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Research report

Risk factors for rural young suicide in China: A case–control study

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ABSTRACT

Background: Suicide is the fifth most important cause of death in China and the leading cause of death among young adults aged 15–34 years. The suicide rate in rural China is three times higher than the urban suicide rate, and the rate in women is higher than in men.
Methods: Sixteen counties from three provinces were selected as sampling sites in which 392 suicide cases and 416 community living controls were obtained. For each suicide case and control there were two informants who provided the target person's information. A structured questionnaire including demographics, social and familial environments, and personal characteristics was administered to the informants.
Results: Mental disorders and high hopelessness were found to be strongly related to suicide among Chinese rural young adults. Other suicide risk factors among this population were negative life events, never married but dating, suicide history in family, lack of positive coping skills, lack of social support, dysfunctional impulsivity, and not being a Communist Party/League member.
Conclusions: The prevalence of mental disorders, although the strongest risk factor among rural young adult suicides in this study, was markedly lower than that in Western countries. Some of the risk factors found in the comprehensive analyses are specific to Chinese culture. "Being a Communist Party/League member" as a protective factor for suicide among Chinese rural youths requires further study and appropriate interpretation.

1. Introduction

In China the mean annual suicide rate is 23 per 100,000 and there are about 287,000 suicide deaths per year. Suicide accounts for about 3.6% of all deaths in China and ranks number five among the causes of death in the country. Further, among young people 15–34 years of age, suicide is the leading cause of death, accounting for 19% of all deaths, and rural rates are three times higher than urban rates (Wang et al., 2008). Given the large population base in rural areas of China, rural young suicides have contributed to the high rate of suicide and the total suicide casualties of China. Research that focuses specifically on suicide and its correlates among older adolescents and young adults in rural China is a necessary foundation for design and implementation of prevention.

An important difference between China and Western countries is that over 35% of people who die by suicide in China do not have a diagnosable mental illness at the time of their suicidal behavior, even rigorously and culturally adapted versions of internationally accepted diagnostic criteria being applied, whereas over 90% of suicides in the West have died with mental illnesses (Phillips et al., 2002a). Instead, researchers proposed that the main determinant of

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China's different pattern of suicidal deaths is the frequent use of highly lethal pesticides as a suicide method in rural areas (Yang et al., 2005 ; Manoranjitham et al., 2010). Because about 58% of fatal suicides are by pesticide ingestion (Phillips et al., 2002a; Kong and Zhang, 2010), earlier researchers argue that pesticide-related preventive strategies are the most likely to rapidly reduce the overall suicide rate (Wang et al., 2008). These large differences between the characteristics of suicide in China and those reported in the West mean that the Western models which focus most preventive efforts on the identification and treatment of mental illness might not be applicable to China (Wasserman, 2001). An earlier study with the Chinese data identified some unique characteristics of Chinese rural young suicides, such as marriage, religion, impulsivity, and psychological strain (Zhang et al., 2010). This study attempts to do a comprehensive investigation with most major risk factors documented in previous research for both Western and Chinese societies. We hypothesize that depression and other mental illnesses are still major predictors of suicide in China, but the importance of certain social and personal factors such as marital status, belief, impulsivity, and negative life events, etc. might also be noticed in Chinese suicide studies.

2. Methods

2.1. Study population and the design

A case–control psychological autopsy study design was used to explore possible risk factors for suicide among Chinese rural young adults. We examined rural young adults aged 15 to 34 years who died by suicide in comparison with community living controls from the same location. Results of pilot work showed excellent feasibility of studying suicide using psychological autopsy method in Chinese social and cultural environments (Zhang et al., 2002; Zhang and Norvilitis, 2002), and that the Western developed instruments were reliable and valid among Chinese populations (Zhang et al., 2003).

The case–control design was the optimal research method given the environment of Chinese rural young suicides and the hypotheses we were to test. The epidemiological assumption was that controls were representative of the general population in terms of probability of exposure (suicide risk) and that controls had the same possibility of being selected or exposed as the cases (Timmreck, 2002). To optimize scientific validity, suicide cases in this study needed to be compared to living and non-suicidal people that were the same as or equal to the population from which the suicides came. The controls were from the same counties and among the living general population within the same age group of the suicides.

2.2. Sampling

Three provinces in China were involved in this study: Liaoning as an industrial province located in Northeast China, Hunan an agricultural province in the Central South China, and Shandong a province with economic prosperity in both industry and agriculture which was located on the east coast of China mid-way between Liaoning and Hunan. A total of sixteen rural counties were randomly selected from the three provinces (6 from Liaoning, 5 from Hunan, and 5 from Shandong). Suicides aged 15–34 years were consecutively enrolled into the study from October 2005 through June 2008. Similar numbers of community living controls were recruited in the same counties during the same time periods. After successful interviews with the informants of the suicides, the information of 392 suicide cases was collected among which 178 were female and 214 male.

In each of the 16 counties, a project coordinator from the county level Center for Disease Control and Prevention (CDC) monitored suicide occurrences. In each of the three provinces, a project director from the provincial CDC or the university the study was affiliated with received reports on suicide cases each month.

Regarding the importance of clearly defined criteria for suicide as a manner of death (Younger et al., 1990), we excluded cases of accidental or natural death based on suicidal intent and other information. As China lacks a medical examiner system and all deaths are required to be sent to a health agency for a death certificate, hospitals are the primary place for the CDC to locate cases for the study. In rural China where villages are often far away from the nearest hospital, village doctors are in charge of the death certificate. In this study, they were required to report the death to the *Xiang* (township) health agency which then forwarded the death report to the county CDC. All suicidal deaths were required to be reported to the county CDC by telephone or fax within 24 h after the suicide was discovered, and the suicide information gathered at the county CDCs was transferred monthly to the provincial CDC. For the suicidal deaths that were not identified by any health agency, the village treasurer, who collected fees for each burial or cremation and were aware of all the deaths in the village, was allowed to notify the *Xiang* health agency or the county CDC. Whenever necessary, an investigation was conducted to determine the cause of death with the help of village board and villagers. These procedures were implemented to make sure no suicide cases were missed, or erroneously reported, and to minimize misclassification.

The 2005 census database of all the counties was used in the sampling of community controls to identify all the individuals living in the same counties and within the same age range (i.e. 15–34 years), and for each suicide case one living control was randomly selected from the eligible candidates. As to gender, the random selection of controls from each county yielded approximately an equal number of males and females, which also approximated the gender distribution of suicide cases in the study.

The control group did not exclude individuals with mental disorders or previous suicide attempts. Therefore, the prevalence of mental disorders could be roughly assessed in the rural young population, and the effects (direct, moderating, and intervening) of mental disorders as a suicide risk factor could be studied. Following were specific sampling methods for suicide cases and living controls.

2.3. Information sources

For each suicide case and living control, two informants were interviewed with very few exceptions (for two subjects