	16	58		.773*
Hallucinations						
Auditory	16	8	57	17	1.02	.312
Commenting	10	14	41	33	1.37	.242
Visual, olfactory or other	8	16	29	45	0.26	.607
Disorganized speech	23	1	53	21	6.10 (1)	.014
Bizarre behavior	21	3	57	17		.385*
Negative symptoms						
Flat affect	16	8	42	32	0.74	.391
Alogia	6	18	25	49	0.65	.421
Amotivation	13	11	43	31	0.12	.735

*Based on Fisher's exact test.

Table 3a. Recent thoughts of death and past history of suicide attempt

Measure	Treatment Group				Analysis	
	Accidental Control (N = 24)		Completed Suicide (N = 74)		t'(df)	p
	Present	Absent	Present	Absent		
Thoughts of death	0	24	26	48	11.48 (1)	.001
One or more prior suicide attempts	0	24	28	46	12.71 (1)	.000

Table 3b. Recent depressive symptoms based on DSM-IV criteria

Measure	Treatment Group				Analysis	
	Accidental Control (N = 24)		Completed Suicide (N = 74)		t'(df)	p
	Present	Absent	Present	Absent		
Depressed mood	0	24	20	54	8.15 (1)	.004
Anhedonia/Diminished interest	0	24	13	61		.034*
Appetite/Weight loss/gain	3	21	13	61		.754*
Insomnia/Hypersomnia	6	18	22	52	0.20 (1)	.656
Psychomotor agitation/retardation	4	20	22	52	1.59 (1)	.208
Fatigue	1	23	15	59		.108*
Guilt/Worthlessness	0	24	13	61		.034*
Concentration/indecisiveness	0	24	11	63		.061*
Meets SCID criteria for Major or Minor Depression	0	24	20	54		.003*
	Mean	SD	Mean	SD	t(df)	p
Mean severity of 9 probes	0.33	0.53	1.43	2.14	-4.10 (92)	<.001
Mean severity of 8 probes	0.33	0.53	1.17	1.80	-3.40 (95)	.001

*Based on Fisher's exact test. All other analyses are based on student's t-test or Chi square.

Table 4a. Past history of depression and family history of depression

Measure	Treatment Group				Analysis	
	Accidental Control (N = 24)		Completed Suicide (N = 74)		t'(df)	p
	Present	Absent	Present	Absent		
Multiple episodes of depression	0	24	3	71		1.00* .569*
Blood relative with history of depression	0	0	4	5.4		

*Based on Fisher's exact test.

Table 4b. Recent negative life event

Measure	Treatment Group				Analysis	
	Accidental Control (N = 24)		Completed Suicide (N = 74)		t'(df)	p
	Present	Absent	Present	Absent		
Negative life event in last 7 days	2	22	11	63		.511*
	Mean	SD	Mean	SD	t(df)	p
Mean number of negative life events	2.56	1.54	3.47	2.23	-1.84 (96)	.068
Mean effect of negative life event in last year	37.65	38.72	77.66	58.37	-3.14 (96)	.002

*Based on Fisher's exact test.

Table 5. Exploratory hypotheses

Measure	Treatment Group				Analysis	
	Accidental Control (N = 24)		Completed Suicide (N = 74)		t'(df)	p
	Present	Absent	Present	Absent		
Hopelessness for 14 days prior to death	0	24	14	60		.019*
	Mean	SD	Mean	SD	t(df)	p
Hopelessness severity	0.00	0.00	12.14	23.64		.523
Mean effect of depression	1.62	4.84	17.793	25.483	-3.08 (96)	.003
Mean overall quality of life	42.13	14.13	44.16	10.849	-0.74 (96)	.463

CONCLUSIONS

A. Our study represents a novel opportunity to study suicide. To the best of our knowledge, this is the only postmortem psychologic autopsy study with accidental controls in Chinese individuals with schizophrenia who died by suicide. The results are consistent with the hypothesis that depressive symptoms are more characteristic of suicide than those who die by accidental death. We determined that there were (was):

1. More thoughts of death prior to the completed suicide as well as a history of suicide attempts
 - a. 38% of the subjects who completed suicide had a prior attempt while the accidental control group had no reported prior attempt.
 - b. 35% of the subjects who completed suicide had recent thoughts of death while the accidental control group reported no prior attempt.

2. A greater number of individuals in the completed suicide group who had depressive symptoms based on the DSM IV criteria for major depression as well as greater hopelessness, "mean severity of the 8 DSM IV probes" (which exclude the "thoughts of death" symptom) and "mean severity of the 9 DSM IV probes."
3. No difference in family history of depression nor in multiple past episodes of depression between the 2 groups.
4. A trend in greater numbers of negative life events in the week prior to the completed suicide and a significantly greater mean effect of negative life events in the past year, as judged by the respondent, in the completed suicide group.

B. Findings from Exploratory Analyses Revealed the following: In the group that completed suicide, we determined that there was a shorter duration of illness prior to the event and greater likelihood that they ever received psychiatric treatment. Also subjects who died by accident exhibited more psychotic behavior, specifically grandiose delusions and/or disorganized speech. In addition, the "mean effect of depression" was significantly higher in the group that completed suicide.

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