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Features for Medically Serious Suicide Attempters Who Do Not Have a Strong Intent to Die in rural China

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4 **Features for Medically Serious Suicide Attempters Who Do Not Have**
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6 **a Strong Intent to Die in rural China¹**
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Features for Medically Serious Suicide Attempters Who Do Not Have a Strong Intent to Die in rural China

Abstract

Objective

This study aims to analyze the features for medically serious suicide attempters who do not have a strong intent to die in rural china.

Design Cross-sectional study

Setting Rural China.

Participants

Subjects were 791 medically serious suicide attempters who were limited only to those survivals whose injury and wounds were so serious as to require hospitalization or immediate medical care.

Results

The results supported that less education years, religious belief, living alone, negative life events, low level of impulsivity, mental disorder were associated with higher level of suicide intent.

Conclusion

These imply that there are some medically serious suicide attempters with higher education and impulsivity who are not really want to die by suicide. It can be translated into practice in Chinese suicide prevention.

Keywords: Suicide intent; medically serious suicide; suicide attempters; rural China.

Strengths and limitations of this study

1. This is a study based on a large sample of attempted suicides in rural China (n=791);
2. Medically serious suicide attempters were consecutively recruited in selected emergency rooms, which ensure the validity of the sample.
3. It is one of few reports about the factors associated with suicide intent among suicide attempt in rural China.
4. As this is a cross-sectional study, we cannot infer any causal relationship for all of the factors analyzed in this study.
5. All of the attempters were interviewed after they had leaved hospitals, and recall basis cannot be avoided.

Features for Medically Serious Suicide Attempters Who Do Not Have a Strong Intent to Die in rural China

Background

World Health Organization (WHO) estimated that there were about 804 000 suicide death worldwide in 2012, which meant there was one person died by suicide every 40 seconds¹. For suicide attempt, some studies assessed that the number was about 20 times higher than suicide death, and nearly 50% of them required emergency medical treatment^{2,3}. China was one of few countries which reported higher suicide rate in the world⁴. Although the Chinese suicide rates have decreased in recent years, completed suicide and attempt suicide are also important social and public health issues in China⁵.

In the last decades, lots of studies have explored the patterns of suicide, and we found several differences in suicides between China and Western countries⁶. In these findings, many of them imply that there are some suicides who do not intent to die by suicide, and they may only instrumentally use for certain gains.

Firstly, the percentage of mental disorder among suicide is different. In Western countries, there are about 90% of suicides who can be diagnosed with mental disorder⁷. However, the percentage in China is only about 40- 70%⁸. Although mental disorder is also an important risk factor for suicide behavior, other factors may also play roles in the Chinese suicide which need to be discussed.

Secondly, impulsivity is another factor which has been identified as a risk factor for suicide attempt both in China and Western countries^{9,10}. However, previous study

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4 found that there were about 50% of suicide attempters can be categorized as
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6 impulsivity suicide in China ¹¹. It further implies us there are a large group of Chinese
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8 suicide attempters who do not really want to die by suicide, and their suicide behavior
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10 was promoted by impulsivity.
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13 As we mentioned above, many findings about Chinese suicide speculate that
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15 there are some suicides who do not really want to die by suicide. Suicide intent is
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17 defined as the level of intent to die by suicide ¹², and many studies show that it is
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19 significantly associated with suicide behavior ¹³. Analyzing suicide intent is helpful
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21 for us to better understanding the suicides who do not really want to die.
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24
25 In recent years, many studies had identified some factors which were associated
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27 with suicide intent. In Western countries, previous studies found that older adults ¹⁴,
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29 rural resident ¹⁵, mental health problem ¹⁶ and hopelessness ¹⁷ were associated with
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31 suicide intent. In China, there were also some studies which supported that older age,
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33 higher level of education, living alone and suicide communication were correlated
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35 with higher level of suicide intent among completed suicide ^{18 19}. However, we have
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37 little knowledge about the suicide intent among suicide attempters who do not really
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39 want to die by suicide in China.
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43 This study aims to analyze the suicide intent among medically serious suicide
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45 attempters in rural China. It is helpful for us to realize what kinds of suicide
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47 attempters do not really want to die by suicide. It is also useful for us to better know
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49 the suicide behavior, and make some direct evidence for suicide prevention and
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51 intervention in China.
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Methods

Study sample and the design

In the current study, all of attempters were chose from two provinces in China, Shandong and Hunan. Shandong locates in the north of China, and it is a province with economic prosperity in both industry and agriculture. Hunan locates in the south of China, and it is a province with economic prosperity in agriculture. In the two provinces, thirteen rural counties were randomly selected from them.

In each of the rural county, departments of hospital emergency were connected to notify the research teams in each province the suicide attempters on monthly basis from May 2012 through July 2013. We consecutively recruited the attempters who aged 15-54 years in rural region. In this study, medically serious suicide attempters were limited only to those survivals whose injury and wounds were so serious as to require hospitalization or immediate medical care.

All of the interviewers would receive a strict training about this study before the interview. The main aims for this training were to make the interviewers sufficiently understanding about this study and each question in the questionnaire.

Interviewing procedures

All the attempters were interviewed when they had leaved hospitals because of their weakness in the hospitals. To connect with the attempters, all of them were first approached by the local health agency or the village administration by a personal visit. Upon their agreement on the written informed consent, the interview time was

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4 scheduled about two months after suicide incident. Each attempter was interviewed
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6 separately by one trained interviewer in a private place of a village medical room or
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8 their home. For those participants who were too weak to talk, family members could
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10 assist in the interview by answering some of the questions on the protocol. The
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12 average time for each interview was 1.5 hours.
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15 ***Patient and Public Involvement statement***

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18 The IRB approvals from both the Chinese institutions (Shandong University and
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20 Central North university) and the US based university (State University of New York,
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22 Buffalo State) where the principal investigator is affiliated ensured the human
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24 subjects protection and the ethical methodology regulated by the NIMH which funded
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26 the project. Written Informed consent was obtained from all participants of the study.
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30 ***Measures***

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34 ***Suicide Intent*** Beck's Suicidal Intent Scale (SIS) was used to measure the
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36 degree of suicide intent for the attempters²⁰. It mainly evaluates the attempters'
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38 precautions, planning, communication and expectations about the suicide behavior.
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40 There are 15 items in this scale, and each item is weighted on 0-2. The English
41
42 version of SIS had been evaluated by Beck and David among completed suicides and
43
44 attempted suicides²¹. The Chinese version of SIS also has sound reliability and
45
46 validity which has been testified in a previous study²².
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50 ***Social-demographic variables*** **Age** which ranged from 15 to 54 years was
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52 calculated to the time when the suicide occurred. **Gender** was measured by male or
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54 female. **Education years** were evaluated by the years which the attempters learned in
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4 school. **Married status** was dichotomized as “never married” and “ever married”
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6 with the latter including those who were divorced, separated, or widowed.
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8 **Occupation** was measured by peasant, businessman, public service staff, student,
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10 factory worker, rural doctor, teacher, housewife, unemployed and others. As most
11
12 attempters were peasants, we recoded it into peasants and others. **Religious belief** was
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14 measured by what religion the attempters believed in, and the choices were Taoism,
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16 Muslim, Christianity, Buddhism, others, and no religion. As there were few people
17
18 have a religious belief, the religious belief was recoded into “yes” or “no.”
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22 **Living alone** Living alone was estimated by a question that “Do you live with
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24 others?” The answer can be chose from yes or no. Somebody who did not live with
25
26 others was seen as living alone. The same evaluation method was also used in our
27
28 previous suicide studies ²³.
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31 **Physical Disease** Physical disease was estimated by one question that “Do
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33 you diagnose with a chronic disease now?” The answer could be chosen from “yes” or
34
35 “no.”
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39 **Pesticide at home** Pesticide availability at home was assessed with a single
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41 item which asked the participants if any type of farming chemicals was stored at home.
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43 The answer also could be chosen from “yes” or “no.”
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46 **Family suicide history** Family suicide history was measured by a question
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48 that “Do your family members conduct suicide behavior before?” The answer also
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50 could be chosen from “yes” or “no.”
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4 **Negative life events** Negative life events were calculated by the revised
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6 version of Interview for Recent Life Events (IRLE)²⁴. The IRLE is a 64-item scale
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8 which measures the life events happened in the past 12 months. We also asked
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10 another question that if there were other life events which were not mentioned in the
11
12 64 items. The attempters should also answer that if each event was perceived as
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14 positive or negative. In this study, we only used the number of negative life events
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16 (NLEs). The Chinese version of IRLE have been used in many previous suicide
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18 studies²⁵.

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22 **Impulsivity** Dickman Impulsivity Inventory (DII) was used to evaluate the
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24 level of impulsivity. It is a 23-item scale developed and validated in English by
25
26 Dickman²⁶. Each item is weight by yes (1) or no (0). The sum score for all items was
27
28 used in the data analysis, and the higher score means higher level of impulsivity. The
29
30 Chinese version of DII had be tested with sound reliability and validity²⁷.

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34 **Coping skill** Coping Responses Inventory (CRI) was used to assess the
35
36 attempters' coping skill in this study²⁸. It asked the participants to evaluate the
37
38 frequency (0= never, 1=occasionally, 2=sometimes, 3=often) of engaging in 48
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40 separate coping activities. The sample questions in CRI were “talk with your spouse
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42 or other relative about the problem” and “think about how this event could change
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44 your life in a positive way.” The Chinese version of CRI had been used in previous
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46 suicide studies²⁹.

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50 **Mental disorder** We used the Chinese version of the Structured Clinical
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52 Interview for the Diagnostic and Statistical Manual of Mental Disorders (SCID)³⁰ to
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54 generate diagnoses for attempters. Diagnoses were made by the psychiatrists with the

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4 written information obtained by the trained interviewers for each suicide attempt. The
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6 Chinese version of the SCID was provided by the Department of Psychiatry of
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8 Kaohsiung Medical College in Taiwan ³¹, and permission to use the work had been
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10 obtained. It also had been used in Chinese populations in many areas including
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12 Taiwan, Hong Kong, Macau, as well as mainland China for the past few decades ³². A
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14 total of 27 Axis I mental diseases were detected by the SCID, and we used the
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16 dichotomous diagnosis for each of them with yes and no.
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19 20 ***Statistical Methods***

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23 IBM SPSS Statistics 24.0 (Web Edition) was used for the data analysis. T-tests
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25 or bi-variable correlation analysis were used to compare the differences in suicide
26
27 intent among categorical and continuous variables. Stepwise liner regression was
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29 performed to examine the factors related to suicide intent. All of the tests were
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31 two-tailed and a p value of <0.05 was considered statistically significant.
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34 35 **Results**

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38 In Table 1, we described the sample distribution about the social and
39
40 psychological characteristics among Chinese rural medically serious suicide
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42 attempters. The average age and education years were 31.63 and 6.90 years,
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44 respectively. In these attempters, there were more females (63.0%) and peasants
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46 (53.4%). More attempters were ever married (83.3%), not believing in religion
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48 (81.3%), not suffering physical disease (83.2%), storing pesticide at home (60.4%),
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50 not living alone (95.6%), not having family suicide history (92.9%) and not diagnosed
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4 with mental disorder (80.9%). The mean for negative life events, impulsivity and
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6 coping skill were 1.83, 9.89 and 33.13, respectively.
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9 We also analyzed the differences of suicide intent among these social and
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11 psychological characteristic. The results showed that age ($r=0.071$, $p=0.045$),
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13 education years ($r=-0.076$, $p=0.032$), religious belief ($t=3.340$, $p=0.001$), living alone
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15 ($t=2.315$, $p=0.021$), physical disease ($t=2.416$, $p=0.016$), negative life events ($r=0.148$,
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17 $p=0.000$), impulsivity ($r=-0.084$, $p=0.019$), mental disorder ($t=7.393$, $p=0.000$) were
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19 associated with suicide intent. The detailed information was shown in Table 2.
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23 Table 3 listed the results of stepwise liner regression about the factors associated
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25 with suicide intent. We found that less education years ($\beta = -0.11$, $p=0.037$), religious
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27 belief ($\beta = 1.20$, $p=0.005$), living alone ($\beta = 1.92$, $p=0.017$), negative life events (β
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29 $= -0.29$, $p=0.003$), low level of impulsivity ($\beta = -0.10$, $p=0.013$), mental disorder (β
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31 $= 2.82$, $p=0.000$) were associated with higher level of suicide intent.
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34 35 Discussion

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38 This is a study focusing on suicide intent among medically serious suicide
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40 attempters in rural China. The primary purpose is to explore the features for medically
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42 serious suicide attempters who do not have a strong intent to die. The results showed
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44 that the attempters with strong intent to die were associated with religious belief,
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46 living alone, negative life events and mental disorder, and the low intent suicide
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48 attempters were related to education years and impulsivity.
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52 In the current study, we found that education years were negatively associated
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54 with suicide intent. It means that the attempters with higher education have lower
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4 intention to die by suicide behavior. Many studies also have identified that higher
5 education was a protective factor for suicide behavior worldwide^{33 34}. In China,
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7 previous studies also support this relationship between education and suicide intent
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9 among rural suicides³⁵.

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13 Religious belief is another factor associated with strong suicide intent. As there
14 are few people who have a religious belief in China³⁶, many people see religious
15 belief as a deviant behavior. Suicide which also can be seen as a deviant behavior in
16 the society may be correlated between them. Besides, many Chinese rural residents
17 believe in a religion after they suffer difficulties or misfortunes. Suffering difficulties
18 or misfortunes, as an important risk factor for suicide³⁷, may promote the intent to die
19 by suicide in rural China. This is why attempters with religious belief have strong
20 intent to die by suicide. It is different from the findings in Western countries³⁸.

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24 We also found living alone and negative life events promoted the suicide intent
25 among attempters. Both of them have been proved to be risk factors for suicide
26 behavior in previous studies worldwide^{39 40}. People who do not live with others are
27 hard to receive social support, and this can raise the risk of suicide. Somebody
28 encounter negative life events can lead to psychological problems, and it is also a very
29 important risk factor for suicide behavior. In the same way, people who live alone and
30 suffer negative life events would have strong intent to die by suicide.

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34 Impulsivity has been identified as an important risk factor for suicide in many
35 studies^{41 42}. As we introduced above, many Chinese suicide attempters can be
36 diagnosed with impulsivity suicide¹¹. Previous study also supported that impulsivity
37 was associated with completed suicide in rural China¹⁹. It implies that some

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4 attempters do not want to die by suicide, and this is also consistent with our
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6 assumption in the Introduction section.
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9 The present study also identified that mental disorder was associated with suicide
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11 intent. Similar to other previous studies, mental disorder was a very important risk
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13 factor for suicide behavior^{43 44}. Somebody diagnosed with mental disorder are
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15 tortured by the psychological problem. Suicide may be a way for them to avoid this
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17 problem. Thus, attempters with mental disorder really want to die by suicide.
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21 In the current study, we also analyzed the relationship between physical disease,
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23 family suicide history and suicide intent. Both of them are not associated with suicide
24
25 intent in our results. For physical disease, it is associated with suicide behavior which
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27 was supported by previous studies⁴⁵. However, somebody suffered physical disease
28
29 do not have a stronger intent to die than others without physical disease. It may be
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31 caused by the psychological problems. In this regression, we have controlled mental
32
33 disorder. Previous studies have found that physical disease may lead to mental
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35 problem which is a risk factor for suicide behavior⁴⁶. Although some studies found
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37 family suicide history was associated with suicide behavior⁴⁷, we have no direct
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39 evidence to prove it is associated with suicide intent.
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44 There are also several limitations which we should be considered when we
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46 interpret these findings. Firstly, as this is a cross-sectional study, we cannot infer any
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48 causal relationship for all of the factors analyzed in this study. Secondly, all of the
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50 attempters were interviewed after they had leaved hospitals, and recall bias cannot be
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52 avoided. Thirdly, the participants in this study were all medically serious suicide
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54 attempters. Thus, the results may be not consistent with other suicide attempters.
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Conclusion

Although there are these limitations, this study also contributes to our understanding about the Chinese suicide behavior. Our results support that there are some medically serious suicide attempters with higher education and impulsivity who are not really want to die by suicide. It can be translated into practice in Chinese suicide prevention.

Contributorship statement

LS analyzed the data and wrote the manuscript, JZ designed the study and reviewed the paper.

Competing interests

Both of the authors declare that they have no Competing interests.

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Data sharing statement

The data and materials used in this study are available from the first author (LS) and corresponding author (JZ) on reasonable request.

Acknowledgements

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Table 1: Description of the social and psychological characteristics among Chinese rural medically serious suicide attempters (n=791)

Variables		Mean±SD/n (%)
Age	-	31.63±8.00
Gender	Male	293 (37.0)
	Female	498 (63.0)
Education years	-	6.90±3.26
Married status	Never married	132 (16.7)
	Ever Married	659 (83.3)
Occupation	Peasant	422 (53.4)
	Others	369 (46.6)
Religious belief	Yes	148 (18.7)
	No	643 (81.3)
Living alone	Yes	35 (4.4)
	No	756 (95.6)
Physical disease	Yes	133 (16.8)
	No	658 (83.2)
Pesticide at home	Yes	478 (60.4)
	No	313 (39.6)
Family suicide history	Yes	56 (7.1)
	No	735 (92.9)
Negative life events	-	1.83±1.77
Impulsivity	-	9.89±4.08
Coping skill	-	33.13±10.16
Mental disorder	Yes	151 (19.1)
	No	640 (80.9)

Table 2: Comparing the suicide intent among the social and psychological characteristics (n=791)

Variables	Suicide intent (Mean±SD)	t/r	p
Age	-	0.071	0.045
Gender		0.342	0.559
Male	9.37±4.96		
Female	9.86±4.84		
Education years	-	-0.076	0.032
Married status		1.179	0.239
Never married	9.22±4.88		
Ever married	9.77±4.89		
Occupation		1.811	0.071
Peasant	9.97±4.92		
Others	9.34±4.84		
Religious belief		3.430	0.001
Yes	10.91±4.82		
No	9.39±4.87		
Living alone		2.315	0.021
Yes	11.54±5.52		
No	9.59±4.85		
Physical disease		2.416	0.016
Yes	10.61±4.93		
No	9.49±4.86		
Pesticide at home		-0.980	0.327
Yes	9.54±4.66		
No	9.89±5.23		
Family suicide history		2.104	0.036
Yes	11.00±5.18		
No	9.58±4.86		
Negative life events	-	0.148	0.000
Impulsivity	-	-0.084	0.019
Coping skill	-	-0.067	0.061
Mental disorder		7.393	0.000
Yes	12.24±4.77		
No	9.07±4.72		
All	9.68±4.89	-	-

Table 3: Liner regression about the social and psychological characteristics associated with suicide intent (n=791)

Variables	β	95% CI	p
Education years	-0.11	-0.21, -0.01	0.037
Religious belief	1.20	0.36, 2.04	0.005
Living alone	1.92	0.34, 3.51	0.017
Negative life events	0.29	0.10, 0.48	0.003
Impulsivity	-0.10	-0.18, -0.02	0.013
Mental disorder	2.82	1.98, 3.66	0.000
Constant	10.04	8.91, 11.16	0.000
Adjust R ² =0.097			

Note: CI means confidence interval.

Stepwise liner regression was used in this regression.

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Features for Medically Serious Suicide Attempters Who Do Not Have a Strong Intent to Die: A Cross-sectional Study in Rural China

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4 **1 Features for Medically Serious Suicide Attempters Who Do Not Have**
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6 **2 a Strong Intent to Die: A Cross-sectional Study in Rural China¹**
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55 (R01 MH068560) and National Natural Science Foundation of China (71603149).
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4 18 **Features for Medically Serious Suicide Attempters Who Do Not Have**
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6 19 **a Strong Intent to Die: A Cross-sectional Study in Rural China**
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9

10 **Abstract**

11
12 21 **Objective**

13 22 Previous studies have implied that there were many Chinese suicide attempters who
14 23 did not want to die by suicide. In the current study, we explored the factors which
15 24 were associated with low levels of suicide intent. We also examined features for
16 25 medically serious suicide attempters who do not have a strong intent to die in rural
17 26 china.

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21 27 **Design**

22 28 Cross-sectional study

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24 29 **Setting**

25 30 The interviews occurred between May 2012 and July 2013 in thirteen rural counties in
26 31 Shandong and Hunan Province, China.

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28
29 32 **Participants**

30 33 Subjects were 791 medically serious suicide attempters whose injury and wounds
31 34 were so serious they required hospitalization or immediate medical care.

32
33 35 **Results**

34 36 The results supported that less years of education ($\beta = -0.11, p = 0.037$), religious
35 37 beliefs ($\beta = 1.20, p = 0.005$), living alone ($\beta = 1.92, p = 0.017$), negative life events
36 38 ($\beta = 0.29, p = 0.003$), low levels of impulsivity ($\beta = -0.10, p = 0.013$), and mental
37 39 disorders ($\beta = 2.82, p < 0.001$) were associated with higher levels of suicide intent.

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39
40 42 **Conclusion**

41 43 Results imply that there are some medically serious suicide attempters with a higher
42 44 education and/or exhibit impulsivity who do not want to die by suicide. These
43 45 findings can inform practice to prevent suicide in rural China.

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49 44 **Keywords:** Suicide intent; medically serious suicide; suicide attempters; rural China.
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Strengths and limitations of this study

1. This study is based on a large sample of suicide attempters in rural China ($n=791$);
2. Medically serious suicide attempters were consecutively recruited in selected emergency rooms, which ensured the validity of the sample.
3. This is one of few studies examining the factors associated with intent among medically serious suicide attempters in rural China.
4. As this is a cross-sectional study, we cannot infer causal relationships among study variables.
5. All of the attempters were interviewed following hospital discharge, so recall bias is a possibility.

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4 57 **Features for Medically Serious Suicide Attempters Who Do Not Have a Strong**
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6 58 **Intent to Die: A Cross-sectional Study in Rural China**
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9 59 **Background**
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12 60 The World Health Organization (WHO) estimated that there were about 804, 000
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14 61 suicide deaths worldwide in 2012, which equated to one person dying by suicide
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16 62 every 40 seconds¹. With regards to suicide attempts, some have suggested that the
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18 63 number was about 20 times higher than suicide death², and nearly 50% of attempts
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20 64 required emergency medical treatment^{3,4}. China has one of the higher suicide rates in
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22 65 the world⁵. Although the rates have decreased in recent years, suicide attempts and
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24 66 deaths are also important social and public health issues in China⁶.
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28 67 In the last decades, several studies have explored the patterns of suicide and
29
30 68 found differences between China and other countries⁷. Many of these investigations
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32 69 imply that there are some suicide attempters who do not intend to die by suicide and
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34 70 may only instrumentally use for some other aims, such as getting attention from their
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36 71 family members, proving their viewpoint or behavior.
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40 72 First, there is a difference in percentages of mental disorders in suicide across
41
42 73 countries. In Western countries, it has been estimated that 90% of individuals who die
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44 74 by suicide have a diagnosable mental disorder⁸. However, this percentage was lower
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46 75 in comparison to Asian countries. For example, they were only about 40- 70% in
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48 76 mainland China, 16.2% in Indian, and 12.0% in Malaysia^{9,10}. Although mental
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50 77 disorders remain an important risk factor for suicidal behavior, other factors may play
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52 78 roles in Asian suicides. Thus, exploring the characteristics of suicide attempters in
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4 79 China not only may help us to understand the differences between China and Western
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6 80 countries, but also can provide important information about other Asian countries.
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9 81 Secondly, impulsivity has been identified as another risk factor for suicide
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11 82 attempts both in China and Western countries^{11 12}. However, previous studies have
12
13 83 found that approximately 50% of suicide attempters in China could be categorized as
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15 84 impulsive¹³. It further implies that there is a large group of Chinese suicide
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17 85 attempters who do not really want to die by suicide, and their suicidal behaviors may
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19 86 be impulsive.
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23 87 As mentioned above, many findings about Chinese suicide suggest that there are
24
25 88 some suicidal individuals who do not really want to die by suicide. Suicide intent is
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27 89 defined as the level of intent to die by suicide¹⁴, and many studies show that it is
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29 90 significantly associated with suicidal behavior¹⁵. Investigating suicide intent is
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31 91 helpful for us to better understand the suicide attempters who do not really want to
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33 92 die.
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37 93 In recent years, many studies identified factors associated with suicide intent. In
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39 94 Western countries, researchers have found that older adults¹⁶, rural residence¹⁷,
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41 95 mental health problems¹⁸ and hopelessness¹⁹ were associated with suicide intent. In
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43 96 China, there were also some studies which supported that older age, higher level of
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45 97 education, living alone and suicide communication were correlated with higher level
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47 98 of suicide intent among individuals who died by suicide^{20 21}. However, we have little
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49 99 knowledge about the suicide intent among suicide attempters who do not really want
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51 100 to die by suicide in China.
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4 101 Thus, in the current study, we explored factors associated with low level of
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6 102 suicide intent. It was helpful for us to understand the features for medically serious
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8 103 suicide attempters who do not have a strong intent to die in rural China, which may
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10 104 inform intervention and prevention strategies for at-risk individuals in rural China.
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12

13 105 **Methods**

14 15 16 17 106 *Study sample and the design*

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20 107 In the current study, all of attempters were chosen from two provinces in China,
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22 108 Shandong and Hunan. Shandong is located in the north of China, and is a province
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24 109 with economic prosperity in both industry and agriculture. Hunan is located in the
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26 110 south of China, and is a province with economic prosperity in agriculture. In the two
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28 111 provinces, thirteen rural counties were randomly selected.
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31 112 In each of the rural county from May 2012 through July 2013, all hospital
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33 113 emergency departments were instructed to notify the research teams in each province
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35 114 when suicide attempts occurred. We consecutively recruited the attempters who were
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37 115 aged 15-54 years in either rural region. The enrollment of patients followed the
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39 116 definition of suicide attempt and deemed medically serious. In this study, suicide
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41 117 attempt was defined as someone who attempted suicide and wanted to die, but did not
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43 118 ^{22 23}, and medically serious suicide attempters included those survivors whose injury
44
45 119 and wounds were so serious as to require hospitalization or immediate medical care.
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50 120 All of the interviewers received training about the study and were master or PhD
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52 121 level students in the medical school. The main aims of this training were to provide
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54 122 the interviewers with sufficient information about the study and questionnaire.
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4 123 ***Interviewing procedures***
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7 124 All of the attempters were interviewed following hospital discharge. In order to
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9 125 successfully contact the attempters, all of them were first approached in-person by the
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11 126 local health agency and/or village administration. Upon their agreement of written
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13 127 informed consent, the interview time was scheduled approximately two months after
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15 128 suicide incident. Each attempter was interviewed separately by one trained
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17 129 interviewer in private at the village medical room or their home. For those participants
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19 130 who were too weak to talk, family members could assist in the interview by
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21 131 answering some of the questions on the protocol. The average time for each interview
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23 132 was 1.5 hours.
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27 133 ***Patient and Public Involvement Statement***
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30
31 134 The suicide attempters were first involved in the process of data collection. The
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33 135 aims of this study and outcome measures were informed via the interviewers. Written
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35 136 Informed consent was obtained from all participants of the study. There are no plans
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37 137 to disseminate the qualitative study results to subjects or the relevant patient
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39 138 community. The IRB approvals from both Chinese institutions (Shandong University
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41 139 and Central North universities) and the US based university (State University of New
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43 140 York, Buffalo State) where the principal investigator is affiliated ensured the ethical
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45 141 methodology regulated by the NIMH.
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49 142 ***Measures***
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52 143 ***Suicide Intent*** Beck's Suicidal Intent Scale (SIS) was used to measure the
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54 144 degree of suicide intent for the attempters²⁴. The SIS assesses attempters' precautions,
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4 145 planning, communication, and expectations about the suicidal behavior. There are 15
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6 146 items on this scale, and each item is scores from 0 to 2. The psychometric properties
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8 147 of the English version of SIS has been evaluated among suicide attempts and
9
10 148 decedents²⁵. The Chinese version of SIS also demonstrated sound reliability and
11
12 149 validity, which shown in a previous study²⁶.

15
16 150 ***Social-demographic variables*** **Age** which ranged from 15 to 54 years was
17
18 151 calculated to the time when the suicide occurred. **Gender** was measured by male or
19
20 152 female. **Education years** were evaluated by the number of years in which the
21
22 153 attempters completed in school. **Married status** was dichotomized as “never married”
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24 154 and “ever married” with the latter including those who were divorced, separated, or
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26 155 widowed. **Occupation** was assessed by peasant, businessman, public service staff,
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28 156 student, factory worker, rural doctor, teacher, housewife, unemployed and others. As
29
30 157 most attempters were peasants, we recoded the variable into peasants and others.
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32 158 **Religious belief** was measured by what religion the attempters believed in, and the
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34 159 choices were Taoism, Muslim, Christianity, Buddhism, others, and no religion. As
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36 160 there were few people who had a religious belief, the religious belief was recoded into
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38 161 “yes” or “no.”

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42 162 ***Living alone*** Living alone was assessed by a question that “Do you live with
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44 163 others?” with response options being “yes” or “no.” Participants who did not live with
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46 164 others were deemed as living alone. The same evaluation method was used in our
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48 165 previous suicide studies²⁷.

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4 166 **Physical Disease** Physical disease was assessed by one question: “Have you
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6 167 been diagnosed with a chronic disease now?” with response options including “yes”
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8 168 or “no.”

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11 169 **Pesticide at home** Pesticide availability at home was assessed with a single
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13 170 item which asked the participants if any type of farming chemicals were stored at
14
15 171 home. The effect of pesticide on suicide has been shown in previous Chinese studies
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17 172 ²⁸. The response options consisted of “yes” or “no.”

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21 173 **Family suicide history** Family suicide history was measured by a question:
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23 174 “Do your family members conduct suicide behavior before?” The answer also could
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25 175 be chosen from “yes” or “no.”

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28 176 **Negative life events** Negative life events were determined by the revised
29
30 177 version of Interview for Recent Life Events (IRLE) ²⁹. The IRLE is a 64-item scale
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32 178 which measured life events occurring in the past 12 months. We also asked another
33
34 179 question in case there were other life events which were not asked in the 64 items.
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36 180 The attempters could also answer if each event was perceived as positive or negative.
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38 181 In this study, we only used the number of negative life events (NLEs). The Chinese
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40 182 version of IRLE has been used in previous suicide studies ³⁰.

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44 183 **Impulsivity** The 23-item Dickman Impulsivity Inventory (DII) was used to
45
46 184 evaluate the level of impulsivity, which was developed and validated in English³¹.
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48 185 Each item includes a response option of yes (1) or no (0). The sum score for all
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50 186 items was used in the data analysis, and the higher score represents a higher level of

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4 187 impulsivity. The Chinese version of the DII has been tested and demonstrated sound
5
6 188 reliability and validity³².

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9 189 **Coping skills** Coping Responses Inventory (CRI) was used to assess the
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11 190 attempters' coping skills in this study³³. It asked the participants to evaluate the
12
13 191 frequency (0= never, 1=occasionally, 2=sometimes, 3=often) of engaging in 48
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15 192 separate coping activities. Sample questions on the CRI include "talk with your
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17 193 spouse or other relative about the problem" and "think about how this event could
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19 194 change your life in a positive way." The Chinese version of CRI had been used in
20
21 195 previous suicide studies³⁴.

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25 196 **Mental disorder** We used the Chinese version of the Structured Clinical
26
27 197 Interview for the Diagnostic and Statistical Manual of Mental Disorders (SCID)³⁵ to
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29 198 determine diagnoses for suicide attempters. Diagnoses were made by the psychiatrists
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31 199 with the written information obtained by the trained interviewers for each suicide
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33 200 attempt. There was one psychiatrist to make the diagnosis in each province. The
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35 201 Chinese version of the SCID was provided by the Department of Psychiatry of
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37 202 Kaohsiung Medical College in Taiwan³⁶, and permission to use the work had been
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39 203 obtained. It also had been used in Chinese populations in many areas including
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41 204 Taiwan, Hong Kong, Macau, as well as mainland China for the past few decades³⁷. A
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43 205 total of 27 Axis I mental diseases were detected by the SCID, and we used the
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45 206 dichotomous diagnosis for each of them with yes and no.

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50 207 **Statistical Methods**

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4 208 IBM SPSS Statistics 24.0 (Web Edition) was used for the data analysis. T-tests
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6 209 or bi-variable correlation analysis were used to compare the differences in suicide
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8 210 intent among categorical and continuous variables. Stepwise liner regression was
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10 211 conducted to examine the factors related to suicide intent. All of the tests were
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12 212 two-tailed and a p value of <0.05 was considered statistically significant.
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15 213 **Results**

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18 214 In the current study, 791 suicide attempters were successfully interviewed. Table
19
20 215 1 describes the sample distribution regarding social and psychological characteristics.
21
22 216 The average age and education years were 31.63 and 6.90, respectively. Among these
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24 217 attempters, there were more females (63.0%) and peasants (53.4%). The majority of
25
26 218 attempters were ever married (83.3%), did not believe in religion (81.3%), did not
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28 219 suffer from a physical disease (83.2%), stored pesticides at home (60.4%), did not live
29
30 220 alone (95.6%), nor had a family history or suicide (92.9%) or were diagnosed with a
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32 221 mental disorder (80.9%). The mean for negative life events, impulsivity and coping
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34 222 skills were 1.83, 9.89 and 33.13, respectively.
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39 223 We also examined the differences in suicide intent among these social and
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41 224 psychological characteristics. Results demonstrated that age ($r = 0.071, p = 0.045$),
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43 225 education years ($r = -0.076, p = 0.032$), religious belief ($t = 3.340, p = 0.001$), living
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45 226 alone ($t = 2.315, p = 0.021$), physical disease ($t = 2.416, p = 0.016$), negative life
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47 227 events ($r = 0.148, p = 0.001$), impulsivity ($r = -0.084, p = 0.019$), and mental disorder
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49 228 ($t = 7.393, p = 0.001$) were associated with suicide intent (see Table 2).
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4 229 Results of stepwise liner regression examining factors associated with suicide
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6 230 intent are presented in Table 3. We found that less education years ($\beta = -0.11, p =$
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8 231 0.037), religious belief ($\beta = 1.20, p = 0.005$), living alone ($\beta = 1.92, p = 0.017$),
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10 232 negative life events ($\beta = 0.29, p = 0.003$), low level of impulsivity ($\beta = -0.10, p =$
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12 233 0.013), mental disorder ($\beta = 2.82, p = 0.001$) were associated with higher levels of
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14 234 suicide intent.

235 Discussion

236 The present study focused on suicide intent among medically serious suicide
237 attempters in rural China. The primary purpose was to explore the features for
238 medically serious suicide attempters who did not have a strong intent to die. Results
239 indicated that the attempters with a strong intent to die were associated with religious
240 belief, living alone, negative life events and mental disorder; whereas, the low intent
241 suicide attempters has less years of education and more impulsivity.

242 We found that education years were negatively associated with suicide intent. It
243 means that the attempters with higher education have lower intention to die by suicide
244 behavior. Many studies have identified that higher education was a protective factor
245 for suicide behavior worldwide^{38 39}. In China, previous studies also support this
246 relationship between education and suicide intent among rural suicides⁴⁰.

247 Religious belief is another factor associated with strong suicide intent. As there
248 are few people who have a religious belief in China⁴¹, many people see religious
249 belief as a deviant behavior. Suicide which also can be seen as a deviant behavior in
250 the society may be correlated between them. Besides, many Chinese rural residents

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4 251 believe in a religion after they suffer difficulties or misfortunes. Suffering difficulties
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6 252 or misfortunes, as an important risk factor for suicide ⁴², may promote the intent to die
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8 253 by suicide in rural China. This is why attempters with religious belief have strong
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10 254 intent to die by suicide. It is different from the findings in Western countries ⁴³.

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13 255 We also found living alone and negative life events were associated with suicide
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15 256 intent among attempters. Both of them have been shown to be risk factors for suicide
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17 257 behavior in previous studies worldwide ^{44,45}. People living alone often find it difficult
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19 258 to communicate with others, which is a risk factor for suicide intent ⁴⁶. Individuals
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21 259 who encounter negative life events often experience psychological problems, which
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23 260 are contribute to suicidal behavior. In the same way, people who live alone and suffer
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25 261 negative life events may have a strong intent to die by suicide.

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29 262 Impulsivity has been identified as an important risk factor for suicide in many
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31 263 studies ^{47,48}. As we discussed above, many Chinese suicide attempters can be
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33 264 categorized as impulsive ¹³. One of the possible reasons may be that borderline
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35 265 personality disorder is associated with impulsivity and self-harm behavior, but was
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37 266 not diagnosed in the current study ⁴⁹. Previous studies have also suggested that
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39 267 impulsivity contributed to suicide death in rural China ²¹. It implies that some
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41 268 attempters do not want to die by suicide, which is consistent with our assumption.

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45 269 The present study also identified mental disorders as an important risk factor for
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47 270 suicidal behavior ⁵⁰⁻⁵². An individual diagnosed with a mental disorder suffers from
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49 271 psychological symptoms, which contribute to an increased risk for suicide. Thus,
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51 272 attempters with mental disorders may want to die more than those without.

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4 273 In the current study, we did not find gender differences in suicide intent among
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6 274 suicide attempters. Previous studies demonstrated that male attempters tend to choose
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8 275 violent and lethal methods⁵³, it was easy for us to conclude that males may
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10 276 experience higher levels of suicide intent. However, the choice of the suicide means
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12 277 may be caused by the higher level of violence for men compared to women, and we
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14 278 cannot conclude that men may have a higher intent to die²¹. In the current study, we
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16 279 also examined the relationship between physical disease, family suicide history, and
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18 280 suicide intent. Both of them were not associated with suicide intent. Physical disease
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20 281 was associated with suicidal behavior, which was supported by previous studies⁵⁴.
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23 282 However, physical disease did not have a stronger association with those identified
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25 283 with a stronger intent to die compared to those who did not have a strong intent to die.
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27 284 Previous studies have found that physical disease may lead to a mental disorder,
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29 285 increasing the likelihood for suicidal behavior⁵⁵. Although some studies found family
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31 286 suicide history was associated with suicidal behavior⁵⁶, we did not find any evidence
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33 287 showing this relation.

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37 288 There were several limitations to our study, which should be considered when
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39 289 interpreting these findings. First, as this is a cross-sectional study, we cannot infer any
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41 290 causal relationship for the study variables. Secondly, all of the attempters were
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43 291 interviewed following discharge from hospitals, so recall bias is a potential
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45 292 confounder. Third, the participants in this study were all medically serious suicide
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47 293 attempters, and the results may be not be consistent with other types of suicide
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49 294 attempt. Finally, lethality, which is an important factor associated with suicide intent,
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51 295 was not investigated in our study.
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4 296 **Conclusion**

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7 297 Despite these limitations, this study contributes to our understanding of Chinese
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9 298 suicidal behavior. Our results support that there are some medically serious suicide
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11 299 attempters with higher education and impulsivity who do not really want to die by
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13 300 suicide. These findings can inform suicide assessment and intervention to prevent
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15 301 suicide in China⁵⁷.

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19 302 ***Contributorship statement***

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22 303 LS analyzed the data and wrote the manuscript, JZ designed the study and
23
24 304 reviewed the paper, and DL reviewed and edited the manuscript.

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27 305 ***Competing interests***

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30 306 All authors declare that they have no competing interests.

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45 311 ***Data sharing statement***

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48 312 The data and materials used in this study are available from the first author (LS)
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50 313 and corresponding author (JZ) on reasonable request.

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480 Table 1: Description of the social and psychological characteristics among Chinese
 481 rural medically serious suicide attempters ($n = 791$)

Variables		Mean±SD/n (%)
Age	-	31.63±8.00
Gender	Male	293 (37.0)
	Female	498 (63.0)
Education years	-	6.90±3.26
Married status	Never married	132 (16.7)
	Ever Married	659 (83.3)
Occupation	Peasant	422 (53.4)
	Others	369 (46.6)
Religious belief	Yes	148 (18.7)
	No	643 (81.3)
Living alone	Yes	35 (4.4)
	No	756 (95.6)
Physical disease	Yes	133 (16.8)
	No	658 (83.2)
Pesticide at home	Yes	478 (60.4)
	No	313 (39.6)
Family suicide history	Yes	56 (7.1)
	No	735 (92.9)
Negative life events	-	1.83±1.77
Impulsivity	-	9.89±4.08
Coping skill	-	33.13±10.16
Mental disorder	Yes	151 (19.1)
	No	640 (80.9)

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484 Table 2: Comparing the suicide intent among the social and psychological
 485 characteristics ($n = 791$)

Variables	Suicide intent (Mean±SD)	<i>t/r</i>	<i>p</i>
Age	-	0.071	0.045
Gender		0.342	0.559
Male	9.37±4.96		
Female	9.86±4.84		
Education years	-	-0.076	0.032
Married status		1.179	0.239
Never married	9.22±4.88		
Ever married	9.77±4.89		
Occupation		1.811	0.071
Peasant	9.97±4.92		
Others	9.34±4.84		
Religious belief		3.430	0.001
Yes	10.91±4.82		
No	9.39±4.87		
Living alone		2.315	0.021
Yes	11.54±5.52		
No	9.59±4.85		
Physical disease		2.416	0.016
Yes	10.61±4.93		
No	9.49±4.86		
Pesticide at home		-0.980	0.327
Yes	9.54±4.66		
No	9.89±5.23		
Family suicide history		2.104	0.036
Yes	11.00±5.18		
No	9.58±4.86		
Negative life events	-	0.148	0.000
Impulsivity	-	-0.084	0.019
Coping skill	-	-0.067	0.061
Mental disorder		7.393	0.000
Yes	12.24±4.77		
No	9.07±4.72		
All	9.68±4.89	-	-

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488 Table 3: Liner regression about the social and psychological characteristics associated
 489 with suicide intent (n = 791)

Variables	β	95% CI	p
Education years	-0.11	-0.21, -0.01	0.037
Religious belief	1.20	0.36, 2.04	0.005
Living alone	1.92	0.34, 3.51	0.017
Negative life events	0.29	0.10, 0.48	0.003
Impulsivity	-0.10	-0.18, -0.02	0.013
Mental disorder	2.82	1.98, 3.66	0.000
Constant	10.04	8.91, 11.16	0.000
Adjust R ² =0.097			

490 Note: CI means confidence interval.

491 Stepwise liner regression was used in this regression.

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