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# Epidemiology of Suicide and Associated Socio-Demographic Factors in Emergency Department Patients in 7 General Hospitals in Northwestern China

Authors' Contribution:  
Study Design A  
Data Collection B  
Statistical Analysis C  
Data Interpretation D  
Manuscript Preparation E  
Literature Search F  
Funds Collection G

ABCDEF **Cheng-jin Zhao**  
ABCDE **Xing-bo Dang**  
BCDEF **Xiao-li Su**  
BCDE **Jia Bai**  
CDEF **Long-yang Ma**

Department of Emergency, Shaanxi Provincial People's Hospital, Xi'an, Shaanxi, P.R. China

**Corresponding Author:** Cheng-jin Zhao. e-mail: zhaocj2014@163.com  
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**Background:** This study aimed to illustrate the characteristics of suicide attempters treated in the Emergency Departments of 7 general hospitals in Xi'an and to provide relevant data for early psychological treatment.





**Material/Methods:** Between October 2010 and September 2014, 155 suicide attempters were treated in the Emergency Departments. Data were collected using a semi-structured questionnaire. Descriptive statistics, chi-square tests, and multivariate analyses were used to identify the factors associated with suicidal behaviors.

**Results:** Females outnumbered males at a ratio of 3.7 to 1. The greatest proportion of cases was in the age group of 21 to 30 years (52.9%). Patients who finished middle school or high school accounted for most of the suicide attempters (50.3%). The most common method used for attempted suicide was drug ingestion (86.5%). The majority of cases attempted suicide at home (74.8%) during the night. Marriage frustration, work and study problems, family fanaticism and conflict, somatic disease, and history of mental disorders were all significantly associated with suicide attempts. The ratio of patients to be discharged or to die were similar in occupation, marital status, and the place of suicide attempt; however, the results were different in gender, age, educational level, methods used for suicide, time of day, and reason.

**Conclusions:** Suicide is an important public health problem and is multidimensional in nature. Future studies with larger samples are expected to provide more specific knowledge of the effect of each social factor on the suicide risk in Chinese in order to improve the prevention of suicides.

**MeSH Keywords:** **Epidemiology • Suicide • Tertiary Prevention**

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## Background

Suicide is an important public health problem in developing and developed countries [1]. Self-inflicted death ranks among the tenth leading cause of death worldwide [2]. Suicides were divided into 2 categories by the World Health Organization (WHO): suicide attempts and actual suicides. Actual suicides are those that result in death. Suicide attempts are those non-fatal attempts individuals may make to kill, harm, or poison themselves voluntarily [3]. In 2008, it was reported that the suicide rate for the world was 11.6 per 100 000 population [4], and the number of suicide case had been rising with the development of society [5]. According to the WHO, 900,000 people worldwide die as a result of suicide each year [6]. Based on the reports from Chinese Ministry of Health, the number of suicides accounted for 8.14 per 100 000 population, the fifth cause of death in China [7]. Nearly 40% of all world suicides occur in Japan, India and China. Suicide is threatening the health of youth and elderly in China [8]. Suicide leads to the great family and society loss, and has become one of the severe social problems which need more intensive attention [9].

Therefore, it is urgent for emergency workers to make a comprehensive analysis of suicide attempters and explore the new comprehensive rescue mode, including somatic and psychological treatment [10]. An understanding of the risk factors is imperative for effective suicide prevention. Suicide risk factors have attracted a great deal of research attention in China. Many studies have investigated the influence of demographic, socio-psychological, economic and lifestyle-related factors, and physical illness on suicidal behavior. However, the results of these studies have been inconsistent [11,12].

In this study we comprehensively examine the risk factors of completed suicide and suicidality (suicide ideation and suicide attempt) in the 155 suicides from the Emergency Departments of our hospital and 6 other large tertiary general hospitals from October 2010 to September 2014.

## Material and Methods

### Subjects

The subjects enrolled in this study were collected from the suicide attempters in the Emergency Departments of 7 tertiary general hospitals in Xi'an, Shaanxi Province. The individuals who were sent to the emergency departments immediately after a suicide attempt were identified and reviewed by a trained research assistant. The subjects (14 years of age or older) who were able to understand the study procedures and provided written informed consent and had at least one contact person were recruited. Respondents aged 14 were examined with

the agreement of their parents. This study was approved by the ethics committee of Shaanxi Provincial People's Hospital.

### Data collection

An 11-item structured questionnaire was used for data collection. The study questionnaire has 2 parts: The first 6 questions are related to the socio-demographic characteristics of the subjects, such as name, age, gender, educational level, occupation, and marital status; and the second part includes questions on suicide reasons, methods used for suicide, history of mental and psychological disorders, the time and place of suicide attempt, hospitalization, and outcome of the suicide attempt.

The tool designed for data collection was developed based on our literature review. Two trained nurses completed the questionnaires. All completed questionnaires were reviewed by the study investigators. An interview with the patients or/and their family members were performed when additional information was needed.

### Statistical analysis

Categorical variables are presented as counts and percentages. The chi-square and Fisher's exact tests (SPSS for Windows Version 18.0, Chicago, IL, USA) were used to compare the distribution of categorical variables among different groups. The multivariate analyses for factors associated with suicide attempts in 155 patients were performed using the Cox proportional hazards model with stepwise selection.  $P < 0.05$  was considered statistically significant.

## Results

### Socio-demographic characteristics of the suicide attempters

The demographic characteristics of the suicide attempters were first compared among all groups. As shown in Table 1, there were 122 (78.7%) females and 33 (21.3%) males among the total 155 individuals. There were 113 patients who survived after treatment and 42 patients died. Most of the cases were in the age group of 21 to 30 years (52.9%), followed by those aged 31 to 40 years (22.6%). Most (50.3%) of the suicide attempters had finished middle school (grade 7–9) or high school (grade 10–12). Patients with college degree or higher took the second place (40.0%), and those with elementary school education or illiteracy were less likely to attempt or commit suicide (9.7%). Nonlocal migrant workers and college students accounted for almost two-thirds of the subjects. Most of the suicide patients were married.

**Table 1.** The socio-demographic characteristics of the suicide patients.

	n (%)	
<b>Gender</b>		
Female	122	(78.7%)
Male	33	(21.3%)
<b>Age (year)</b>		
≤20	10	(6.5%)
21–30	82	(52.9%)
31–40	35	(22.6%)
>40	28	(18.1%)
<b>Educational level</b>		
Primary school or illiteracy	15	(9.7%)
Junior or senior middle school	78	(50.3%)
University degree or holder	62	(40.0%)
<b>Occupation</b>		
School Students	12	(7.7%)
College students	50	(32.3%)
Farmer	21	(13.5%)
Nonlocal migrant workers	56	(36.1%)
Unemployed	16	(10.3%)
<b>Marital Status</b>		
Married	98	(63.2%)
Single	31	(20.0%)
Divorced	19	(12.3%)
Widowed	7	(4.5%)

### Analysis of the characteristics for suicide

The correlates of the suicidal behaviors are presented in Table 2. Drug ingestion (86.5%) was the most common method, followed by slitting wrists (6.5%). Hypnagogue, such as diazepam, was the substance most commonly used for drug ingestion (61.3%). The majority of patients attempted suicide at home (74.8%) and only a small proportion (6.5%) chose public places for suicide attempts. We found that 40.6% of the suicide attempts occurred during the night, 24.5% in the morning, 21.3% before dawn, and 13.5% at noon.

### Analysis of suicide reason

Multivariate analysis was performed to find relevant factors associated with suicide attempts (Table 3). Marriage frustration, work and study problems, family fanaticism and conflict,

**Table 2.** Methods, places and suicide time of patients.

	n (%)	
<b>Methods</b>		
Drug	134	(86.5%)
Slit wrists	10	(6.5%)
Hang	1	(0.6%)
Falling off a building	5	(3.2%)
Gas poisoning	2	(1.3%)
Other methods	3	(1.9%)
<b>Place</b>		
Home	116	(74.8%)
Work place	29	(18.7%)
Public places	10	(6.5%)
<b>Time of day</b>		
Before dawn	33	(21.3%)
Morning	38	(24.5%)
Noon	21	(13.5%)
Night	63	(40.6%)

somatic disease, and history of mental disorders were all significantly associated with suicide attempts. The ORs for the marriage frustration, work and study problems, family fanaticism and conflict, somatic disease, history of mental disorders with suicide attempts were 2.72 (1.35–5.46), 1.06 (1.02–1.09), 4.78 (1.59–8.41), 3.32 (1.20–9.17), and 5.17 (1.48–9.93), respectively. As shown in Table 4, marriage frustration accounted for 60.6% of the suicide attempts. The second cause of suicidal behavior was work and learning problems (21.9%). Somatic disease and history of psychological disorders were reported as 12% and 10% of the causes of suicide, respectively. Family fanaticism and conflict together accounted for 3.2% of the cases.

Of all the suicide attempts, we comparing the precipitating factors between male and female cases (Table 4), the results showed that marriage frustration ( $p < 0.001$ ) were more common in females, while work and learning problems ( $p < 0.001$ ), somatic disease ( $p = 0.002$ ), and history of psychological disorders ( $p = 0.001$ ) were more frequent in males.

### Comparison of characteristics of fatal and non-fatal suicide cases

Fatal and non-fatal suicide cases are compared both in socio-demographic and suicide attempt characteristics in Table 5. Patients who were discharged and those who died were similar in occupation, marital status, and the place of suicide

**Table 3.** The multivariate analysis for factors associated with suicide attempts among discharged and died patients.

	OR	95%CI	P value
Marriage frustration	2.72	1.35–5.46	0.005
Work and study problems	1.06	1.02–1.09	0.04
Family fanaticism and conflict	4.78	1.59–8.41	0.01
Somatic disease	3.32	1.20–9.17	0.02
History of mental disorders	5.17	1.48–9.93	0.004

OR – odds ratio; CI – confidential interval.

**Table 4.** Distribution of factors associated with suicide attempts by gender in patients.

	Female n (%)	Male n (%)	P value
Marriage frustration	92 (68.15)	2 (9.09)	<0.001
	41 (31.85)	20 (90.91)	
Work or study problems	16 (11.85)	18 (81.82)	<0.001
	117 (86.67)	4 (18.18)	
Family fanaticism and conflict	4 (2.96)	1 (4.55)	0.540
	129 (95.56)	21 (95.45)	
Somatic disease	6 (4.44)	6 (27.27)	0.002
	127 (94.07)	16 (72.73)	
History of mental disorders	4 (2.96)	6 (27.27)	0.001
	129 (95.56)	16 (72.73)	

attempt, while significant differences were observed in the gender, age, educational level, methods used, time of day, and reason. We also noted that the suicide attempters with mental illness were more likely to be older, and/or were divorced or widowed, unemployed, or living alone.

### Discussion

The results of this study show that most suicide cases were young women with low education levels. The most frequently used method for suicide was drug ingestion. Most cases committed suicide at home and at night. Marriage frustration, work and study problems, family fanaticism and conflict, somatic disease, and history of mental disorders are all risk factors for suicide attempts. Marriage frustration was the major reason for young women to attempt suicide. Patients with mental illnesses were more likely to die.

Regardless of potential bias in collecting data, in this study most cases were in the age group of 21 to 30 years, perhaps

because they had just finished school and lacked social experience, followed by those aged 31 to 40 years. They usually have a variety of pressure coming from job, marriage, and social interactions. If they cannot cope with setbacks and changes, suicide was possibly selected to escape from the frustration [13,14]. World-wide, men die from suicides 2–3 times more often than women, but women make more suicide attempts, which is called the “gender paradox” in suicide [15]. This paradox was also seen in our study results. The proportion of female and male patients in this study is 3.7:1, which is similar to the domestic literature, perhaps because in China women are more affected by negative life events, eventually producing the impulse to commit suicide [16,17]. Moreover, it was reported that 62% of women who committed suicide had made previous suicide attempts, and 62% of men who committed suicide had not previously made such an attempt [18]; therefore, women are more likely to attempt suicide while men are more likely to die from suicide [14,19]. Moreover, in this study, we found that most cases committed suicide at home and at night. This phenomenon may be partly because the quiet and isolated environment makes them feel lonely and gives them

**Table 5.** Factors associated with fatal suicide outcome in patients.

	Discharged	Died	P value
Gender			0.002
Female	96	26	
Male	17	16	
Age (year)			<0.001
≤20	7	3	
21–30	65	17	
31–40	30	5	
>40	11	17	
Educational level			0.006
Primary school or illiteracy	6	9	
Junior or senior middle school	57	21	
University degree or holder	50	12	
Occupation			0.794
School Students	9	3	
College students	38	12	
Farmer	14	7	
Nonlocal migrant workers	42	14	
Unemployed	10	6	
Marital status			0.819
Married	72	26	
Single	23	8	
Divorced	14	5	
Widowed	4	3	
Methods			0.034
Drug	100	34	
Slit wrists	9	1	
Hang	0	1	
Falling off a building	1	4	
Gas poisoning	1	1	
Other methods	2	1	
Place			0.305
Home	83	33	
Work place	24	5	
Public places	6	4	

**Table 5 continued.** Factors associated with fatal suicide outcome in patients.

	Discharged	Died	P value
Time of day			<0.001
Before dawn	12	21	
Morning	35	3	
Noon	19	2	
Night	47	16	
Reason			<0.001
Marriage frustration	76	18	
Work and study problems	29	5	
Family fanaticism and conflict	4	1	
Somatic disease	2	10	
History of mental disorders	2	8	

the courage to commit suicide. If the suicide occurred at home, especially at night, it would less likely to be found by other people and could succeed.

Research shows that there are 200 million emergency suicide attempt patients in China annually, of which less than 1% received psychiatric evaluation or treatment in the emergency room [7]. Thus, many patients suffering from depression attempt suicide again because the fundamental problems are unresolved. An analysis indicated that in major cities with economic and cultural development in China, the suicide attempt population is mainly young women [20]. In this study, more than one-third of these patients experienced depressive mode before attempting suicide. The number of patients attempting suicide more than once accounted for 6.1%, and only 2.9% of them asked for psychological help. Through the analysis of different age groups, it was found that the fatality rate of the elderly group was higher, and the total fatality rate was 60%. Most of the elderly suffered from severe somatic disease or severe mental stimulation before attempting suicide. Due to the loss of self-care ability and neglect by the family, they attempt suicide. Suicide is among the top 10 causes of death in the elderly [21], and depressive disorder is an independent risk factor for suicide [22]. Therefore, emergency medical personnel should attach great importance to the psychological health status of patients and assess their mental state to detect problems and intervene early, eventually effectively reducing the suicide rate.

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The purpose of present study was to illustrate the characteristics of suicide attempters, which potentially improved the prevention of the occurrence of suicide. At present, international suicide prevention has formed a 3-level pattern of prevention [23] and the primary prevention goal is to reduce the mortality of suicide, including treatment of patients with mental disorders. The secondary prevention is focused on early intervention in people on the brink of attempting suicide. The tertiary prevention aims to prevent suicide attempters from attempting suicide again. At present, the emergency treatment for suicide attempt patients in general hospitals is only to save their lives, and seldom provides psychological intervention. Thus, comprehensive hospital emergency and psychiatric cooperation is required to provide early diagnosis and prompt treatment to prevent future suicide attempts [24].

## Conclusions

Suicide is an important public health problem and is multidimensional in nature. Future studies with larger samples are expected to provide more specific knowledge of the effect of each social factor on the suicide risk in Chinese in order to improve the prevention of suicides.

## Conflict of interest statement

None declared.

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