


A Micro-Level Explanation for Suicidal Ideation Based on Marriage-Squeeze and Social Support Among Rural Men in China

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Abstract

Higher sex ratio at birth often leads to sex imbalance and a severe squeeze on the marriage market. Up to now, no systematic studies have examined the relationship between marriage squeeze and suicidal ideation among rural men in a context of sex imbalance. Using surveys conducted in Chaohu (Anhui Province) and Ankang (Shaanxi Province) in China, this study analyzed the impact of marriage squeeze and social support on suicidal ideation among rural men. The perceived marriage squeeze significantly and positively affected suicidal ideation and the perceived social support negatively affected suicidal ideation among married and unmarried rural men. Objective social support did not significantly affect suicidal ideation among married men; however, it negatively affected suicidal ideation among unmarried men. Marriage squeeze increased the incidence of suicidal ideation among rural men, but perceived social support acted as a protective factor against suicidal ideation. These findings support the main effect hypothesis of social support. Objective social support is a double-edged sword, which may increase suicidal ideation incidence among rural men. The article ends with the conclusions and limitations of this study.

Keywords

marriage squeeze, suicidal ideation, social support, rural men

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Background

In 1980s, due to son preference and the widely used B-ultrasound technology, China began to experience its highest and widest ranges in terms of imbalance in sex ratios at birth. In 2005, it reached the peak of 120.56, before declining slowly. The sex ratio at birth in 2016 was still around 113 (Hu, 2016). Higher sex ratio at birth often leads to sex imbalance when the affected generation reaches adulthood, thus causing a severe squeeze on the marriage market (Jiang et al., 2014). It has been estimated that, since 2000, about 10% of surplus men in China experienced difficulty in finding marriage partners each year and the total surplus men in China will reach 33 million at the end of 2014 (Peng, 2017). Due to the existence of a universal marriage system and hypergamy marriage model, most marriage-squeezed men live in rural and remote areas. Most of them have remained in economic poverty, faced a relative lack of social resources, and faced difficulties in finding marriage partners; their situation

often exposes them to dual pressures from family and society (S. Wang et al., 2022; Wei et al., 2008; X. Y. Yang et al., 2020).

Although the overall Chinese suicide rate has declined sharply, the suicide rate of rural men still remains at high level. Health Statistics Yearbook revealed that, in 2016, the suicide rate among rural men was 9.31/100,000, and that among rural women was 6.87/100,000, among urban women was 4.15/100,000, and among urban men was

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5.62/100,000. Chinese rural men are now a key group for conducting research and interventions on suicide.

Is a higher suicide rate among rural men in China associated with the marriage squeeze? What kind of social support could help them reduce their suicidal ideation and escape from suicidal shadow? Currently, no systematic studies have examined this issue. The purpose of this study is to explore the relationship between marriage squeeze and suicidal behaviors of rural men by looking at the micro consequences of marriage squeeze, and to find possible ways to reduce suicidal behaviors of rural men.

Literature Review

Explanations for Suicidal Behavior

Early studies that sought to explain suicide mainly adopted two approaches: the psychiatric and psychological perspectives, which led to the emergence of neurobiological studies on suicide. It was believed that suicide has a strong neurobiological factor and that this factor is directly affected by the quantity of certain substances in an individual's body. With regard to measuring the mental health of people who commit suicide, the difference between physiological indicators and biological factors should be considered (Statham et al., 1998). Later, psychological studies on suicide broke the border in psychiatry and proposed a hypothesis that the inner activity of people who commit suicide should be adopted as the research object (Zhou et al., 2014). Subsequently, people gradually realized social environment's impacts on suicide, and suicide as an issue also attracted an increasing amount of attention from sociologists; among whom the most famous scholar was 19th-century French sociologist Émile Durkheim (2005), who represents one example of sociological studies on suicide.

Unlike Western countries, the suicide rate in rural China is significantly higher than that in urban areas, and which directly leads to the national suicide rate in general (Jing et al., 2010). Considering this special phenomenon, Chinese scholars have adopted localized Chinese concepts and theories to explain the suicidal behaviors in rural China. (a) The "living" theory argues that, in the process of living, people become vulnerable to experiencing emotional setbacks, grievances, and injustices within the family, and this results in feelings of failure with regard to "living," which eventually lead individuals to commit suicide (Wu, 2007). (b) "strain theory of suicide," namely, that suicide is a rational choice. When the cost of living exceeds the reward of living, suicide may occur (Zhang et al., 2011). (c) The theory of consanguinity connectivity, this suggested that "consanguinity connectivity" determines whether a suicide is an "egoism suicide" or an "altruistic suicide" and that the degree of

"rule's maintaining and controlling" determines whether a suicide is a "despairing suicide" or a "vengeful suicide." (Y. W. Liu, 2014; Y. W. Liu & Wang, 2014). (d) The "migration" theory, namely that migration helped rural women avoid three previous suicide risks, including the subordinate status of women in the family, family disputes, and certain tools that could assist in suicide (Jing et al., 2010).

In recent years, the theory of masculinity was adopted to explain suicidal behavior in men by some scholars in western countries rather than in China (River & Flood, 2021). The higher suicide rate among rural men than other groups in China was reported and family events were the main reasons for suicidal behaviors in rural areas (S. F. Li & Tao, 2016). China's patriarchal culture was fully reflected by rural areas' family and marriage systems. Accordingly, it can be inferred that the masculinity theory may also explain the higher suicide rate among men in rural China to some extent. The Chinese rural family is a typical patriarchal cultivation unit, and patriarchal authority has a leading position in the family. The masculinity that rural men pursue in the patriarchal system is to become a man who is recognized by the patriarchal culture (Cai, 2018). When their masculinity is questioned and challenged, rural men may defend their dignity by committing suicide (S. F. Li & Zhang, 2015). At the same time, as men play different family roles, their masculinity changes, and the triggers of suicidal behavior may change accordingly (Cai, 2018).

In traditional patriarchal societies, "husbands" are commonly defined as "breadwinners" and usually reinforced their masculinity through the power of "husbands" and the obedient positions of their wives within the marriage, as well as maintain their family lines and identified their masculinity by having sons to carry on their family names (Zheng & Yang, 2003). When marriage and emotions are not satisfied, men's masculinity as "husbands" cannot be supported, which will hurt their esteem and their negative moods will occur, eventually lead to suicide (S. F. Li & Tao, 2016). From this perspective, marriage squeeze may block the way for rural men to achieve their masculinity and finally may increase suicidal behavior.

Family Stress and Suicide

Family stress refers to a certain degree of variation in the family system, which is caused by various life events or situations. Such variations are related to situations where expected norms for system operation are inconsistent (McCubbin, 1995). Sources of such stress may include macro-environmental changes outside the family, such as globalization, sociocultural changes, and social transformation. These may include changes in the internal structures and functions of the family, such as stress events

and changes in the family life cycle (McCubbin, 1995; Plunkett et al., 1999). Sex imbalances in society may reduce rural men's marriage chances, and they may thus become "squeezed" by the marriage market. Rural men who face difficulties in finding a marriage partner are also often subjected to double discrimination by society and their families, and this situation could generate family stress for these men (Wei et al., 2008).

Family stress can significantly affect the physical and mental health of individuals and the order and harmony of families. Studies have reported that excessive family stress can lead to many problems, including insomnia, induced hypertension, anxiety, depression, and so on. In severe cases, it may even lead to drug abuse, crime, and suicide (Vas, 2013). Families that are subjected to excessive stress are vulnerable to marital violence, and even families with higher marital satisfaction may still experience mental violence under conditions that produce family pressures (T. Yang & Jin, 2018). Family stress thus has serious negative effects on individuals and families, which, in turn, may lead to suicidal behavior (Yoder & Hoyt, 2005).

Studies have reported that rural men who have experienced sex imbalances and marriage squeezes can become vulnerable to family stress, but no studies have examined the relationship between family stress and suicidal behavior among rural men in further depth. According to existing research, we can infer that, in China, sex imbalances and marriage squeezes can produce stress in rural families, which, in turn, can further affect suicidal behavior among rural men.

Social Support and Suicide

Experimental studies on human beings and animals have reported that social isolation is a risk factor for suicide death (House et al., 1988). The French sociologist Durkheim pointed out that loss of social relations was one of the important factors leading to suicide (Shi & Ma, 2003). While exploring the relationship between social support and suicide behaviors among rural residents, the scores for social support were reported lower among suicidal groups compared with those for the control group, and among rural residents, high objective support and social support utilization are protective factors against suicidal behaviors (Lu et al., 2011). Simultaneously, family members and neighbors are the main sources of support for rural people. The factors that influenced social support were marriage, living alone, family economic status, educational levels, and health status.

The social support networks were reported no significant influence on life satisfaction among forced bachelors in rural areas, but emotional support networks could alleviate their depressive symptoms (Y. Li, 2011). At the same time, the marital status was reported to

have significant impact on the scale of rural men's social support networks. Married men had a larger social support networks compared with unmarried men and lack of marriage led to reduced emotional support among unmarried men (Y. Li et al., 2015). Forced male bachelors had weaker social capital, in terms of social support networks, than married men (Y. Li et al., 2010). How is the perceived social support and objective social support among marriage-squeezed men in rural areas who are facing family stress? Is it a buffer or a main effect model for social support to explain suicidal ideation? No systematic studies could answer this question.

Data

Data adopted in this study were from two large-scale surveys conducted in July 2014 and January 2015 among rural men, respectively.

Step 1: A Survey on Rural Men's Family and Living Conditions in Ankang (Shaanxi Province)

The "Survey on rural men's family and living conditions" was administered in July 2014 at Hanbin District in Ankang (Shaanxi Province). Ankang is a city that shares borders with Shaanxi, Sichuan, Hubei, and Anhui Provinces. Therefore, it has the characteristics of all four provinces. Hanbin District could be considered as a "microcosm" of Ankang in terms of its history and administrative areas, which could be said to represent the western regions of China. By the end of 2012, the resident population of Hanbin District had reached 870,000, and the total sex ratio reached 114.

A stratified sampling method was adopted to extract seven townships from 30 townships and streets in Hanbin District according to their economic development level. Next, with the coordination and cooperation of local governments, random sampling method was adopted to select the target population from each township: Unmarried people aged 20–28 years, unmarried people aged over 28 years, married people aged 20–28 years, and married people aged over 28 years. A total of 1,032 questionnaires were distributed as part of this survey; 1,017 questionnaires were returned (return rate: 98.55%). After data cleaning procedures such as logic detection and missing value processing, 998 questionnaires were finally deemed valid, and the valid recovery rate was 96.71%. At the same time, in the overall valid sample, there were 104 unmarried samples aged 20–28 years, 77 unmarried samples aged over 28 years, 45 married samples aged 20–28 years, and 772 married samples aged over 28 years.

Step 2: A Survey on Rural Men's Family and Living Conditions in Chaohu (Anhui Province)

The "Survey on rural men's family and living conditions in Chaohu (Anhui Province)" was conducted in January 2015. Anhui Province has a large population. Chaohu with a medium economic development, is located in the central region of Anhui. In 2013, the resident population of Chaohu was 782,000, and the sex ratio was 106.32.

According to economic development level of Chaohu, a stratified sampling method was adopted to divide 18 townships and streets under the jurisdiction of Chaohu into four "grades." One township was then selected from each grade, and 6 administrative villages were randomly selected from each township. Based on marital status and an age limit of 28 years, certain number of unmarried/married men aged 20-28 years and unmarried/married men aged 28-65 years were selected from each administrative village, with the cooperation of the local population and the family planning department. Before the investigation, the investigators explained the principles of privacy protection to the respondents and obtained their consent. Finally, the 1,053 samples were collected, among which 56.03% were married men, 43.97% were unmarried men, 37.23% were aged under 28 years, and 62.77% were aged 28 years and above.

Variable Measurement

Suicidal Ideation. Suicidal behavior is difficult to measure, therefore the suicidal ideation rather than actual suicidal behavior was adopted for the study design. Suicidal ideation refers to the mental ideation of ending one's own life; this can range from occasionally experiencing suicidal thoughts to, more seriously, planning and preparing for suicide (Rachman, 1980). It is an important indicator for assessing suicide risk (Rachman, 1980). This study adopted the Self-rating Idea of Suicide Scale (SIOSS) to measure rural men's suicidal ideation. The scale used for this study was compiled by Xia Chaoyun in 2001, and it was proved to have a good reliability and validity. It contains 26 items with the answers "yes" or "no." The scale includes four dimensions: despair, optimistic, sleep, and masking. The measurement of scale is deemed as unreliable if the scores for the masking dimension are greater than or equal to 4. The total scores of suicidal ideation are obtained from the simple summation of the scores for the despair dimension, optimistic dimension and sleep dimension. When the total scores of suicidal ideation are greater than or equal to 12, the suicidal ideation were predicted to occur. A higher score on the suicidal ideation scale indicates a higher degree of despair, less optimism, and higher sleep disorders. A Cronbach's α value of the scale in the samples was 0.743, indicating a good internal consistency reliability.

Perceived Marriage Squeeze. As a macro-level concept, marriage squeeze is difficult to measure at the individual level. The existing theory of social psychology reveals that individuals have different subjective cognitions and perceptions regarding macro-level environment, and this leads to different individuals' decisions and behaviors. Therefore, this study designed a concept of the perceived marriage squeeze to measure the degree of marriage squeeze perceived at individual level. It was reported in existing research that marriage squeeze not only lead to perceived difficulties in getting married among rural men, but also lead to various experiences in marriage stress among rural men. Therefore, this study adopted perceived difficulties in getting married and the marital stress scale to measure perceived marriage squeeze at individual level among rural men.

Perceived Difficulties in Getting Married. This is measured by asking "How difficult do you think for you to get married?" A Likert-type 5-point scale (1 = *very easy*; 5 = *very difficult*) was adopted to measure this variable. A higher score indicates a higher perceived marriage squeeze.

Marriage Stress Scale. A marriage stress scale was designed in this study based on the context of marriage squeeze and Wei et al.'s (2008) qualitative interviews among forced bachelors in rural areas. A psychometric assessment was conducted to prove a good reliability and validity for this scale. The scale consists of 11 items by asking, "Do you worry about the following issues related to marriage?" The options for each question included four choices: 1 = *never worry*, 2 = *occasionally worry*, 3 = *sometimes worry*, and 4 = *often worry*. The scores for the marriage stress scale were obtained from simply summing each score from each item. A higher score indicates a greater marriage stress among rural men. A Cronbach's α value of this scale was 0.892, indicating a good internal consistency reliability. This marriage stress scale covers many aspects of family life among rural men, including economic pressures, pressures in daily life, emotional pressures, pressures related to old-age support, pressures related to inheritance, and so on. Here, we would like to point out that the different statements for the scale items were designed due to the great differences between married and unmarried groups.

Perceived Social Support Scale. The Perceived Social Support Scale (PSSS) was adopted in this study to measure subjective social support. The scale was from Zimet's Perceived Social Support Scale and revised by Jiang Ganjin (Blumenthal et al., 1987). The "leaders, relatives, and colleagues" were changed in this study to "relatives

and neighbors” according to target groups. The scale includes 12 questions, which are divided into three dimensions: family support, friend support, and other support. Each item was measured with a Likert-type 5-point scale (range: 1 = *strongly agree*; 5 = *strongly disagree*). The total score for perceived social support was obtained from simply summing each score on each item. A higher score indicated a more perceived social support and a better emotional experience. A Cronbach’s α value for the scale was 0.912, indicating a good internal consistency reliability.

Objective Social Support. Van der Pul’s social support questionnaire was adopted in this study, which includes three dimensions: instrumental support, emotional support, and interpersonal support.

Instrumental support refers to practical and actual help, including physical, financial, and service-related, and it was measured by asking the following question:

If you want to borrow something (such as money, sugar, pliers, and so on) or ask someone to help you do small things outside the house (such as moving things, buying everyday items, and so on), which of the following persons would you like to ask for help?

Emotional support involves emotional aspects such as comforting, listening, caring, communicating, and so on. It was measured by asking the following question: “If you are in a bad mood due to quarreling with other person or bad luck, whom would you like to talk to?”

Interpersonal support refers to communication-related aspects, such as providing companionship and meeting the needs of interpersonal communication. It was measured by asking the following question: “If you want to chat, drink, play cards, watch movies, or do some other activities, whom would you like to contact with?”

A structural perspective was adopted in this study to design the different components of the social support. In traditional rural societies, kinship is the most important parts of social relations. However, as time changes, unrelative relationships have become increasingly important by providing different resources to individuals. Therefore, this study explored the impact of unrelative relationships on suicidal ideation. First, the respondents were asked about their trusted persons, whom they could ask for help or interaction, family, relatives, villagers, friends, leaders, colleagues, netizens, and others, in three specific scenarios; Among these, family members and relatives were classed as “relatives,” and villagers, friends, leaders, colleagues, netizens, and others were classed as “non-relatives.” To make it simple, the components of the actual support, emotional support, and interpersonal support were defined as categorized variables and respectively

classified into two categories: “having non-relatives” and “not having non-relatives.”

Control Variable. The variables such as age, marital status, educational level, and income status were adopted as control variables. Age was measured by the two following options: 0 = 28 years old, 1 = 28 years old and above; marital status was measured by the two options: 0 = married (have marital status), 1 = unmarried (not have marital status); educational level was measured by the following three options: 1 = *primary and below*, 2 = *junior high school*, and 3 = *high school and above*; and income status was measured by the following three options: 1 = *less than 10,000*, 2 = *10,000–30,000*, and 3 = *more than 30,000*.

Considering the differences in economic development, cultural atmosphere, and ethnic customs between central regions (represented by Chaohu, Anhui) and the western region (represented by Ankang, Shaanxi), and the possible impacts of these differences on rural men who live in different regions, the variable region was designed in this study and was measured by two options: 0 = central region; 1 = western region.

Analysis Strategy

Epidata software was adopted in this study to enter and clean the collected data.

The cross-tabulation analysis, chi-square test, and independent sample *t*-test were adopted in this study to describe the status of suicidal ideation, family stress, and social support among rural men and compare the status of between groups with different marital statuses and live in different regions.

To analyze the impacts of marriage squeeze, family stress and social support on rural men’s suicidal ideation, a multi-level linear regression model was conducted. First, the binary logistic regression analysis was adopted with “suicidal ideation” as the dependent variable and “marriage squeeze” and “family stress” as independent variables; second, “perceived social support” was included in the model as an independent variable, third, “instrumental support,” “emotional support,” and “interpersonal support” were included in the model as independent variables. Finally, control variables were included in the model.

Results

Descriptive Analysis

Table 1 presents the comparison between suicidal ideation and perceived marriage squeeze among rural men with different marital status and in different regions. As

Table 1. A Comparison of Suicidal Ideation, Perceived Marriage Squeeze Among Rural Men With Marital Status and in Different Regions

Variables	Central region (represented by Chaohu, Anhui)		Western region (represented by Shaanxi, Ankang)		χ^2 test/t-test
	Frequency (percentage)/M (SD)		Frequency (percentage)/M (SD)		
Suicidal ideation incidence					
No suicidal ideation	830 (89%)		774 (78.8%)		—
Having suicidal ideation	103 (11%)		208 (21.2%)		***
Perceived marriage squeeze					
Perceived difficulties in getting married	3.26 (1.10)		2.99 (0.96)		***
Marriage stress	23.72 (7.74)		21.38 (7.57)		***

Variables	Married		Unmarried		χ^2 test/t-test
	Frequency (percentage)/M (SD)		Frequency (percentage)/M (SD)		
Suicidal ideation incidence					
No suicidal ideation	1100 (84.3%)		489 (82.7%)		—
Having suicidal ideation	205 (15.7%)		102 (17.3%)		—
Perceived marriage squeeze					
Perceived difficulties in getting married	2.87 (0.94)		3.54 (1.11)		***
Marriage stress	22.21 (7.3312)		23.21 (8.5241)		**

Variables	Central region (represented by Chaohu, Anhui)		Western Region (represented by Shaanxi, Ankang)		χ^2 test/t-test
	Frequency (percentage)/M (SD)		Frequency (percentage)/M (SD)		
	Married	Unmarried	Married	Unmarried	
Suicidal ideation incidence					
No suicidal ideation	468 (91.9%)	352 (85.6%)	632 (79.4%)	137 (76.1%)	Central: — Western: —
Having suicidal ideation	41 (8.1%)	59 (14.4%)	164 (20.6%)	43 (23.9%)	Central: ** Western: —
Perceived marriage squeeze					
Perceived difficulties in getting married	1.81 (0.95)	3.58 (1.13)	2.92 (0.93)	3.41 (1.04)	Central: *** Western: ***
Marriage stress	19.95 (6.49)	23.05 (8.69)	23.76 (7.48)	23.62 (8.06)	Central: *** Western: —

Note. "—" indicates not significant.

† $p < .1$. *** $p < .001$. ** $p < .01$. * $p < .05$.

reported in Table 1, incidence of suicidal ideation among rural men in western region (208, 21.2%) are significantly higher than rural men in central region (103, 11%) ($p < .001$). The scores obtained for difficulty in getting married (3.26) and marriage stress (23.72) among rural men in central region are significantly higher than that in western region (2.99; 21.38) ($p < .001$; $p < .001$). The incidence of suicidal ideation among unmarried rural men (59, 14.4%) were significantly higher than married rural men (41, 8.1%) ($p < .01$) in central region. There was no significant difference on the incidence of suicidal ideation between married and unmarried men in rural western region. The average scores obtained for difficulty in getting married and marriage stress among unmarried men (3.58; 23.05) were significantly higher than that among

married men in central region (1.81; 19.95) ($p < .001$; $p < .001$). Unmarried men's average score on difficulty in getting married (3.41) was significantly higher than that among married men in western region (2.92) ($p < .001$), while for them, there is no significant difference in the scores obtained for marriage stress.

Table 2 presents the comparison on social support among rural men with different marital statuses and in different regions. As reported in Table 2, the perceived social support among rural men in the western region was better than that in central region, and their average scores on social support from friends, families, relatives, and neighbors were significantly higher than that in central region. Married men's scores for perceived social support were better than that among unmarried men, and their

Table 2. A Comparison of Social Support Among Rural Men in Different Regions and Marital Status

Variables	Central region (represented by Chaohu, Anhui)		Western Region (represented by Shaanxi, Ankang)		χ^2 test/t-test
	Frequency (percentage)/M (SD)	Frequency (percentage)/M (SD)	Frequency (percentage)/M (SD)	Frequency (percentage)/M (SD)	
Perceived social support	45.9171 (7.53623)	47.3214 (7.10004)			***
Friends' support	15.0279 (2.79947)	15.2799 (2.83739)			*
Families' support	15.7621 (2.81705)	16.1404 (2.59045)			**
Relatives' and neighbors' support	15.1270 (2.73442)	15.9010 (2.53994)			***
Objective social support					
Instrumental Support					
No non-relatives	199 (19.4%)	99 (10.1%)			***
Having non-relatives	826 (80.6%)	883 (89.9%)			
Emotional Support					
No non-relatives	306 (30%)	131 (13.3%)			***
Having non-relatives	715 (70%)	851 (86.7%)			
Social Interaction					
No non-relatives	132 (12.9%)	99 (10.1%)			*
Having non-relatives	889 (87.1%)	883 (89.9%)			

Variables	Married		Unmarried		χ^2 test/t-test
	Frequency (percentage)/M (SD)	Frequency (percentage)/M (SD)	Frequency (percentage)/M (SD)	Frequency (percentage)/M (SD)	
Perceived social support	47.1357 (7.14150)	45.5136 (7.73568)			***
Friends' support	15.2823 (2.77986)	14.8960 (2.89592)			**
Families' support	16.1108 (2.59934)	15.6046 (2.92734)			***
Relatives' and neighbors' support	15.7427 (2.60573)	15.0130 (2.75812)			***
Objective social support					
Instrumental support					
No non-relatives	181 (13.4%)	115 (18%)			**
Having non-relatives	1165 (86.6%)	525 (82%)			
Emotional support					
No non-relatives	295 (22%)	139 (21.8%)			—
Having non-relatives	1048 (78%)	500 (78.2%)			
Social interaction					
No non-relatives	153 (11.4%)	75 (11.8%)			—
Having non-relatives	1192 (88.6%)	562 (88.2%)			

Note. "—" indicates not significant.

† $p < .1$. *** $p < .001$. ** $p < .01$. * $p < .05$.

average scores for social support from friends, families, relatives and neighbors were also significantly higher than that among unmarried men. Objective social support for rural men in western region were better than that in central region. Simultaneously, the proportions of non-relatives who provided instrumental support, emotional support, and interpersonal support in western region was significantly higher than that in central region. Objective social support among married men were slightly better than that among unmarried men, and the rates of instrumental support from non-relatives among married men were significantly higher than that among unmarried men.

Regression Analysis Results

Table 3 presents regression analysis results on the impacts of perceived marriage squeeze and social support on

suicidal ideation among married rural man. As reported in Table 3, perceived difficulties in getting married and marriage stress had a significant positive impact on suicidal ideation among rural men (1.563, $p < .001$; 1.079, $p < .001$) in Model 1, which indicates that more difficulties in getting married were associated with greater marriage stress and, consequently, higher suicidal ideation among married rural men.

When perceived social support was included as an independent variable in Model 2 (based on Model 1), the impact of perceived marriage squeeze variables on suicidal ideation remained unchanged in direction, coefficient size, and significance as compared with that of Model 1; furthermore, perceived social support variables had a negative impact on suicidal ideation with a significance level of 0.01 (0.968, $p < .01$). This indicated that a higher level of perceived social support helped to reduce suicidal ideation among married men in rural region.

Table 3. Impacts of Perceived Marriage Squeeze and Social Support on Suicidal Ideation Incidence Among Married Men in Rural Areas

Dependent variable	Model 1	Model 2	Model 3	Model 4	Model 5
Suicidal ideation incidence (reference: none)					
Independent variable					
Perceived difficulties in getting married	1.563***	1.542***	1.574**	1.523***	1.547***
Marriage stress	1.079***	1.082***	1.081***	1.078***	1.075***
Perceived social support		0.968 [†]	0.969 [†]	0.959*	
Families' support					1.029
Friends' support					1.026
Relatives' and neighbors' support					0.819**
Objective social support					
Instrumental support (reference: no non-relatives)					
Having non-relatives			1.078	1.068	1.022
Emotional support (reference: no non-relatives)					
Having non-relatives			1.235	1.249	1.319
Interpersonal support (reference: no non-relatives)					
Having non-relatives			0.670	0.812	0.795
Control variables					
Age (reference: under 28 years old)					
28 years old and above				0.711	0.740
Education (reference: primary school and below)					
Junior high school				0.710	0.690
Senior High school and above				0.469*	0.437*
Annual income (reference: less than 10,000)					
10,000–30,000				0.902	0.932
More than 30,000				0.697	0.719
Region (reference: Central region)					
Western region				1.544	1.705
-2 Log Likelihood	460.692***	457.198***	445.657***	411.609***	406.571***
Cox & Snell R ²	0.101	0.106	0.111	0.135	0.142
Nagelkerke R ²	0.177	0.185	0.194	0.237	0.250

[†] $p < .1$. *** $p < .001$. ** $p < .01$. * $p < .05$.

When the three objective social support variables were included in Model 3 (based on Model 2), the previous impacts on suicidal ideation from variables such as perceived marriage squeeze and perceived social support remained unchanged in direction, coefficient size, and significance, while the three objective social support variables had no significant impacts on suicidal ideation.

When the control variables were included in Model 4 (based on Model 3), the impacts of perceived marriage squeeze, perceived social support, and objective social support variables on suicidal ideation remained unchanged in direction, coefficient size, and significance, as compared with that in Model 3. Among the newly added control variables, only educational level had a significant negative impact on suicidal ideation: the scores for suicidal ideation among married men with senior high school-level education and above were significantly

lower than those for unmarried men with primary school-level education and below (0.469, $p < .05$).

Model 5 is based on Model 4 by including the tree dimensions of the perceived social support variables. The impacts of variables such as perceived marriage squeeze, objective social support, and control variables on suicidal ideation were almost unchanged in directions, coefficient size, and significance, as compared with those in Model 4. It was reported that, among the three dimensions of perceived social support, only relatives' and neighbors' support could significantly reduce suicidal ideation among married men (0.819, $p < .001$).

Table 4 presents regression analysis results on the impacts of perceived marriage squeeze and social support on suicidal ideation among unmarried men in rural region. As reported in Table 4, the perceived difficulties in getting married (OR=1.870, $p < .001$) and marriage stress (OR = 1.059, $p < .001$) had a significant positive impact

Table 4. Impacts of Perceived Marriage Squeeze and Social Support on Suicidal Ideation Among Unmarried Men in Rural Areas

Dependent variable	Model 6	Model 7	Model 8	Model 9	Model 10
Suicidal ideation (reference: none)					
Independent variable					
Perceived difficulties in getting married	1.870***	1.821**	1.905***	1.992***	2.038***
Marriage stress	1.059***	1.059***	1.057**	1.058**	1.059**
Perceived social support		0.962*	0.959*	0.948**	
Families' support					0.854†
Friends' support					1.132
Relatives' and neighbors' support					0.879
Objective social support					
Instrumental support (reference: no non-relatives)					
Having non-relatives			0.712	0.569	0.580
Emotional support (reference: no non-relatives)					
Having non-relatives			1.205	0.865	0.775
Interpersonal support (reference: no non-relatives)					
Having non-relatives			2.284†	2.957†	3.124*
Control variables					
Age (reference: under 28 years old)					
28 years old and above				1.657	1.742
Education (reference: primary school and below)					
Junior high school				1.580	1.531
Senior High school and above				1.162	1.040
Annual income (reference: less than 10,000)					
10,000–30,000				0.809	0.898
More than 30,000				0.732	0.697
Region (reference: Central region)					
Western region				3.957***	4.203***
-2 Log Likelihood	325.769***	320.428***	311.019***	272.156***	266.783***
Cox & Snell R ²	0.128	0.142	0.155	0.203	0.216
Nagelkerke R ²	0.195	0.216	0.234	0.310	0.330

† $p < .1$. *** $p < .001$. ** $p < .01$. * $p < .05$.

on suicidal ideation. This indicated that unmarried men with higher perceived difficulties in getting married and higher marriage stress are likely to have a higher suicidal ideation.

The perceived social support variables were included in Model 7 (based on Model 6). The impacts of the perceived marriage squeeze variables on suicidal ideation remained unchanged in direction, coefficient size, and significance compared with Model 6. The newly added perceived social support variables had a significant negative impact on suicidal ideation ($OR = 0.962$, $p < .05$). This indicated that perceived social support could effectively reduce suicidal ideation among unmarried men.

The objective social support variable was included in Model 8 (based on Model 7). The impacts of the perceived marriage squeeze variables and objective social support variables on suicidal ideation remained unchanged in direction, coefficient size, and significance

compared with Model 7. Among the newly added objective social support variables, only interpersonal support had a significantly positive impact on suicidal ideation ($OR = 2.284$, $p < .1$).

The control variables were included in Model 9 (based on Model 8). The impacts of the perceived marriage squeeze variables, perceived social support, and objective social support variables on suicidal ideation remained almost unchanged in direction, coefficient size, and significance compared with Model 8. Among the newly added control variables, only region had a significantly positive effect on suicidal ideation ($OR = 3.957$, $p < .001$).

The scores obtained for the three dimensions of perceived social support were included separately in Model 10 (based on Model 9) instead of the total scores. The impacts of the perceived marriage squeeze variables and marriage stress variables on suicidal ideation remained

almost unchanged in direction, coefficient size, and significance compared with Model 9. The impacts of perceived difficulties in getting married on suicidal ideation remained almost unchanged in direction and significance, but the coefficient size increased (OR = 2.038, $p < .001$) compared with Model 9. Among the perceived social support variables, only family support had a significant negative impact on suicidal ideation (OR = 0.854, $p < .1$). Among objective social support variables, the impact of interpersonal support on suicidal ideation remained unchanged in direction, but both the coefficient size and significance increased (OR = 3.124, $p < .05$) compared with Model 9. Among the control variables, the impacts of region on suicidal ideation remained unchanged in direction and significance, but the coefficient size increased compared with Model 9 (OR = 4.203, $p < .001$).

Discussion

The descriptive results indicated that there were significant regional differences in suicidal ideation, with a higher suicidal ideation incidence in western region than that in central region. While there was no significant difference in suicidal ideation incidence among rural men by marital statuses. In central region, the suicidal ideation incidence was higher among unmarried men than that among married men. Among all groups, a highest suicidal ideation incidence was indicated among unmarried men from the western region, followed by that among married men in western region. There was a lowest suicidal ideation incidence among married men in central region.

In terms of perceived marriage squeeze, there were higher difficulties in getting married but lower marriage stress among rural men in western region compared with those in central region. Both the difficulties in getting married and the marriage stress among unmarried men were higher than that among married men. Perceived social support and objective social support were generally better among rural men in western region compared with those in central region. Perceived social support and objective social support were generally better among married men than those among unmarried men. Among all the groups, the difficulties in getting married among unmarried men in central region were highest, followed by that among unmarried men in western region. The difficulties in getting married among married men in central region were lowest. There is a similar marriage stress between married and unmarried men in western region and unmarried men in central region, but lowest marriage stress among married men in central region.

The regression analysis results suggested that perceived marriage squeeze variables had a significant positive impact on suicidal ideation incidence among married and unmarried men; that is, among rural men, a greater level of perceived marriage squeeze (including the higher

difficulties in getting married and marriage stress) were associated with a higher probability of having suicidal ideations. When other variables were added into models, the impacts of perceived marriage squeeze on suicidal ideation did not significantly change in direction, coefficient size, and significance. This result indicated that the perceived marriage squeeze variables had a net impact on suicidal ideation, which is consistent with previous inferences and existing research findings. The French sociologist Durkheim confirmed the relationship between marriage and suicide and reported that the suicide rate was significantly lower among married people compared with unmarried people; which proved the protective effects of marriage against suicidal behavior (Durkheim, 2005; Feng, 2015). This finding suggested that the perceived marriage squeeze measured by the perceived difficulties in getting married and marriage stress will lead to a higher suicidal incidence.

This also can be explained by the masculinity concept in rural China. Due to the definition of masculinity in rural China, men are viewed as "husbands" who are responsible for the economic income of the whole family and therefore have more voices in the family events. Rural men have traditional expectation for their wives and have built a dual relationship "power-obedience" between husbands and wives, by which the rural men have built their masculinity (Cai, 2018; C. H. Li et al., 2013). When rural men could not get married successfully, their masculinity as "husbands" cannot be satisfied, and then their self-confidence and dignity will be undermined. They will also have to be facing negative assessments from societies and families, which will amplify the marriage stress and eventually lead them to commit suicide.

Perceived social support had a negative impact on suicidal ideation among married and unmarried men; which is independent from that of the perceived marriage squeeze variables on suicidal ideation. This result is consistent with the main effect model hypothesis and also consistent with the findings from existing studies (Z. J. Liu et al., 2010; Yu et al., 2018). However, the buffer effect hypothesis is not verified (Han & Zhang, 2014; X. Q. Liu et al., 2015). The possible explanation is that the perceived marriage squeeze (including the difficulties in getting married and marriage stress) are commonly viewed as a state of life rather than a negative life event among rural men. Therefore, the buffering and regulating effect of perceived social support on the relationship of perceived marriage squeeze and suicidal ideation are hard to be verified. Perceived social support provided by relatives and neighbors can help married men reduce their suicidal ideation, and families' support can help unmarried men reduce their suicidal ideation; which is in accord with the research team's expectations and findings from existing research (Chen et al., 2008; Zhao et al., 2011). Objective social support does not have any significant

impact on suicidal ideation among married men, while interpersonal support has a significant positive impact on suicidal ideation among unmarried men with an increased interpersonal support leading to a higher suicidal ideation incidence. This result seems irrational. The possible explanation is that interpersonal support is actually a double-edged sword, which can improve people's psychological welfare but expose individuals to interpersonal pressures, which, in turn, may have a negative impact on psychological welfare (Costanza et al., 1988; Hagihara et al., 2003).

Rural unmarried men are facing a higher pressure from marriage squeeze than married men. In this case, interpersonal support may induce a greater interpersonal pressure on unmarried men, which will lead to a lower psychological welfare and increased suicidal ideation (S. Wang et al., 2018). Perceived social support commonly reflects the quality of received social support, while objective social support reflects the quantity of received social support. Above discussed results indicate that the quality of social support is obviously more important than the quantity (Rock et al., 1984). This also provides us with an important reference for designing an intervention strategy on rural men's suicidal behavior.

Among control variables, educational level has a significant negative impact on suicidal ideation among married men with a lower suicidal ideation incidence among those married men with senior high school education and above than those with primary school education and below, which is accord with the results from existing research. A possible explanation is that a higher educational level can help married men cope better with marriage stress, thereby improving their psychological welfare and reducing the incidence of suicidal ideation (X. Y. Li et al., 2009; Yao et al., 2010). The region significantly and positively affected the suicidal ideation among rural unmarried men with a higher incidence of suicidal ideation among unmarried men in western region than those in central region, which is in accord with the results from existing research (D. J. Wang & Zhou, 2010; X. Y. Yang et al., 2004). This also indicates that men from the western region have experienced a more severe level of marriage squeeze; these men also have to face higher difficulties in getting married and greater marriage stress, which, in turn, lead to a higher incidence of suicidal ideation.

Conclusion

Based on above discussions, we have drew following conclusions:

Conclusion 1. Marriage squeeze caused by sex imbalance increases the suicidal ideation incidence among

married and unmarried men in rural region, which, in turn, further leads to suicidal behavior. This may partly explain why the suicide rate for rural men remain high level despite the general decline happened in suicide rates in China.

Conclusion 2. Perceived social support had a significant positive impact on suicidal ideation among married and unmarried men in rural region; furthermore, this impact exists independently from the impact of perceived marriage squeeze, which have supported the main effect model hypothesis. Social support provided by relatives and neighbors, as part of perceived social support, could help to reduce suicidal ideation incidence among married men, while family support could help to reduce suicidal ideation incidence among unmarried men.

Conclusion 3. Objective social support has no significant impact on suicidal ideation among married men, while social interaction support has increased suicidal ideation incidence among unmarried men. In this present study, the impact of social support quantity on psychological welfare and suicidal ideation is uncertain; such support may even have the negative impact in certain situations. The quality of social support is a protective factor against suicidal behavior and thus has greater significance than social support quantity.

Conclusion 4. Educational levels had a negative impact on suicidal ideation among married men, with a lower suicidal ideation incidence observed among the married men with the higher educational level. Region significantly affected the suicidal ideation among unmarried men with a higher suicidal ideation incidence observed among unmarried men in western region than those in central region.

This study had some limitations as following:

Design limitations. This study is aimed to explore whether marriage squeeze could lead to suicidal behavior among rural men, but because the data for suicidal behaviors are difficult to measure and obtain, we have to adopt the variable suicidal ideation instead and collect data for measuring the suicidal ideation rather than the actual suicidal behaviors. However, the suicidal ideation is the predictor variable for but different from suicidal behaviors, which may make this study could not fully reflect the reality.

Data limitations. To make it simple and considering the feasibility, the data used in this study only from two representative regions in central and western China, which could not fully reflect the whole nationwide situation.

Content limitations. This study only focuses on the impact of marriage squeeze and social support on

suicidal ideation among rural men; while other factors that may be associated with suicidal ideation are not be considered. It was indicated that among all populations groups, rural people aged over 65 years had a highest suicide rate (Deng, 2014), but this population was not covered by the sample selected, and the related factors that could lead to suicide behaviors among rural elderly men are not addressed in this present study.

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Author Contributions

Xueyan Yang wrote the paper. Li Rui translated the paper from Chinese to English. Sasa Wang did the data analysis. All authors read and approved the final manuscript.

Declaration of Conflicting Interests

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Ethics Approval and Consent to Participate

Written ethics approval was obtained from School of Public Policy and Management, Xi'an Jiaotong University (protocol number: 140701; approved on July 1, 2014). Participant information sheets and consent forms were approved by the local committee and in line with the standardized documents for the university. All participants were approached as healthy volunteers participating in different groups. All were deemed to have capacity to consent to participation and due to the fact that the study only included adults above 18, and all participants provided written informed consent for all aspects of the study. All methods from availability of data and material section to ethics approval and consent to participate section were carried out in accordance with human guidelines and regulations.

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Availability of Data and Material

All methods for collecting and analyzing data were carried out in accordance with human guidelines and regulations, and all data used in this article are available. All data generated or analyzed during this study are included in this published article (and its supplementary information file).

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