Drinking Behavior and its Influence Factors among Medical Students in China: A Web-based Survey

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Keywords: Drinking Alcohol, Risk Behavior, Medical Students.

Abstract: Unhealthy drinking behaviour places a heavy burden on personal health and social development. Our study aimed to analyze the drinking behavior and its influence factors of medical students, and provide evidence for the design of a better drinking-related health education. College students in a medical university was selected as the participants. Epidata 3.1 and SAS 8.0 were used for data collection and analysis. Chi-square test, one-way analysis of variance (ANOVA), and the ordinal multinomial stepwise logistic regression were used to analyze the variance of drinking behavior in different participant with $P<0.05$ as statistically significant. Totally 2045 participants in grade 1 to grade 5 from a medical university were surveyed with 32.55% (n=662) males and 67.45% (n=1373) females and 11 missing ones. The drinking rate was significantly lower in medical students than that in non-medical students (37.52% VS 43.36%, $\chi^2=9.443$, $P<0.05$). The regression results showed that drinking behavior was related to major, gender, smoking, drinking of parents, peer drinking, drinking attitudes ($P<0.05$). Gender, major, personal health risk behavior such as smoking will influence the drinking behavior. Moreover, surrounding factors, including drinking history of parents, drinking behavior of peer may change the drinking behavior. Given that the attitudes of participants will alter their drinking behavior, and attitudes depends on knowledge. Therefore, we need to enhance health education on drinking according to their different characteristics and surrounding factors of participants in future.

1. Introduction

Drinking is the most common abused substance according to the statistics from World Health Organization. Chinese consumption was equal to 3 litres of pure alcohol consumed per person aged 18 years or older, and the drinking rate of Chinese was 32.80%. And 65.40% of Chinese drinkers have bad drinking behaviors, while only 0.50% of drinkers have the correct conception on alcohol.

In addition, about 62.30% of Chinese drinkers began to drink alcohol at the age of 18-25. Hence college student is the critical drinking group. College students in many countries are at increased risk for heavy drinking [1]. For medical students, their conception, attitudes, and behaviors on drinking do not only influence themselves but also their patients. Alcohol use for medical students had serious consequences on their effectiveness and fitness to practice as a doctor in future. Therefore, the aim of our study was to analyze the drinking behaviors of students in medical universities and its influence factors, which may provide evidence for the future health education.

2. Methods

2.1. Sample and Data

A cross-sectional and web-based survey was conducted in a medical university in Chongqing,

  DOI: 10.25236/ehmit.2021.011

China. Convenient sampling was used for this study, 2500 questionnaires were hand out, with 2045 questionnaires valid (81.80%). The major of participants including medical medicine, preventive medicine, anesthesiology, nutrition and food hygiene, pediatrics, et al. These major were divided into medical and non-medical by different degree (medical degree or non-medical degree), with 51 missing.[2]

2.2. Basic Information

The initial part of the questionnaire was basic information, which was compiled by ourselves[3]. There were 28 items, including age, ethnicity, gender, grade, life satisfaction and so on. Knowledge and attitudes on drinking was measured by the self-compiled questionnaire with 8 items respectively[4]. The drinking knowledge was mainly about disease risks caused by alcohol, such as fatty liver, and relation with water and so on. Participants answered 'yes' or 'no', and scored one point if they chose the correct answer [5]. The participants would be divided into three groups based on the total score of knowledge as 0-4, 5-6, 7-8 groups.

2.3. AUDIT

The Alcohol Use Disorders Identification Test (AUDIT) has been widely used in many countries[6]. It is a 10-item measure of recent hazardous and harmful alcohol use with good reliability and validity in previous studies in China [7].

2.4. Statistical Analysis

Data were entered with Epidata 3.1, and SAS 8.0 was used for data analysis. Numerical variables were reported as mean ± SD and categorical variables as percent. Qualitative data were compared using the Chi-square test. Analysis of Variance (ANOVA) was used to analyze the association between age and drinking behavior. Based on the above results of univariate analysis, the variables with statistical significance were included in the ordinal multinomial stepwise logistic regression. $P< 0.05$ was considered statistically significant. All statistical tests were two-sided.

3. Results

3.1. Sample Description

A total of 2045 participants in grade 1 to grade 5 from a medical university were enrolled in this study. 32.55% (n=662) of them were males, and 67.45% (n=1372) of them were females, with 11 invalid because of the missing data. The drinking rate was 40.10% (820/2045). The missing value of each item was showed in the following table.

3.2. Drinking Behavior with Characteristics

The results in Table 1 indicated that the drinking rate of male was significantly higher than that of the female (62.39% VS 28.86%, χ^2=270.313, P<0.05). Compared to girls, boys were more likely to be low risk drinking (48.04% VS 27.41%) and increasing risk drinking (14.45% VS 1.46%). For the participants who were the only child of their family, they were more likely to drink than other participants (42.78% VS 32.79%). The only child had higher risk of low risk drinking (37.05% VS 31.71%) and increasing risk drinking (5.73% VS 5.58%) than others, and the difference was of great statistical significance (χ^2=6.736, P<0.05). The drinking rate was significantly lower in medical students than that in non-medical students (37.52% VS 43.36%, χ^2=9.443, P<0.05), and compared to non-medical students, medical students had a low risk of low-risk drinking (32.95% VS 36.47%) and increasing risk drinking (5.84% VS 7.84%). The drinking rate was significantly increased as the self-assessment academic performance decreased (χ^2=17.009, P<0.05). The drinking rate of the participants whose self-assessment academic performance was relatively bad was 48.37%, while in relatively good group, the drinking rate was 36.09%. The drinking rate of participants who were smoking was higher than that of those who did not smoke (19.23% VS 38.08%), and they had a higher risk of low-risk drinking (35.90% VS 34.07%) and increasing risk

drinking (44.87% VS 4.01%) than no smoking participants, and the difference was of statistical significance (P<0.05). Furthermore, no statistical significance was observed in participants with different ethnicity, grade, and sleep quality (P>0.05).

Table 1 The difference of drinking behavior in participants with different characteristics.

Variables		No-drinking N (%)	Low risk N (%)	Increasing risk N (%)	Total	χ^2	*P*
Gender*	Male	249(37.61)	318(48.04)	95(14.35)	662	270.313	<0.001
	Female	976(71.14)	376(27.41)	20(1.46)	1372		
	Missing	11					
Ethnicity	Han	1098(59.61)	639(34.69)	105(5.70)	1842	3.903	0.142
	Other	124(67.03)	53(28.65)	8(4.32)	185		
	Missing	18					
Only child*	Yes	519(57.22)	336(37.05)	52(5.73)	907	6.736	0.035
	No	708(62.71)	358(31.71)	63(5.58)	1129		
	Missing	9					
Major*	Medical	821(62.48)	433(32.95)	60(4.57)	1314	9.443	0.009
	Non-medical	384(56.67)	248(36.47)	48(7.06)	680		
	Missing	51					
Grade	Freshman	108(61.71)	58(33.14)	9(5.14)	175	7.409	0.285
	Sophomore	511(25.02)	261(32.18)	39(4.81)	811		
	Junior	459(58.25	283(35.91)	46(5.84)	788		
	Senior	152(56.72)	95(35.45)	21(7.84)	268		
	Missing	3					
Academic performance*	Relatively good	301(63.91)	148(31.42)	22(4.67)	471	17.009	0.002
	Medium	829(60.03)	480(34.76)	72(5.21)	1381		
	Relatively bad	95(51.63)	68(36.96)	21(11.41)	184		
	Missing	9					
Smoking*	Yes	15(19.23)	28(35.90)	35(44.87)	78	247.050	<0.001
	No	1205(61.92)	663(34.07)	78(4.01)	1946		
	Missing	21					
Sleep quality	Relatively good	504(60.58)	288(34.62)	40(4.81)	832	7.293	0.121
	Medium	628(60.97)	342(33.20)	60(5.83)	1030		
	Relatively bad	85(53.13)	60(37.50)	15(9.38)	160		
	Missing	23					

**P*<0.05.

3.3. Drinking Behavior with Surrounding Factors

Table 2 demonstrated that the drinking history of parents was significantly correlated with the drinking behavior of participants. The participants whose mother drank were more likely to drink than others (51.42% VS 36.64%, χ^2=30.561, P<0.05), and they had a higher risk of low risk drinking (44.08% VS 31.52%) and increasing risk drinking (7.35% VS 5.12%). If father drank, the participants were more likely to drink than others (42.90% VS 30.32%), and they had a higher risk of low risk drinking (37.45% VS 24.48%) increasing risk drinking (5.44% VS 5.12%), and the statistical significance was observed (χ^2=29.768, P<0.05). Statistical difference of drinking behavior was observed in different groups with different numbers of peer drinking. The drinking rate was higher in the group with almost all peers drank than that in the group with no peer drank (69.00% VS 11.32%, χ^2=216.404, P<0.05). Participants whose peer drank had a higher risk of low risk drinking (50.50% VS 11.32%) and increasing risk drinking (18.50% VS 0.00%). What's more, if one's close friends were approved of drinking, the drinking rate was higher than those whose friends were disapproved of drinking (63.18% VS 18.52%, χ^2=98.388, P<0.05), and more participants were acted as low risk drinking (48.95% VS17.04%) and increasing drinking (14.23% VS 1.48%). The effect of relationship, smoking history of parents, economy of family on drinking behavior was no statistical significance (P>0.05).

Table 2. The difference of drinking behavior in students based on factors of family, peer and close friend(s).

Variables		No-drinking N (%)	Low risk N (%)	Increasing risk N (%)	Total	χ^2	*P*
Smoking history of father	Yes	722(58.32)	441(35.62)	75(6.06)	1238	5.259	0.072
	No	504(63.32)	253(31.78)	39(4.90)	796		
	Missing	11					
Smoking history of mother	Yes	15(46.88)	13(40.63)	4(12.50)	32	4.149	0.126
	No	1215(60.48)	684(34.05)	110(5.48)	2009		
	Missing	4					
Drinking history of father*	Yes	860(57.10)	564(37.45)	82(5.44)	1506	29.768	<0.001
	No	370(69.68)	130(24.48)	31(5.12)	531		
	Missing	8					
Drinking history of mother*	Yes	205(48.58)	186(44.08)	31(7.35)	422	30.561	<0.001
	No	1027(63.36)	511(31.52)	83(5.12)	1621		
	Missing	2					
Relationship of parents	Relatively good	931(60.14)	537(34.69)	80(5.17)	1548	5.765	0.217
	Medium	264(62.41)	131(30.97)	28(6.62)	423		
	Relatively bad	35(51.47)	27(39.71)	6(8.82)	68		
	Missing	6					
Economy of family	Relatively good	72(63.72)	31(27.43)	10(8.85)	113	5.525	0.238
	Medium	891(59.32)	529(35.22)	82(5.46)	1502		
	Relatively bad	265(62.50)	137(32.31)	22(5.19)	424		
	Missing	6					
Number of peer drinking*	Almost all	62(31.00)	101(50.50)	37(18.50)	200	216.404	<0.001
	A part	745(56.31)	504(38.10)	74(5.59)	1328		
	Few	374(80.95)	84(18.18)	4(0.87)	462		
	No	47(88.68)	6(11.32)	0(0.00)	53		
	Missing	7					
Attitude of your close friend on drinking*	Approve	88(36.82)	117(48.95)	34(14.23)	239	98.388	<0.001
	Medium	1032(62.02)	554(33.29)	78(4.69)	1664		
	Disapprove	110(81.48)	23(17.04)	2(1.48)	135		
	Missing	7					

*P<0.05.

Table 3 The association of drinking attitude and knowledge with drinking behavior.

Variables		No-drinking N (%)	Low risk N (%)	Increasing risk N (%)	Total	χ^2	*P*
Attitude 1*	Yes	294(46.08)	268(42.01)	76(11.91)	638	113.564	<0.001
	No	939(66.79)	428(30.44)	39(2.77)	1406		
	Missing	1					
Attitude 2*	Yes	366(48.28)	313(41.29)	79(10.42)	758	96.344	<0.001
	No	863(67.42)	381(29.77)	36(2.81)	1280		
	Missing	7					
Attitude 3*	Yes	154(40.00)	169(43.90)	62(16.10)	385	138.254	<0.001
	No	1078(64.98)	528(31.83)	53(3.19)	1659		
	Missing	1					
Attitude 4*	Yes	253(46.34)	222(40.66)	71(13.00)	546	105.724	<0.001
	No	979(65.44)	473(31.62)	44(2.94)	1496		
	Missing	3					
Attitude 5*	Yes	849(65.92)	385(29.89)	54(4.19)	1288	48.799	<0.001
	No	382(50.73)	310(41.17)	61(8.10)	753		
	Missing	4					
Attitude 6*	Yes	408(48.17)	357(42.15)	82(9.68)	847	104.722	<0.001
	No	822(68.84)	339(28.39)	33(2.76)	1194		
	Missing	4					
Attitude 7*	Yes	666(73.03)	200(21.93)	46(5.04)	912	116.830	<0.001
	No	565(50.00)	496(43.89)	69(6.11)	1130		
	Missing	3					
Attitude 8	Yes	724(59.54)	415(34.13)	77(6.33)	1216	2.861	>0.05
	No	506(61.26)	282(34.14)	38(4.60)	826		
	Missing	3					
Knowledge*	0-4	60(60.61)	23(23.23)	16(16.16)	99	28.884	<0.001
	5-6	272(58.62)	159(34.27)	33(7.11)	464		
	7-8	901(60.80)	515(34.75)	66(4.45)	1482		

*P<0.05.

3.4. Drinking Behaviors with Knowledge and Attitude

As Table 3 illustrated that, the effects of drinking attitudes, knowledge score of participants on their drinking behavior were of great statistical significance. Each item was depicted in the table.

The incidence rate of increasing risk drinking was significantly decreased with the increasing knowledge score. The participants who were scored 7-8 were less likely to act as increasing risk drinking than those who scored 0-4 (4.45% VS 16.16%, χ^2=28.884, P<0.05). Interestingly, the incidence rate of low risk drinking was significant increased with the increasing knowledge score. The participants who were scored 7-8 were more likely to act as increasing risk drinking than those who were scored 0-4 (34.75% VS 23.23%, χ^2=28.884, P<0.05).

3.5. Risk factors of drinking behavior

The ordinal multinomial stepwise logistic regression analysis results reported that gender, smoking, drinking history of parents, peer number of drinking, attitudes of college students on drinking were significantly correlated with drinking behavior. Non-medical major, male, smoking, drinking of parents, peer drinking were the risk factors of drinking behavior. Students who will feel be left out when they have a gathering with friends and drinking were more likely to be lower risk drinking and increasing risk drinking. Students who agreed that alcohol should be forbidden to sell to juveniles in our country were less likely to be lower risk and increasing risk drinking. Students who thought that it was disrespectful to others if they refuse his toast were more likely to be lower risk drinking and increasing risk drinking than students who did not agree with it. Furthermore, students who thought that their parents would be upset if they drank were less likely to be lower risk drinking and increasing risk drinking than students who did not care about it.

Table 4 Ordinal multinomial stepwise logistic regression analysis.

Variables		OR	95%CI
Major	Medical	0.722	0.585-0.890
	Non-medical	1	
Gender	Male	2.597	2.077-3.247
	Female	1	
Smoking	Yes	7.655	4.670-12.548
	No	1	
Drinking history of father	Yes	1.632	1.274-2.089
	No	1	
Drinking history of mother	Yes	1.334	1.039-1.712
	No	1	
Peer number of drinking	Almost all	6.037	2.209-16.502
	A part	3.292	1.260-8.597
	Few	14	0.506-3.621
	No	1	
Attitude 1	Yes	1.420	1.128-1.788
	No	1	
Attitude 5	Yes	0.712	0.577-0.878
	No	1	
Attitude 6	Yes	1.934	1.555-2.405
	No	1	
Attitude 7	Yes	0.521	0.420-0.646
	No	1	

4. Discussion

We investigated the effect of drinking knowledge among college students in medical school on drinking behavior. Unfortunately, there was no statistical significance observed in ordinal multinomial stepwise logistic regression analysis. However, their attitudes on drinking may influence drinking behavior. Some students drink because they don’t want to be left out when they

are gathering with friends, or they think it is disrespectful to others if they refuse others' toast. Participants will reduce their risk drinking if they consider that their parents will be upset if they drink, or agree that alcohol should be banned to sell to juveniles in our country.

Limitations were also existed in our study. AUDIT was used as the outcome in regression analysis [8], which may not be a proper manner to make conclusions. The survey was conducted in a medical university in a city. We only can make conclusions in a medical university, Chongqing, China. We will expand our survey to other college students in other universities in future and carry out health education on drinking among college students.

5. Conclusions

This study highlights that the drinking rate of college students in medical university is lower than that of other college students. Gender, major, personal health risk behavior such as smoking will influence the drinking behavior. Moreover, surrounding factors, including drinking history of parents, drinking behavior of peer may change the drinking behavior. Given that the attitudes of participants will alter their drinking behavior, and attitudes depends on knowledge. Therefore, we need to enhance health education on drinking according to their different characteristics and surrounding factors of participants in future.

Acknowledgement

The study's protocol and data collection procedure were approved by Chongqing Medical University (Reference Number 2018015).Funded by Chongqing Science and Techonogy Bureau of the People's Republic of China (grant number: cstc2017jcyjAX0004).

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