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Patterns of Alcohol Consumption and Drinking Motives Among Korean Medical Students

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

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Background:
Physicians who have healthy lifestyles can provide quality healthcare to their patients and keep themselves healthy. There is little data on the prevalence of drinking behaviors and problems among East Asian medical students. Here, we explored alcohol use and drinking motives among medical students in Korea.

Material/Methods:
A questionnaire-based, multicenter, cross-sectional study was carried out in 323 students from 5 medical colleges in Korea between July and October 2016. We used the Korean version of the Alcohol Use Disorders Identification Test (AUDIT) and an anonymous, self-administered questionnaire that included demographic characteristics, smoking status, consumption of alcohol, and drinking motives.

Results:
The mean AUDIT score was 9.8±7.5 for males and 6.3±5.4 for females. Heavy drinking (75.9%) and binge drinking (56.0%) were very high among Korean medical students. Female medical students drank as much as male students, and much more than other women. The probability that a student would be a binge drinker was 2.72 times higher for a smoker than a non-smoker. The scores for drinking frequency, alcohol intake at one time, heavy drinking, binge drinking, and alcohol dependence symptoms were highest in the group who had "enhancement drinking motives".

Conclusions:
Heavy drinking and binge drinking are common among both male and female medical students in Korea and this behavior is associated with smoking and enhancement drinking motives. Medical schools should consider implementing effective interventions to prevent and reduce problem drinking among medical students.

MeSH Keywords: **Alcohol Drinking • Cross-Sectional Studies • Education • Students, Medical • Students, Public Health**

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Background

In college, students experience and adapt themselves to certain levels of autonomy and independence at the adult level. During this period, it is very important for students to form a healthy lifestyle, both physically and mentally. Unhealthy lifestyles can lead, either directly or indirectly, to various health problems after graduation, while also hindering social performance and achievement [1,2]. College students are the best examples of emerging adults. Worldwide, college students are more involved in risk behavior and serious drinking problems than their age-matched non-college peers and probably non-emerging adults; their excessive alcohol consumption is a major factor in their unhealthy lifestyles and is associated with unhealthy behaviors such as smoking [1–6]. On a personal level, excessive alcohol consumption during college has a negative impact on various post-college lifestyles, leading to health problems, accidents, and interpersonal problems [7]. On a macroscopic level, excessive drinking causes socioeconomic loss and associated problems [8]. For these reasons, drinking problems among college students have become an important social and global issue [9–12].

Many medical students drink alcohol under cultural, social, and environmental influences on drinking, including factors like newly attaining legal age to purchase alcohol, drinking motives, and the stress of an excessive study workload [13–15]. Their drinking problems negatively affect academic achievement, emotional adaptability, and future ability to function well as doctors [14,15]. Like smoking, drinking is a predictor of professional failure among medical students – the greater the amount of alcohol, the higher the rate of failure [16]. When medical students become doctors, they are responsible for treating their patients' drinking- and smoking-related health problems. Physicians who have healthy lifestyles and who exercise, have good eating habits, and abstain from smoking and excessive drinking can better provide quality healthcare to their patients and keep themselves healthy [17,18]. Medical students who understand the impact of a healthy lifestyle (including appropriate drinking) on emotional adjustment are more likely to respond effectively to such issues in future, when they become physicians [19–21]. Kim et al. [22] reported that the prevalence of binge drinking among Korean non-medical college students was 56.7% for males and 34.1% for females, which was higher than for U.S. non-medical college students [23]. In addition, previous studies have found that about 60–70% of medical students admit to binge drinking, with men reporting higher frequency than women [24,25]. However, there is little data on the prevalence of drinking behaviors and problems among East Asian medical students. In Korea, there have been no multicenter surveys on this topic – only small-scale studies carried out in single medical colleges. This cross-sectional multicenter study aimed to investigate patterns of alcohol consumption and drinking motives among medical students in Korea.

Materials and Methods

Participants

The study was approved by the Institutional Review Board of [name deleted to maintain the integrity of the review process] Hospital (No. 05-2016-174); written informed consent was obtained from all subjects before they participated in the study. To achieve cross-regional results, a self-administered questionnaire was mailed to 5 medical schools in 3 metropolitan cities (Seoul, Busan, and Gwangju) and 2 cities (Gyeongju and Jinju) from a total of 41 Korean medical schools. From a total population of 918 students, 323 responded to the questionnaire, a response rate of 35.2%. Overall, 179 (55.4%) were male and 144 (44.6%) were female. The total numbers of first-, second-, third-, and fourth-year students were 178 (55.1%), 64 (19.8%), 40 (12.4%), and 41 (12.7%), respectively. Their mean age was 26.6 ± 3.8 years.

Instruments

The paper-based, self-reported survey consisted of 5 sections: 1. sociodemographic status; 2. alcohol consumption, drinking behaviors, and alcohol-related problem; 3. drinking motives; 4. smoking status. Sociodemographic data (age, gender, and grade) were collected for all participants. We used the Korean version of the Alcohol Use Disorders Identification Test (AUDIT), which is a 10-item screening tool developed by the World Health Organization (WHO) to assess alcohol consumption, drinking behaviors, and alcohol-related problems. AUDIT is composed of 3 subsections: hazardous alcohol use (3 questions), symptoms of dependence (3 questions), and harmful alcohol use (4 questions). For the 3 questions about alcohol dependence symptoms, scores ranged from 0 to 12 points. Four questions addressed harmful alcohol use, with scores ranging from 0 to 16. The AUDIT scores were categorized into 3 groups according to the WHO guidelines: low-risk, 0–7 points; intermediate-risk, 8–15 points; and high-risk drinking, ≥16 points [26]. One standard drink contains about 14 g of pure alcohol. There is no clear definition for heavy drinking or binge drinking in the literature; therefore, in the present study we defined heavy drinking as at least 16 standard drinks for a man and 10 drinks for a woman on average in a week during the past 28 days [27]. Binge drinking was defined as consuming 4+/5+ standard drinks on a single occasion for women/men [28]. Heavy drinking and binge drinking were defined as problem drinking. We used the 12-item short form of the DMQ-R (Drinking Motives Questionnaire-Revised) (DMQ-R SF) [29], a modification of DMQ-R developed

Table 1. Patterns of alcohol consumption by smoking status.

| Variables | Smoking status | | | | | | P value |
| | Current smoker (n=59) | | | Non-smoker (n=264) | | | |
	Male (n=54)	Female (n=5)	p Value	Male (n=125)	Female (n=139)	p Value	
Frequency (/month)*	4 (0–30)			3 (0–25)			<0.001
	4 (0–30)	2 (0–8)	**0.011**	3 (0–25)	3 (0–16)	0.205	
Amount (unit/day)*	4.1 (0–27)			4.1 (0–21)			<0.001
	8.2 (0–27)	4.1 (0–13)	0.096	5.2 (0–21)	4.1 (0–13)	**<0.001**	
Heavy drinking**	48 (81.4)			197 (74.6)			0.316
	45 (83.3)	3 (60.0)	0.592	92 (73.6)	105 (75.5)	0.718	
Binge drinking**	44 (74.6)			137 (51.9)			**0.001**
	41 (75.9)	3 (60.0)	0.644	66 (52.8)	71 (51.1)	0.780	

Data were expressed as median (minimum-maximum) for frequency and amount variables; number (%) for binge drinking and heavy drinking variables. * By Mann-Whitney U test for, ** Fisher's exact test or Chi square test.

by Cooper [30]. Based on the patterns of participants' responses to DMQ-R SF, their drinking motives were categorized into 4 specific domains; social, enhancement, coping, and conformity drinking motives. Cronbach's alpha was 0.834, indicating acceptable reliability. Smoking status was classified into never and current smoking. For those students with current smoking, data on duration (years) and extent (the number of cigarettes smoked per day) were recorded and pack-years of smoking was calculated. The pack-year is a unit for measuring the amount a person has smoked over a long period of time. It is calculated by multiplying the number of packs of cigarettes smoked per day by the number of years the person has smoked, defining a pack as containing 20 cigarettes.

Statistical analysis

Normality of distribution was tested using the Shapiro-Wilk test. All data showed non-normal distributions and are expressed as median with range. We used the Mann-Whitney U test, Kruskal-Wallis test, chi-square test, and Fisher's exact test to determine differences between male and female students or among grades. Spearman's correlation analysis was used to assess the relationship between pack-years of cigarette smoking and drinking frequency and alcohol intake at one time. Multivariable analysis was performed to determine the independent contribution of each of these factors (gender, grade, smoking, and drinking motives) to AUDIT scores. SPSS 11.0 for Windows software (SPSS Inc., Chicago, IL, USA) was used in all statistical analyses. All statistical analyses were two-sided, with P<0.05 considered to be statistically significant.
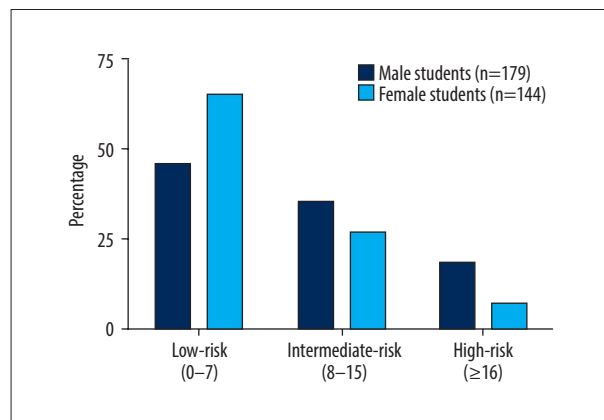

Figure 1. Percentage of subjects in each AUDIT category. Low-risk category, 0 to 7 points [male, 82 (45.8%); female, 94 (65.3%)]; intermediate-risk category, 8 to 15 points [male, 64 (35.8%); female, 39 (27.1%)]; and high-risk category, ≥16 points [male, 33 (18.4%); female, 11 (7.6%)]. P<0.001 by chi-square test for the distribution differences of each AUDIT category between male and female.

Results

Baseline characteristics of subjects

Of the 323 subjects, 179 (55.4%) were male; there were no significant gender differences by year (P=0.284). First-year students (55.1%) accounted for the highest ratio among the 4 years. Fifty-nine respondents (18.3%) were current smokers, with a remarkable difference between genders (males 30.2% *vs.* females 3.5%, P <0.001). There were no significant differences in smoking rates by year (P=0.715). Mean AUDIT score was 9.8±7.5 for males and 6.3±5.4 for females (P<0.001).

Table 2. Patterns of alcohol consumption by sex and grade (year in school).

Variables	Total (N=323)	Male (n=179)					Female (n=144)					P value
		1st (n=101)	2nd (n=31)	3rd (n=27)	4th (n=20)	p Value	1st (n=77)	2nd (n=33)	3rd (n=13)	4th (n=21)	p Value	
Frequency (/month)*		4.0 (0–30)					2.5 (0–16)					**0.002**
		4.0 (0–30)	4.0 (0–12)	2.0 (0–20)	4.0 (0–12)	0.092	3.0 (0–16)	3.0 (0–8)	1.0 (0–8)	2.0 (0–8)	0.118	
Amount (unit/day)*	4.1 (0–27)	6.3 (0–27)					4.1 (0–13)					**<0.001**
		6.3 (0–27)	6.3 (0–27)	4.1 (0–21)	7.2 (0–15)	0.172	3.2 (0–13)	4.1 (0–12)	3.2 (0–10)	2.5 (0–9)	0.638	
Heavy drinking**	245 (75.9)	137 (76.5)					108 (75.0)					0.794
		84 (83.2)	22 (71.0)	17 (63.0)	14 (70.0)	0.086	59 (76.6)	26 (78.8)	10 (76.9)	13 (61.9)	0.530	
Binge drinking**	181 (56.0)	107 (59.8)					74 (51.4)					0.143
		65 (64.4)	19 (61.3)	11 (40.7)	12 (60.0)	0.179	38 (49.4)	21 (63.6)	6 (46.2)	9 (42.9)	0.417	

Data were expressed as median (minimum–maximum) for frequency and amount variables; number (%) for binge drinking and heavy drinking variables. * By Mann-Whitney U test or Kruskal Wallis H test; ** Fisher's exact test or Chi square test.

The low-risk drinking group less than 7 points of AUDIT score consisted of 177 students (54.5%; male 45.8% *vs.* female 65.3%, P<0.001). The intermediate-risk drinking group between 8 and 15 points consisted of 104 students (31.9%; male 35.8% *vs.* female 27.1%, P=0.097), and the high-risk drinking group more than 16 points consisted of 46 students (13.6%; male 18.4% *vs.* female 7.6%, P=0.005) (Table 1, Figure 1).

Patterns of alcohol consumption by sex and year

The median frequency of drinking was 3 times per month. Male students drank a monthly median of 4 times – more than female students, who drank 2.5 times. When questioned about their drinking frequency, only 9.3% of male students and 10.4% of female students did not drink. There was significant difference in median drinking frequency between male and female students (P=0.002). The median alcohol consumption at one time was 4.1 units. Male students drank a median of 6.3 units at one time, while females drank 4.1 units. There was a significant difference in median alcohol consumption between male and female students (P<0.001). Drinking frequency and alcohol intake at one time did not differ significantly between first- and fourth-year students. The prevalence of heavy drinking was 75.9%, with no significant differences between male and female students (male 76.5% *vs.* female 75.0%, P=0.794). The prevalence of binge drinking was 56.0% (male 59.8% *vs.* female 51.4%, P=0.143), with no gender differences except in the first year (male 64.4% *vs.* female 49.4%, P=0.048). Although the prevalence of heavy drinking declined each year (P=0.018 for the linear trend), the prevalence of binge drinking showed no significant differences by year (Table 2).

Patterns of alcohol consumption by smoking status

Smokers had significantly higher frequency of drinking than non-smokers (4 *vs.* 3 times a month, P<0.001) and more alcohol intake at one time (8.1 *vs.* 4.1 units, P<0.001). Smoking history (calculated as pack-years) was significantly associated with alcohol intake at one time (r=0.231, P<0.001, data not shown) and frequency of drinking (r=0.211, P<0.001, data not shown). Although heavy drinking did not show any significant differences in relation to smoking status, the rate of binge drinking was higher in the smoking group (73.3% *vs.* 51.3%, Table 1). Smokers were 2.72 times more likely to be binge drinkers than were non-smokers (OR 2.72, 95% CI 1.443–5.125, data not shown).

Alcohol dependence symptoms domain

The dependence symptoms scores were significantly higher in male students than female students (median 2.0 *vs.* 1.0, P<0.001), but there were no significant differences by year (Table 3). Smokers received higher dependence-symptom scores than non-smokers (P<0.001, data not shown). There was no difference between the dependence-symptom scores of male and female students in the smoking group (Table 3). In the non-smoking group, however, male students had higher dependence-symptom scores than females (P=0.006, data not shown).

Harmful alcohol use domain

Male students had significantly higher harmful-alcohol-use scores than females (P=0.034). There was no significant

Table 3. Symptoms of dependence and harmful alcohol use by sex and grade.

	Total (N=323)	1st grade (n=178)	2nd grade (n=64)	3rd grade (n=40)	4th grade (n=41)	P value**
Symptoms of dependence (total score 12)						
Total	1 (0–12)	1 (0–12)	2 (0–7)	1 (0–12)	1 (0–7)	0.679
Male	2 (0–12)	2 (0–12)	2 (0–6)	1 (0–12)	3 (0–7)	0.196
Female	1 (0–10)	1 (0–10)	2 (0–7)	0 (0–4)	1 (0–3)	0.107
p Value*	**<0.001**	**0.001**	0.944	0.525	**0.003**	
Harmful alcohol use (total score 16)						
Total	0 (0–11)	0 (0–10)	1 (0–11)	0 (0–10)	1 (0–7)	0.983
Male	1 (0–11)	1 (0–9)	0 (0–11)	0 (0–10)	1 (0–7)	0.165
Female	0 (0–10)	0 (0–10)	1 (0–6)	0 (0–6)	0 (0–3)	0.295
p Value*	**0.034**	**0.041**	0.482	0.760	**0.004**	

Data were expressed as Median (minimum-maximum). * By Mann-Whitney U test; ** Kruskal Wallis H test.

Table 4. Multivariable analysis of factors associated with AUDIT scores.

Variables	Beta coefficient	Standard error	95% Confidence interval	P value
Male sex	1.339	0.559	0.234–2.434	0.017
Grade, higher	−0.156	0.242	−0.630–0.319	0.521
Current smoking	2.957	0.791	1.407–4.508	<0.001
Drinking motives				
Social motives	5.297	0.754	3.819–6.775	<0.001
Coping motives	5.407	0.919	3.606–7.209	<0.001
Enhancement motives	7.449	0.969	5.551–9.348	<0.001
Conformity motives	6.273	1.118	4.083–8.464	<0.001

difference across the different school years (Table 3). The harmful-alcohol-use scores were significantly higher in smokers than in non-smokers (P<0.001, data not shown). There was no difference between the harmful-alcohol-use scores of male and females, regardless of smoking status.

Drinking motives

Among the various motives for drinking, social motives (47.3%) were the most common, followed by enhancement motives (20.6%), coping motives (19.4%), conformity motives (7.3%), and other (5.5%) among male students. Among female students, the most common motive for drinking was social motive (50.0%), followed by coping motive (18.0%), conformity motive (10.9%), enhancement motive (9.4%), and other (11.7%). Drinking motives differed between male and female students

(p<0.001, data not shown). The scores for drinking frequency, alcohol intake at one time, heavy drinking, binge drinking, and alcohol dependence symptoms were highest in the group whose response was, "enhancement drinking motives."

Factors associated with AUDIT scores

In multivariable analysis, AUDIT scores were significantly associated with male students (P=0.017), current smoking (P<0.001) and each drinking motives (P<0.001, Table 4).

Discussion

The purpose of this multicenter cross-sectional study was to explore alcohol use and drinking motives among medical

students in Korea and to provide basic data to enable the development of concrete methods for solving drinking problems. The results of the present study show that medical students in Korea seemed to have a higher monthly drinking frequency and higher rates of heavy and binge drinking than do non-medical college students and medical students in other countries [20,21,23,29–40]. Specifically, 90.2% (male 90.7%, female 89.6%) of the current sample consumed alcohol in the past 30 days, which was higher than the 70.5% (male 74.2%, female 66.3%) among persons aged 19–29 including non-medical college students in Korea [31] and the 55.1% of college students and age-matched non-college peers in the United States [32]. Our monthly alcohol consumption rate was similar or slightly higher than prior estimates of medical student in other countries, which in previous reports was 64.3–87.8% [21,33,34]. The present study also showed that the prevalence of binge drinking was 56.0% (male 59.8%, female 51.4%), which was higher than the 7.7–39.6% rate among non-medical female college students in Korea [35,36] and the 28.2–40% rate among non-medical students in other countries [23,32]. Similar to the present study, the prevalence of high-risk drinking among medical students in other countries varied from 33.4% to 58.1% by mode of detection [20,21,33,34,37–39]. In addition, the overall prevalence of intermediate-risk drinking (8–15 points) plus high-risk drinking (≥16 points) according to the WHO guidelines in our sample was 45.5%. In a previous study of the association between chronotype and problem drinking in one medical school in Korea, the prevalence of AUDIT scores over 12 points was 31.0% [25]. Compared to Korean medical students, the percentage of U.S. medical students with AUDIT scores of 8 or above was rather small, at 15.4% [40]. However, these comparisons are less definitive since the data did not directly compare those results. Nevertheless, our findings may provide a pathway for future research to compare these drinking rates across countries in a single study. These results suggest that action needs to be taken at the school and individual levels to spread the message that medical students have a serious drinking problem with long-term implications, although medical students are properly educated about the physiological effects of alcohol and the risk associated with alcohol drinking though basic and clinical courses than non-medical students.

Our analysis of gender differences showed that male students drank more frequently and consumed more alcohol at one time than did female students; there were no gender differences in the rates of heavy and binge drinking. Although the former result is consistent with previous studies, the latter is not [21,31–36,39,40]. In many previous studies, male students had higher rates of excessive drinking than female students among non-medical college students [31,32,36], age-matched non-college peers [31,32], and medical students [21,34,39,40], but the differences between men and women are much higher in Korean university students [35,36]. These interesting results

contradict the traditional sociocultural norms and beliefs of Korea, in which female students are assumed to have a lower rate of problem drinking than male students [41]. As society has changed, contemporary women drink at a younger age and consume larger amounts of alcohol than did previous generations, especially those with higher education [42,43]. The present result may reflect the fact that medical schools have a stronger culture of gender equality than other schools, potentially leading to a lack of restrictions on drinking among female students. Recently, there has been a remarkable increase in problem drinking among female students, suggesting that it may also be necessary to pay more attention to the drinking problems of female students. Identifying women's drinking patterns and the factors that influence problem drinking could help understand this issue more deeply and provide basic data to establish healthy drinking measures, including preventive interventions among female students.

Among student year groups, there were no significant differences in alcohol drinking frequency, alcohol consumption, heavy drinking, or binge drinking. Overall, however, first- and second-year medical students had higher scores. The results of this study confirm those of previous studies, which showed that students in basic medicine courses had higher levels of problem drinking than those undertaking clinical clerkships; they tended to decrease alcohol consumption after graduating from medical school [33]. First-year and second-year medical students in the basic education course experience a lot of stress due to heavy academic workload, too much testing, and a fear of academic failure. They are thus more likely than other students to choose drinking as a way of relieving stress [44]. There may also be some connection with a culture in which older students compel younger ones to drink and refuse to accept them otherwise. Therefore, it would be desirable to conduct a healthy drinking education program, especially for the lower grades. Moreover, differentiated guidance, management, and a multi-faceted counseling system are essential for addressing the characteristics and culture of students in each school year.

If medical students have a healthy lifestyle, results of previous studies suggest that they will also have a positive attitude toward preventive counseling (e.g., for alcohol consumption and problem drinking) and confidence in preventive counseling [17,20]. In particular, the early period of medical school life, especially in Korea, can be regarded as the first gate in forming drinking habits. Unhealthy drinking habits formed during this period may be difficult to modify toward moderation in drinking or abstinence from alcohol. Problem drinking during college may persist after graduation and cause serious future health problems [10,45]; therefore, it is important to pay attention to student guidance so that medical students do not become problem drinkers. The present study found no significant difference between alcohol dependence symptoms and

the harmful alcohol use domain. However, first- and fourth-year male students had stronger alcohol dependence symptoms and higher harmful-alcohol-use scores than female students in the same year. Male students also seemed more likely to choose alcohol to cope with academic stress during the first year, as well as during the fourth year, when they prepare for the Korean Medical Licensing Examination.

The association between drinking patterns and smoking status confirmed the results of previous studies [46]. Smokers were 2.7 times more likely to be binge drinkers, and they received higher scores for alcohol dependence and alcohol-related problems than non-smokers. Smokers drank more frequently than non-smokers, drank more at one time, and had a higher rate of binge drinking. Smokers displayed higher alcohol dependence symptoms and received higher harmful-alcohol-use scores than non-smokers. There was no gender difference in smokers' alcohol dependence symptoms or harmful-alcohol-use scores. However, among non-smokers, male students had more alcohol dependence symptoms and received higher scores than female students. Otherwise, harmful-alcohol-use scores did not differ significantly between the genders. These results are similar to those of previous studies carried out among both medical and non-medical college students, which demonstrated a strong correlation between drinking and smoking [46].

Patterns of alcohol consumption and alcohol-related problems vary depending on drinking motives, in particular those that lead to problem drinking. Drinking motives are classified as originating from inside or outside, as well as by outcome – whether the individual expects to receive positive or negative reinforcement through drinking [47]. By the valence and source dimensions of expected effects, 4 distinct drinking motives can be categorized [48]. In relation to frequency, "social drinking motives" were the most frequent response. In relation to drinking problems, however, students who selected "enhancement drinking motives" showed the highest level of drinking frequency, alcohol consumption per occasion, heavy drinking and binge drinking, and signs of alcohol dependence. Thus, of the 4 motives, "enhancement drinking motives" was the best predictor of problem drinking among medical students.

Moderate drinking improves mood and positively affects interpersonal relationships, but excessive drinking is a serious threat to health and safety. In the present study, most students drank to enhance interpersonal relationships. Compared with male students, whose second most common reason for drinking was to enhance a positive mood, fewer female students chose this response. The results of this study suggest that various types of active intervention are needed to reduce problem drinking among medical students. Dangerous levels of drinking among college students not only undermine academic performance and increase students' risk of alcohol-related injuries, death, exposure to sexual assault, and crime, but also disseminate a culture of inappropriate drinking to the wider community [4,11,12,15]. In particular, medical students who have drinking problems will influence future medical care and social culture; it is essential to provide an institutional environment and system that can establish a healthy drinking culture. Moreover, systematic and policy-based approaches are needed to solve the problem of college students' drinking. However, it is desirable to recognize the seriousness of the drinking problem and share it with the university authorities, professors, and students. Through the present study, we expect that all medical schools will recognize the seriousness of medical students' drinking problems and their motivation to drink, and make joint efforts to ensure a healthy drinking culture.

There are some limitations to consider in the present study. First, the low response rate (27.8%) may have limited the power and the representativeness of the study. There is a possibility that our sample may not be generalizable to the entire population of Korean medical students. However, it is meaningful that it was the first time that we surveyed the drinking problems of Korean medical students using a multicenter survey. Second, in any self-report questionnaire survey, there may be bias in responses to questions that deal with past experiences. Third, we used a modified AUDIT questionnaire and were therefore unable to measure the total AUDIT score. To overcome this limitation, we carried out an analysis and compared items in detail.

Conclusions

Heavy drinking and binge drinking among Korean medical students are common. Their drinking is also strongly correlated with smoking. Female medical students drink the same amount as male students – much more than other women. Enhancement drinking motives were the most common motivation among medical students and the best predictor of drinking problems. Korean medical students need guidance on drinking alcohol; it is also essential to pay more attention to the drinking of female students. When dealing with drinking problems, we need to provide concurrent education on smoking. Appropriate interventions, such as cognitive interventions to address motives, could also be attempted.

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