



# Suicidal ideation, plans and attempts among medical college students in china: The effect of their parental characteristics



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## ARTICLE INFO

### Keywords:

Suicidal ideation  
Suicide plan  
Suicide attempt  
Medical college students  
Parental characteristics

## ABSTRACT

Medical college students are a high-risk population of suicidal ideation, plan and attempt. However, few studies discuss the effect of parental characteristics on suicidal ideation, plans and attempts among medical college students in China. A total of 2198 respondents answered the questionnaires referring social-demographic characteristics, psychological conditions, parental characteristics, suicidal ideation, plan and attempt. The prevalence of suicidal ideation, plan and attempt among the subjects were 17.9%, 5.2% and 4.3%, respectively. The results of multiple logistic regression showed that male, mother's education level, mother's parenting style, relationship in parents and psychological condition were associated with lifetime suicidal ideation. Male, mother's vocation, mother's parenting style, relationship in parents and psychological conditions were associated with suicide plan. Male, relationship in parents and psychological condition were associated with suicide attempt. Those imply that mother may play more roles on suicidal ideation and plan than father among medical college students in China. Psychological condition has a very strong association with suicidal ideation, plan and attempt.

## 1. Introduction

Suicide was a third leading cause of death among people aged 15–34 years in 1990s in China (Phillips et al., 2002). Recently, although the Chinese suicide rates have decreased rapidly (Zhang et al., 2014), suicide is also an important problem in Chinese society (Sun and Zhang, 2015b). Suicidal ideation and suicide plan have been identified as important predictors for suicide behavior in the worldwide (Kessler et al., 2005, 1999). Thus, it is imperative to explore the characteristics and factors associated with suicidal ideation, plan and attempt.

College students are a specific group who reports high level of suicidal ideation, plan and attempt in the worldwide (Eskin et al., 2016; Miletic et al., 2015). For example, a study in United State (US) reports there were about 12% of college students who experienced suicidal ideation (Wilcox et al., 2010). However, the prevalence in US communities was only about 1.0% (Lee et al., 2007). The similar results are also found for suicide ideation, plan and attempt in Chinese society (Yang et al., 2015; Zhang et al., 2012). Medical college students who are training to promote health are also in a high level of suicide ideation, plan and attempt in China and worldwide (Fan et al., 2011; Tyssen et al., 2001; Van Niekerk et al., 2012). Thus, the problems about

suicide ideation, plan and attempt in medical college students should to be discussed.

Recently, many studies have explored the factors associated with suicidal ideation, plan and attempt among college students. The results identify that the risk factors for suicidal ideation, plan and attempt are complex, including social, psychological, cultural, and biological factors (Shtayermman et al., 2012; Whatley and Clopton, 1992). Some studies also find that parental status also plays roles in suicide behaviors (Qin and Mortensen, 2003).

In exploring the effect of parents on suicide, previous studies have showed that parental bonding, attitudes toward suicide and education level were associated with suicide (Hashimoto et al., 2014). However, few studies discuss the effect of parents on suicide in Chinese college students. Because of the specific characteristics of Chinese suicide (Qin and Mortensen, 2001), these results may not be translated in China.

In this study, we aim to analyze the relationship between parental characteristics and suicidal ideation, plan and attempt among medical college students in China. It is helpful for us to understand the effect of parents on suicide among medical college students in China. It also can give us some evidences for suicide prevention and intervention.

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## 2. Methods

### 2.1. Participants and survey procedure

All of the respondents are medical undergraduate students in a Chinese college. All of the twelve majors (clinical medicine, anesthesiology, medical imaging, pathergasiology, pharmacy, preventive medicine, general practice, Chinese medicine, social medicine, stomatology, medical statistics and nursing) in this college were involved in this study. For each major, we selected all of the grades (the first grade to the fourth or fifth grade). In each grade, one of the classes would be interviewed in this study. A total of 2198 respondents answered the questionnaires.

The survey was conducted in the classroom. Firstly, all of the students were informed about the purpose of this study and the confidentiality of personal information. The students who agreed with the participation would sign on the consent forms. Secondly, all subjects would fill out the questionnaires which lasted an average of twenty minutes. One of the trained interviewers would be in the class to explain the questions about the interview. Social-demographic characteristics and psychosocial functioning were included in the questionnaire.

### 2.2. Measures

#### 2.2.1. Suicidal ideation, suicide plan and suicide attempt

Four questions about lifetime suicidal ideation, 12-month suicidal ideation, suicide plan and suicide attempt were asked in the questionnaire. For the lifetime suicidal ideation, we asked the respondents that "whether they ever seriously thought about killing themselves?" The 12-month suicidal ideation was estimated by the question "whether they had these thoughts in the past 12 months?" For suicide plan, they would be asked "whether they ever made a plan for suicide?" For suicide attempt, they would be asked "whether they ever attempted suicide?" All of the answers could be chose from "yes" or "no." Those questions were also used in the US National Comorbidity Survey (NCS) (Kessler et al., 2005).

#### 2.2.2. Parental characteristics

As there were few stepfamilies and single parents, family composition was categorized as regular or not. Father or mother's education level was measured by "elementary or below," "junior high school," "senior high school," and "bachelor or above." We recoded them into "junior high school or below," and "senior high school or above." Father or mother's vocations were estimated by peasants, workers, officer, and others. As there were few officers and others, we recoded it into peasants or not.

Father or mother's parenting styles were assessed by communication, authoritarian and others (Baumrind, 1967). The communication parenting style is one that communicates in a warm, accepting and nurturing manner. The authoritarian parenting style is an extremely strict form of parenting that expects a child to adhere to rules and regulations set out by the parents with little or no input or communication from the child. Other parenting style mainly contains the uninvolved parenting style. It means the parents are totally disengaged and emotionally uninvolved in their child's life. As there were few "others," we recoded the parenting styles into communication or not. The relationship in parents was estimated by "good," "general" and "bad." As there were few bad relationships, we recoded into good or not.

#### 2.2.3. Social-demographic characteristics and psychological conditions

In this study, we interviewed the gender, age and registered residence region for the subjects. The registered residence region was classified into urban and rural. Kessler-10 (K10) questionnaire was

used to estimate the subjects' psychological conditions. This questionnaire was also used in the previous studies about suicide (O'Connor et al., 2012). The Chinese version of K10 had been validated and proved to be a good measurement in Chinese populations (Zhou et al., 2008). The higher level of the score means the worse psychological condition.

### 2.3. Statistical analysis

SPSS for Windows (version 21.0) was used for data analysis. *T*-tests were used to compare the differences on continuous variables across groups. Chi-square tests were used to analyze the differences on categorical variables across groups. Logistic regression analyses were performed to examine the factors related to suicidal ideation, suicide plan and suicide attempt. Significance was set at  $P < 0.05$ .

## 3. Results

### 3.1. Participations and single factor analysis for the samples

The demographic characteristics of the sample were presented in the second row of Table 1. The single factor analyses for the lifetime suicidal ideation, suicide plan and suicide attempt were conducted in this study. The results showed that gender ( $p < 0.001$ ), family composition ( $p = 0.008$ ), mother's education level ( $p = 0.073$ ), father's parenting style ( $p = 0.010$ ), mother's parenting style ( $p = 0.000$ ), relationship in parents ( $p < 0.001$ ) and psychological condition ( $p < 0.001$ ) were associated with suicidal ideation. Gender ( $p < 0.001$ ), age ( $p = 0.023$ ), family composition ( $p = 0.066$ ), mother's vocation ( $p = 0.015$ ), mother's parenting style ( $p < 0.001$ ), relationship in parents ( $p = 0.012$ ) and psychological condition ( $p < 0.001$ ) were associated with suicide plan. Gender ( $p < 0.001$ ), age ( $p = 0.003$ ), family composition ( $p = 0.001$ ), relationship in parents ( $p = 0.021$ ) and psychological condition ( $p < 0.001$ ) were associated with suicide attempt.

### 3.2. Prevalence of suicidal ideation, suicide plan and suicide attempt

Table 2 illustrated that the prevalence of lifetime suicidal ideation, 12-month suicidal ideation, plan and attempt were 17.9%, 8.2%, 5.2% and 4.3%, respectively. There were 27.9% of the ideators who have a plan, 22.1% of the ideators who have an attempt, 63.2% of the planners have an attempt, and 6.7% of ideators who had no plan but made an attempt.

### 3.3. Logistic regression analysis

The logistic regression analyses of lifetime suicidal ideation, suicide plan and suicide attempt were shown in Table 3. Male ( $p < 0.05$ ), mother's education level ( $p < 0.05$ ), mother's parenting style ( $p < 0.05$ ), relationship in parents ( $p < 0.01$ ) and psychological condition ( $p < 0.001$ ) were associated with lifetime suicidal ideation. Male ( $p < 0.001$ ), mother's vocation ( $p < 0.05$ ), mother's parenting style ( $p < 0.05$ ), relationship in parents ( $p < 0.05$ ) and psychological conditions ( $p < 0.001$ ) were associated with suicide plan. Male ( $p < 0.05$ ), relationship in parents ( $p < 0.05$ ) and psychological condition ( $p < 0.001$ ) were associated with suicide attempt.

## 4. Discussion

In this study, we analyzed the prevalence of suicidal ideation, plan and attempt among medical college students in China. The prevalence of suicidal ideation, plan and attempt among medical college students in China were 17.9%, 5.2% and 4.3%, respectively. We also analyzed the association between parental characteristics and suicidal ideation, plan and attempt. The results showed that male, mother's education level, mother's parenting style, relationship in parents and psycholo-

**Table 1**

Characteristics of suicidal ideation, plans and attempts (N=2,198).

	Total (%)	Lifetime Suicidal Ideation			Suicide Plan			Suicide Attempt		
		Yes (%)	No (%)	p	Yes (%)	No (%)	p	Yes (%)	No (%)	p
N (%)	2198 (100.0)	394 (17.9)	1804 (82.1)	–	114 (5.2)	2084 (94.8)	–	94 (4.3)	2104 (95.7)	–
Gender				< 0.001			< 0.001			< 0.001
Male	689 (31.3)	151 (38.3)	538 (29.8)		62 (54.4)	627 (30.1)		45 (47.9)	640 (30.4)	
Female	1509 (68.7)	243 (61.7)	1266 (70.2)		52 (45.6)	1457 (69.9)		49 (52.1)	1464 (69.6)	
Age (yr, mean $\pm$ SD)	20.25 $\pm$ 1.23	20.29 $\pm$ 1.33	20.25 $\pm$ 1.21	0.523	20.51 $\pm$ 1.52	20.24 $\pm$ 1.21	0.023	20.63 $\pm$ 1.24	20.24 $\pm$ 1.23	0.003
Region				0.400			0.540			0.326
Rural	1616 (73.5)	283 (71.8)	1333 (73.9)		81 (71.1)	1535 (73.7)		65 (69.1)	1551 (73.7)	
Urban	582 (26.5)	111 (28.2)	471 (26.1)		33 (28.9)	549 (26.3)		29 (30.9)	553 (26.3)	
Family composition				0.008			0.066			0.001
Regular	2057 (93.6)	357 (90.6)	1700 (94.2)		102 (89.5)	1955 (93.8)		80 (85.1)	1977 (94.0)	
Others	141 (6.4)	37 (9.4)	104 (5.8)		12 (10.5)	129 (6.2)		14 (14.9)	127 (6.0)	
Father's education level				0.694			0.662			0.551
Junior high school or below	1258 (57.2)	229 (58.1)	1029 (57.0)		63 (55.3)	1195 (57.3)		51 (54.3)	1207 (57.4)	
Senior high school or above	940 (42.8)	165 (41.9)	775 (43.0)		51 (44.7)	889 (42.7)		43 (45.7)	897 (42.6)	
Mother's education level				0.073			0.346			0.463
Junior high school or below	1570 (71.4)	296 (75.1)	1274 (70.6)		77 (67.5)	1493 (71.6)		64 (68.1)	1506 (71.6)	
Senior high school or above	628 (28.6)	98 (24.9)	530 (29.4)		37 (32.5)	591 (28.4)		30 (31.9)	598 (28.4)	
Father's vocation				0.770			0.173			0.765
Peasant	1062 (48.3)	193 (49.0)	869 (48.2)		48 (42.1)	1014 (48.7)		44 (46.8)	1018 (48.4)	
Others	1136 (51.7)	201 (51.0)	935 (51.8)		66 (57.9)	1070 (51.3)		50 (53.2)	1086 (51.6)	
Mother's vocation				0.519			0.015			0.249
Peasant	1226 (55.8)	214 (54.3)	1012 (56.1)		51 (44.7)	1175 (56.4)		47 (50.0)	1179 (56.0)	
Others	972 (44.2)	180 (45.7)	792 (43.9)		63 (55.3)	909 (43.6)		47 (50.0)	925 (44.0)	
Father's parenting style				0.010			0.243			0.939
Communication	1348 (61.3)	219 (55.6)	1129 (62.6)		64 (56.1)	1284 (61.6)		58 (61.7)	1290 (61.3)	
Others	850 (38.7)	175 (44.4)	675 (37.4)		50 (43.9)	800 (38.4)		36 (38.3)	814 (38.7)	
Mother's parenting style				< 0.001			< 0.001			0.169
Communication	1409 (64.1)	219 (55.6)	1190 (66.0)		55 (48.2)	1354 (65.0)		54 (57.4)	1355 (64.4)	
Others	789 (35.9)	175 (44.4)	614 (34.0)		59 (51.8)	730 (35.0)		40 (42.6)	749 (35.6)	
Relationship in parents				< 0.001			0.012			0.021
Good	1892 (86.1)	316 (82.3)	1576 (89.0)		89 (80.2)	1803 (88.2)		72 (80.0)	1820 (88.1)	
Not good	263 (11.9)	68 (17.7)	195 (11.0)		22 (19.8)	241 (11.8)		18 (20.0)	245 (11.9)	
Psychological condition	21.71 $\pm$ 7.87	25.67 $\pm$ 9.13	20.85 $\pm$ 7.29	< 0.001	30.88 $\pm$ 10.94	21.21 $\pm$ 7.35	< 0.001	35.50 $\pm$ 10.42	21.38 $\pm$ 7.38	< 0.001

**Table 2**

Prevalence of suicide-related behaviors (N=2198).

	n	Percentage (%)
Total sample prevalence		
Lifetime suicidal ideation	394	17.9
12-month suicidal ideation	181	8.2
Suicide plan	114	5.2
Suicide attempt	94	4.3
Conditional prevalence		
Plan among lifetime ideators	110	27.9
Attempt among lifetime ideators	87	22.1
Attempt among planners	72	63.2
Attempt among lifetime ideators without a plan	19	6.7

gical condition were associated with lifetime suicidal ideation. Male, mother's vocation, mother's parenting style, relationship in parents and psychological conditions were associated with suicide plan. Male, relationship in parents and psychological condition were associated with suicide attempt.

In the previous studies, the prevalence of suicidal ideation was mainly above 15% among medical college students in China (Yuxin et al., 2008). It is similar with our results. However, when we review the studies in different populations, the rates ranged from 1.24% to 26.00% (Fan et al., 2008; Gau et al., 2008). So, the medical students may have higher suicidal ideation than in the community sample. A study in metropolitan China showed that the prevalence of suicide plan and attempt were 0.9% and 1.0%, respectively (Lee et al., 2007). They are lower than the results in the current study. All of these imply that the medical college students have higher risk of suicidal ideation, plan and attempt in China.

**Table 3**

Logistic regression analysis of lifetime suicidal ideation, plans and attempts (N=2198).

Independent variables	Lifetime suicidal ideation	Suicide plan	Suicide attempt
Male	1.28 (1.00, 1.63) <sup>*</sup>	2.14 (1.41, 3.25) <sup>***</sup>	1.77 (1.11, 2.81) <sup>*</sup>
Urban Region	1.32 (0.99, 1.75) <sup>*</sup>	–	–
Family composition (Reference=Regular)	–	–	2.07 (0.96, 4.48)
Mother's education level (Reference=Junior high school or below)	0.74 (0.56, 0.99) <sup>*</sup>	–	–
Mother's vocation (Reference=Peasants)	–	1.63 (1.08, 2.45) <sup>*</sup>	–
Mother's parenting style (Communication)	0.75 (0.60, 0.96) <sup>*</sup>	0.65 (0.43, 0.99) <sup>*</sup>	–
Relationship in parents (Reference=Good)	1.58 (0.15, 2.18) <sup>**</sup>	1.87 (1.10, 3.17) <sup>*</sup>	1.88 (1.05, 3.37) <sup>*</sup>
Psychological condition	1.07 (1.06, 1.08) <sup>***</sup>	1.12 (1.10, 1.14) <sup>***</sup>	1.14 (1.11, 1.16) <sup>***</sup>
Constant	0.047 <sup>***</sup>	0.002 <sup>***</sup>	0.001 <sup>***</sup>
R <sup>2</sup>	0.099	0.207	0.228

The backward regression was used for this analysis. Only ORs and their 95% CIs were presented in the table.

<sup>\*</sup> p < 0.05.

<sup>\*\*</sup> p < 0.01.

<sup>\*\*\*</sup> p < 0.001.

We also conducted the conditional prevalence in this study. Among ideators, the conditional prevalence of making a plan and an attempt were 27.9% and 22.1%. These results are a little lower than other

studies (Bromet et al., 2007). This may be caused by the protective effect of education level for suicide behavior (Zhang and Zhou, 2011). In this sample, somebody who made suicide behaviors were 63.2% among planners, and 6.7% among lifetime ideators without a plan. So the results show that many medical students will make a plan for their suicide behaviors. It is different from the proportion in Chinese rural youths (Sun and Zhang, 2015a).

In this study, male was associated with higher level of suicidal ideation, plan and attempt. For gender difference, various studies reported different results. A study in one medical college students showed that female students were more likely to have suicidal ideation than male students (Zhang et al., 2008). There were also studies which did not find the difference between male and female medical college students (Yang et al., 2013). However, there were studies which supported that suicidal ideation among male medical college students were in higher level of suicidal ideation than females (Shang et al., 2009).

We also found that psychological condition was associated with suicidal ideation, plan and attempt. Many previous studies have reported the effect of psychological condition on suicide ideation, plan and attempt (DeVylder et al., 2015; Lamis et al., 2016). Our findings also support that psychological condition has a very strong association with suicidal ideation, plan and attempt. Family composition and relationship in parents are statistical significant for suicide attempt. They can be seen as negative life events in the current study. Negative life events are an important predictor for suicidal ideation and attempt which has been identified in previous studies (Xu et al., 2004). Our findings are consistent with the conclusion of previous studies that family composition and relationship in parents are risk factors for suicide attempt (Lin et al., 2014; Zhai et al., 2015).

In the current study, we mainly want to discuss the association between parental characteristics and suicidal ideation, plans and attempts. The results support that mother's parenting style is associated with suicidal ideation and plan. The authoritarian and other parenting styles compared with the communication parenting style are risk factors for suicidal ideation and plan. For the authoritarian parenting style, the children must obey the rules and regulations made by their parents. Otherwise they may be physical punished by their parents, and it is a risk factor for suicidal ideation (Liu and Tein, 2005). In this study, the other parenting style is mainly the uninvolved parenting style. For the uninvolved parenting style, the children cannot feel supports from their parents. This kind of support is a protective factor for suicidal ideation (Arria et al., 2009; Rahme et al., 2015). So, the communication parenting style is a protective factor for suicidal ideation and plan among medical college students in China. However, we did not find the association between parenting style and suicide attempt. Previous studies support the relationship between parental bonding and suicide attempt (Hsu et al., 2013; Martin and Waite, 1994). This may be explained by our estimation of the parenting style. The parenting style was evaluated by one question. Some accurate tools may be used to explore this association.

We also found that mother's education level was associated with suicidal ideation, and mother's vocation was associated with suicide plan. Previous studies also have identified the relationships (Björkenstam et al., 2011; Saffer et al., 2015). However, we did not find the associations for father. This may be caused by the Chinese traditional culture. In China, mothers mainly take care of by their babies. They live more time with their mothers than fathers. So mothers may play more roles on their ideation and plan than fathers.

There are also some limitations that should be considered when we interpret these results. First, the data was collected from one medical college in China, and the generalization of the findings has to be done cautiously. Second, as a cross-sectional study, we could not infer any causal relationship based on the results. Third, all of the data were collected from the students, and thus the estimation of their parents' behaviors may have some biases.

Despite these limitations, the study can still contribute to our understanding about the effect of parental characteristics on suicidal ideation, plan and attempt among medical college students in China. The major finding that mother's education level and parenting style are associated with suicidal ideation is critical and may be translated into practical measures in suicide prevention in China as well as elsewhere in the world.

## Conflict of interest

All the authors declared that they have no conflicts of interest.

## Acknowledgements

We would like to thank Shaofeng Dong for her assistance in data collection. We also would like to thank the National Natural Science Foundation of China (81302505 and 71603149) and the Chinese Postdoctoral Science Foundation (2016M592209) for their funding in this study.

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