

# The Influence of Alcohol Use and Depression on Suicide Intention among Chinese University Students

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**How to cite this paper:** Ding, L. Y., Zhang, N., Zhang, W. J., Liu, W., & Cai, S. S. (2023). The Influence of Alcohol Use and Depression on Suicide Intention among Chinese University Students. *Psychology*, 14, 1857-1867.

<https://doi.org/10.4236/psych.2023.1412110>

**Received:** November 8, 2023

**Accepted:** December 25, 2023

**Published:** December 28, 2023

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## Abstract

**Aim:** This study explored the suicide intention among Chinese university students and further examined how alcohol use and depressive symptoms may contribute to suicide intention among a sample of 1126 university students in China. **Method:** Participants were recruited from three universities in China and answered questions about their academic information, alcohol use, depressive symptoms (*Center for Epidemiologic Studies Depression, CES-D*), and suicide intention (*United States Youth Risk Behavior Survey, YRBS*). **Results:** Data analysis indicated that students who drank alcohol had higher levels of depressive symptom scores than nondrinkers. Students with self-reported lower than average academic performance at school also reported higher depression symptom scores. Drinkers were more likely to report suicide intention than non-drinkers. Alcohol use and depression both increased the likelihood of reporting suicide intention. **Conclusion:** The relationship between drinking behaviors, depression and suicide intention suggests that health risky behaviors and depressive symptoms should be examined for their role in possibly increasing suicide risks through education and policy initiatives.

## Keywords

Alcohol, Depression, Suicide, University Students, China, Prevention

## 1. Introduction

Suicide has always been acknowledged as a public health issue by a small group of people, but now the increasing press coverage suggests a wider acknowledgment of the suicide issue, at least in urban areas. Nationwide data shows that

from 1995 to 1999, among 15 - 34 year olds in China, suicide was the leading cause of death, accounting for 19.5% of all deaths nationwide. Among rural females the suicide rate per 100,000 was 32.1 compared to 20.0 for males. Among rural 15 - 34 year olds the rate was 30.3 compared to 10.2 for urban age equivalents. Rural woman accounted for 31.0% of all deaths to suicide compared to 13.1% for rural males (Phillips, Li, & Zhang, 2002; Yip, Liu, Hu, & Song, 2005). The 2013 Global School-based Student Health Survey (GSHS) for China indicated that 17.4% of the survey participants had suicidal ideation—that is, had thought about suicide as a personal behavior option—and 8.1% reported they had made a suicide plan. The meta analysis data suggested being female and being age 14 - 15 years were risk factors for suicide among Chinese adolescents (Che & Jia, 2023). Previous studies indicated a rate of 10% - 14.81% depressive symptoms among Chinese adolescents (Ding, Yuen, Buhs, & Newman, 2019; Guo et al., 2019).

Some studies of causes and correlates to suicide have been done. Liu, Sun, and Yang (2008) reported that suicide behavior increases with age and suicide risk is increased with depression, anxiety, poor mental health, family conflict and authoritarian parental discipline style. Luo (2023) indicated that students with higher social anxiety were more likely to report higher risk of suicidal ideation. Cheng and her colleagues (2009) suggest that good school attendance, seeing the school as a helpful kind of place, having parents/guardians who understood their worries and checked on their homework and other activities and were involved in their lives as protective factors for suicidal behavior. However, few studies explored the possible relationship of alcohol use to suicide (Che & Jia, 2023).

A few researchers predicted that substance use had a close association with suicide and depression (Esposito-Smythers & Spirito, 2004). How these three variables relate to each other, under different conditions, remains unclear. For example, studies indicated that alcohol and tobacco abuse was found to be significantly related to suicidal behavior (Yuan, Yang, Zhou, & Huang, 2006) and depression is significant predictor for suicide ideation in a longitudinal study (Long, 2023). Some scholars suggested that substance abuse and mental disorders has a profound effect on suicidal behavior (Moscicki, 2001). Previous studies consistently suggest that more than half of those who commit suicide had suffered from mental health issues or substance use, or experienced both (Moscicki, 2001; Molnar et al., 2001). Depression and other mood disorders are associated with the highest risk factors for suicide, followed by alcohol and drug abuse (Institute of Medicine (IOM), 2002). Merrick et al. (2008) using the China GSHS data, found a significant association between adolescent alcohol use and other health risk behaviors, including: tobacco use, drug use, skipping school, physical fighting, serious injury, anxiety, and planned suicide. The GSHS data provided a valuable description of health behaviors from a general survey, but it did not collect depression or detailed suicide data. Among a limited number of studies explored the relationship among alcohol use, depression and suicide, Wong et al.

(2008) found a significant correlation between substance use and suicide attempts. They reported that depression, substance use, and suicidal ideation were significant predictors for suicidal behavior if there was no recent attempt. Following a suicide attempt, distress measures such as substance use and depression appeared to be exacerbated compared to baseline.

There are several cultural reasons for the high Chinese suicide rate. First, suicidal behavior in Chinese culture, as in many other cultures, remains a social taboo. Suicidal behavior by one member is likely to draw social stigma upon the entire family. Rather than seeking help, most families and individuals prefer not to talk about the behavior. Second, the concept of “mental” illness, such as depression, is relatively new in China. Medical treatment, rather than psychological therapy, is the preferred approach to mental illness. Research in the field of mental health is still emerging. Prevention and education about mental illness still need to be improved.

Finally, drinking in China is viewed as banal; in other words, alcohol is not typically considered a “problem” substance, except when it leads to motor vehicle crashes or public misbehavior.

Alcohol use, depression and suicidal behaviors are still considered separate issues in today’s China. Where Western studies have linked alcohol use, depression and suicidal behavior, few studies have explored whether this link exists among Chinese. This paper begins to explore this relationship.

## 2. Method

### 2.1. Questionnaire

The questionnaire used in this study included four sections: demographic questions, drinking behavior, a depression scale, and questions about suicide. The eight demographic questions asked about grade in school, gender, age, resident area, each parent’s education level, academic performance and monthly pocket money. Six drinking behavior questions asked about drinking frequency, type of alcohol consumed, drinking occasions, drinking settings, and drinking partners. The drinking behavior questions have been used in earlier studies of high school drinking behaviors in China. Quantity measures were not used for the drinking questions section. The problems of trying to measure alcohol quantity with questionnaires in China are discussed by Newman et al. (Newman, Qian, & Xue, 2004; Newman, 2008; Newman, Qian, Zhang, Zhao, & Zhang, 2009).

Depression was measured with the *Center for Epidemiological Survey-Depression Scale (CES-D)* by Radloff (1991). The *CES-D* has demonstrated acceptable internal consistency including a total score coefficient alpha of 0.85. The Mandarin version of *CES-D* has been widely used in studies of Chinese adolescents (Liao, Zheng, Huang, Wei, 2017; Zhang, Wu, Fang, Li, Han, & Chen, 2010). This section of the questionnaire consisted of 20 questions. Participants were asked to rate the severity of each item on a 4-point Likert scale. The items for positive feelings (item 4, item 8, item 12, and item 16) were reverse-coded. Items

were summed to reach a total score of depression.

In this study, suicide intention was measured by questions asking participants whether they thought about suicide as a personal behavior option, whether they talk about the thought of suicide, and suicide plan. Suicide intention was measured with two questions taken from the United States *Youth Risk Factor Behavior Survey (YRBS)*, namely “During the last 12 months did you ever seriously consider suicide” and “During the past 12 months did you make a plan about how you would attempt suicide?” One additional question was included in this study, “During the past 12 months did you ever talk with another person about your thought of suicide?” Based on binomial response (Yes/No) to the three questions, suicide intention was categorized into four classes: 1) never thought about suicide as a personal behavior option; 2) have thought about suicide, but never talk about it; 3) talk about committing suicide, but never made a plan; 4) made a suicide plan. The four categories indicate an increasing severity in suicide intention.

## 2.2. Data Collection

Using convenience sampling, the data were collected from undergraduate students in three universities. One university is in the northern part of China, and the other university locates in the northwestern part of China, and the third one is in the central of China. The data were collected by trained data collectors. No teachers or school officials were involved in data collection.

Before data collection the data collectors introduced the questionnaire to the students and read to them the three paragraphs on the front of the survey that assured students the questionnaire was anonymous and they should not place their names on the questionnaire. Students were told the answers from all students would be combined so no individual’s answers could be identified. Students were urged to talk to the school doctor if they had questions about depression, suicide or alcohol. Data was collected from all students present in the surveyed classrooms. All completed questionnaires were immediately taken from the school and shipped to a data entry center. Data from all questionnaires were double entered to minimize errors. Analysis was conducted with SPSS.

## 2.3. Sample

Data were collected from undergraduate students in three universities in China. A valid sample of 1126 participants (87% of the collected questionnaires) was used for the data analysis. Students were ages 18 - 24. Males are 652 (57.90%).

## 3. Result

### 3.1. Drinking Behaviors

Participants’ drinking behaviors were divided into three groups based on their drinking frequency in the past 30 days and last year. Students who had not drunk alcohol in the past year were classified as “nondrinkers”. Students who

had drunk alcohol at least once in the past year but not in the past 30 days were classified as “occasional drinkers”. And students who had drunk alcohol at least once in the past 30 days were classified as “regular drinkers”. Analysis by this drinking classification was used in earlier studies (Newman, Qian, Shell, Qu, & Zhang, 2006a; Newman, Qian, Shell, Qu, & Zhang, 2006b; Newman, Shell, Qu, Xue, & Maas, 2006c; Xue, Newman, Shell, & Fang, 2007; Qian, Hu, Newman, & Hou, 2008; Shell, Newman, & Qu, 2009; Shell, Newman, & Fang, 2010). Based on this classification, 34.41% (181) of the students were non-drinkers, 34.03% (179) occasional drinkers, and 31.56% (166) regular drinkers. Drinking status was significantly related to gender. Males are more likely to be occasional drinkers ( $N = 115$ ) and regular drinkers ( $N = 138$ ), while females are more likely to be non-drinkers ( $\chi^2(2) = 106.99, p < 0.0001$ ).

### 3.2. Depression

No significant difference in depression score was found for female and male, or for mother’s or father’s level of education. The one-way ANOVA test revealed a significant difference in the scores for depressive symptoms among non-drinkers, occasional drinkers, and regular drinkers ( $F(2, 1123) = 3.15, p < 0.05$ ). Regular drinkers reported the highest scores on depressive symptom indices ( $18.93 \pm 10.65$ ), followed by occasional drinkers ( $16.01 \pm 8.99$ ) and then those non-drinkers ( $13.14 \pm 9.31$ ). The Bonferroni post hoc tests showed that, in comparison with the non-drinkers, regular drinkers reported significantly higher scores on depressive symptom indices ( $p < 0.01$ ) (Table 1).

The one-way ANOVA test indicated a significant difference among students at different levels of academic performance ( $F(2, 1121) = 13.65, p < 0.001$ ). Students who reported academic performance lower than average had higher depression scores ( $17.10 \pm 10.68$ ), followed by students with average academic performance ( $15.68 \pm 8.26$ ). Students who reported better than average academic performance had the lowest depression score ( $13.21 \pm 6.46$ ). The Bonferroni post hoc tests showed that, students who reported academic performance lower than average reported significantly higher scores on depressive symptom indices than those had academic performance higher than average ( $p < 0.001$ ) (Table 1).

**Table 1.** Depression by alcohol use and academic performance ( $N = 1126$ ).

		Depression	
		Mean	Mean
Alcohol Use	Non-drinker	13.21	6.46
	Occasional drinker	16.01	8.99
	Regular drinker		
Academic Performance	Better than average	13.58	8.44
	Average	15.68	8.26
	Worse than average	17.10	10.68

### 3.3. Suicide Intention

A total of four levels of suicide intention was classified according to participants' responses. The majority of students reported that they have never thought about committing suicide as a personal behavior option ( $N = 944$ , 83.84%). The chi-square test indicated no significant differences among students reporting each level of suicide intention.

The numbers of students reporting each level of suicide intention and, especially, planning for suicide were too small to carry out statistical analysis by level of suicide intention severity, so the suicide intention was recoded into two groups based on having thought about committing suicide as a personal behavior option or not having such a thought of committing suicide. Analyses of suicide intention by gender, drinking status, and academic performance are shown in **Table 2**. There was no significant difference in suicide intention by gender or by academic performance. However, a significant difference was found in suicide intention by drinking status, with drinkers were more likely to have suicide intention than non-drinkers ( $\chi^2(2) = 8.62$ ,  $p < 0.01$ ).

Logistic regression was used to test the relationship among suicide intention (yes, no), depression, and drinking behavior (yes, no). Results are shown in **Table 3**. Both depression and drinking behavior were significantly associated with

**Table 2.** Suicide intention by gender, alcohol use and academic performance ( $N = 1126$ ).

	Suicide intention	Yes		No		Total	
		N	%	N	%	N	%
Gender	Male	122	18.71	530	81.29	652	100
	Female	60	12.66	414	87.34	474	100
Alcohol Use	non-drinker	43	8.81	445	91.19	488	100
	Occasional drinker	76	21.65	275	78.35	351	100
	Regular drinker	63	21.95	224	78.05	287	100
Academic Performance	Better than average	41	12.09	298	87.91	339	100
	Average	57	13.10	378	86.90	435	100
	Worse than average	84	23.86	268	76.14	352	100

**Table 3.** Logistic regression of suicide intention on depression and drinking status ( $N = 1126$ ).

Parameter	B	Std. error	Wald	df	Sig.	Exp(B)
Constant	-3.71	0.44	70.67	1	<0.001	
Depression	0.31	0.05	36.72	1	<0.001	1.45
Drinker	0.89	0.40	4.32	1	0.04	2.41
Depression × Drinker	0.11	0.12	0.68	1	0.42	0.90

greater likelihood of having suicide intention. Each higher score on depression increased the odds of suicide intention by 1.45. Being a drinker increased the odds of suicide intention by 2.41.

#### 4. Discussion

The percentages of drinkers in this sample—31.17% occasional drinkers and 24.49% regular drinkers—were similar to those found in earlier studies, as were the gender differences in drinking behaviors. The drinking occasions, companions, and settings described by this sample were typical for Chinese adolescents.

In this study, gender was not significantly related to depression symptoms. Some past studies indicated more severe symptoms among female students, while others reported no difference between the genders (Liu, Ma, Kurita, & Tang, 1999).

In the CES-D test of depression by drinking status, regular drinkers reported the highest scores on depressive symptom indices and then non-drinkers reported the lowest indices. Drinking may be a means of relieving depression symptoms, or drinking may be a risk behavior associated with depression. Alcohol use, especially in excess, could lead to failure to apply coping strategies to resist alcohol or it could exacerbate depression symptoms.

Students who reported lower than average academic performance at school also reported higher depression symptom scores. Students who rated themselves higher than average in school performance had the lowest depression symptom scores. It is important to remember that students' academic performance and their depression symptoms are self-rated. It is highly possible that specific stress related to academic performance is linked to higher level of depression symptoms. Findings also show that suicide intentions increased for those with average or below average academic achievement, but the differences were not statistically significant. Academic performance stress appears to be somewhat self-generated. Significantly more students reported perceived academic performance stress than reported stress from their failure to meet parents' expectations, even though parent expectations have often been thought to be a source of academic stress.

Cheng et al. (2010) and Wang & Feng (2007) found that girls were more likely than boys to be identified as at risk for suicide. In this study no difference was found in suicide intention by gender. This study found overall 16.16% of students reported some level of suicide intention, compared to 17.4% reported in Cheng et al. (Cheng, et al., 2010) and 20.8% in Wang & Feng (2007). Significantly more drinkers than non-drinkers reported suicide intention.

Exploring the relationship of alcohol use, depression and suicide was one of the purposes of this study. Suicide intention was related to higher depression and alcohol use. Each higher depression score increased the odds of suicide intention by 1.45 and being a drinker more than doubled the odds of having suicide intention. These findings suggest important associations between depression and drinking and having suicidal intention. Typically in China suicide and

depression have been studied as separate entities. Although there are certain limitations in the measures of depression and suicide used in this study, exploring their relationship to each other and to drinking is new. Results suggest a need for more attention to the relationships of these variables before well-grounded educational interventions to reduce the likelihood of suicide can be introduced. A useful first step would be to carefully assess the ways each of these variables and possibly other variables relate to suicide intention with the possibility that depression and alcohol use are mediating variables.

### **Study Limitations**

Measuring alcohol consumption in a Chinese population remains a challenge. Drinking frequency is currently the best accepted descriptor to distinguish drinking patterns. Reporting the quantity of alcohol consumed and the alcohol-by-volume of the beverage would increase the validity of the drinking pattern description, but it is not realistic at this time. Without standard serving sizes, regular-sized drinking cups, and given the wide range of alcohol concentrations in drinks, estimating alcohol risk will depend on gross measures (Newman, Qian, & Xue, 2004).

The students in this study were mostly from northern and central part of China with convenience sampling. The differences between northern, central and southern areas in China are well established, so these results have limited generalizability.

This study used the self-reported data for measuring sensitive issues like alcohol use, depression and suicide intentions, which can affect the reliability of the results.

The cultural factors may affect the self-report data for depressive symptoms and suicide intention, future work needs to be done to address how cultural factors may influence the measuring of mental disorder, which is crucial in the context of Chinese university students.

In our sample, too few students reported communicating about their thoughts of committing suicide or planning suicide to allow a specific analysis of the different levels of suicide intention. Future work needs to be done to explore how the associations identified between depression, drinking, and suicide intention may impact more specific suicide communication and planning.

In spite of the limitations, these data give insight into depression and suicide and the relationship with alcohol use in an important population. Alcohol use is different in China so there is a need to view the behaviors and any survey results describing the behavior and associated variables as presented in this paper through a Chinese lens and resist the temptation to use a western system to interpret results.

### **Funding**

This work was supported by funds received from the Fundamental Research



Funds for the Central Universities (ZYTS23131 and ZYTS23130) and the Ministry of Education in China (MOE) Project titled “Selection and Analysis of Typical Cases of Mental Health Education Guidance for College Students” (1025-29901230002).

### Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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