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Alcohol consumption among college students in Minahasa, Indonesia: a cross-sectional study towards the formulation of intervention strategies

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ABSTRACT

Background: College students are within the high-risk group to experience the full spectrum of alcohol-related psychopathologies, ranging from initial contact with alcohol to the severe problematic drinking. The prevalence, degree of severity, reasons of drinking, among other variables, however, have been inconsistent across studies. Therefore, it is crucial to replicate such studies in different socio-cultural settings to synthesize a broader understanding about alcohol-consuming behavior and formulating intervention strategies. This research aims to describe the pattern of alcohol drinking behavior among college students in Minahasa, Indonesia, and to analyze its correlation with academic performance.

Methods: We conducted a questionnaire-based cross-sectional study to investigate the alcohol-consumption pattern and examined its association with the students' academic performance obtained from the campus database. A total-sampling technique was applied to draw the samples. Chi-square and Kendall's tau analyses were employed accordingly to measure the relationship significance.

Results: From 417 samples (338 samples were females), 70.98% of them reported never had consumed alcohol of any amount. Male sex and local ethnicity are positively associated with consuming behavior. We found an association between alcohol consumption status with cumulative GPA but not with current GPA. Although alcohol consumers considered GPA as less important, the self-insight about their academic performance is intact. The consumed beverages were mostly beers, followed by traditional liquor and winepalms. Most of them consumed alcohol to "warm-up the body"—a common practice in this area, followed by social reasons. Only small number of them identified themselves as being addicted. Majority of the consumers realized the importance to reduce or quit consuming alcohol. The implications of these findings are then discussed.

Conclusions: This study showed that most of the students have never consumed alcohol. However, among the consumers, male sex and local ethnicity are more prone to become alcohol users. The academic performance is also affected, and since most of the consumers consider to reduce their drinking behavior, professional interventions are necessary to facilitate recovery attempts.

Keywords: Alcohol, College students, Academic performance, Minahasa

INTRODUCTION

Alcohol consumption has been a considerable public health problem worldwide due to its related health, socioeconomic, and productivity issues. Approximately 3.3 million deaths annually had been related with alcohol

consumption.¹ The burdens caused by alcohol-related morbidity is approximately 139 million disability-adjusted life years (DALYs), contributing to 5.1% of the global burden.² Consuming alcohol is associated with a wide range of diseases, disabilities, and deaths. Well-established causal link were confirmed to be existent between alcohol consumption and liver cirrhosis, cancers,

and injuries. More recent research revealed a surprising association with infectious diseases such as tuberculosis and HIV/AIDS. 3-5

College students are within the high-risk age range to consume alcohol. During these years, many of the them would experience the first encounter with alcohol, and this behavior can be sustained into adulthood.^{6,7} The prevalence of students' alcohol consumption varies across studies, mainly due to the differences in sampling methods as well as socio-demographic characteristics. Therefore, characterization of local alcohol consumption patterns can assist public health decision makers to formulate an approach in preventing and overcoming youth alcohol abuse. Alcohol consumption has been associated with poor academic performance in certain societies. 8–10 Since local culture can influence the attitude of the society towards alcohol consumption and subsequently the prevalence, it is critical to repeat such studies in different sociocultural settings. 11,12

Minahasa is regency in Indonesia where traditional alcohol drinks can be easily purchased even in housebased traditional kiosks (warung) with a cheap price. Minahasa has a 3-times higher prevalence of alcohol consumption than the national prevalence of Indonesia (17.4% and 4.6%, respectively) and ranks in top-two areas with the highest rate of consumption.¹³ Interestingly, Indonesia itself is among the lowest rank of countries in term of alcohol consumption.¹⁴ Despite the established national law against the marketing of illegal alcohol, the enforcement is relatively loose, relying only on occasional raids. 15 Alcohol consumption in Minahasa has been associated with celebration, joy, respecting guests, even considered inextricable from the culture. ¹⁶ In a large-scale survey conducted by our Department in 2015 involving 23 villages in Minahasa, alcohol consumption was reported to be the most prevalent nonhealth behavior (unpublished data). Taken together, this area is in particular unique, where the society is more permissive to alcohol consumption compared to other areas in Indonesia. To our best knowledge, there has not been any research conducted about the alcohol consumption pattern of college students in this area. We chose college students as the object of study because in Indonesian culture, compared to high school students, a college student is considered mature and can be fully independent to decide their behavior and bear the consequences.

This current research aims to describe the pattern of alcohol drinking behavior among college students in the Manado State University, the only state university in the regency of Minahasa. Further correlational analyses with the academic performance, self-insight, and desire to quit were also conducted. Efforts for intervention based on the current findings were then discussed with emphases on formulating psychological-based manipulation strategies.

METHODS

This is a questionnaire-based cross-sectional study conducted in the Manado State University, Minahasa, Indonesia from June to July 2016 to describe the prevalence and pattern of alcohol consumption among college students and to evaluate its relationship with the students' academic performance. Total sampling method was employed to ensure maximum representation from the population of all enrolled undergraduate college students in the School of Public Health, Manado State University, at the time of data collection.

We employed a validated questionnaire tailored and developed in our department to capture the frequency, volume, most recent time, type of drink, severity, as well as motivation and self-assessment of student's alcohol consumption behavior. The questionnaires were administered after a session of an end-of-semester test to ensure maximum attendance of the students. When agree, samples were asked to sign the consent form and provide their student identification number, which then was used to download their current and cumulative grade point average, as well as their demographic data from the Academic Information System. The access to the database had been approved by the database authoritative of the Department. The questionnaire also included questions about the students' self-perception about their academic performance. Those who were unwilling to participate were asked to leave the questionnaire blank. No monetary incentives nor grade bonus were offered as a reward for filling in the questionnaire.

Data were analyzed using SPSS ver. 22 (IBM, USA). When appropriate, we applied Chi-square and Kendall's tau tests to determine the significance, where p<0.05 is considered as statistically significant.

RESULTS

Sample characteristics

Of the 417 students in the study, 81.06% were females. This skewness is due to the sampling technique (total sampling) and the nature of population where female students dominate the department. At the time of the survey, students were spread across 5 batches (year 1 to 5), with only 5 students remaining on the 5th year. Most students are locals (i.e. had stayed in Minahasa at least during the duration of secondary school, 79.14%) while the rest came from different regions in Indonesia. The Grade Point Average (GPA) at the last semester (on scale 0 to 4) ranged from 0.00 to 4.00, mean (SD)=3.36 (0.42); while the cumulative GPA ranged from 1.46 to 4.00, mean (SD)=3.28 (0.29). Most of the students (70.98%) reported never consumed alcohol, and the rest 29.02% reported to have consumed alcohol, ranging from within the last year to within the last one day (Table 1).

Table 1: Sample characteristics.

Variables	n	%
Sex		
Male	79	18.94
Female	338	81.06
Year		
1	101	24.22
2	115	27.58
3	64	15.35
4	132	31.65
>4	5	1.20
Ethnicity		
Local	330	79.14
Non-local	87	20.86
Last GPA (mean±SD)	3.36±0.4	42
Cumulative GPA (mean±SD)	3.28±0.2	29
Alcohol consumption		
Never	296	70.98
Within the last year or more	44	10.55
Within the last semester	19	4.56
Within the last month	22	5.28
Within the last week	21	5.04
Within the last one day	15	3.60

Total-sample analysis

Despite the female dominancy over the total samples, more males reported alcohol consumption of any amount within the last past year (p<0.001) compared to females.

Across batches, alcohol consumption rate does not differ (p=0.205). Students who came from local ethnic background were more likely to consume alcohol in comparison with those who are non-locals (p=0.003). There is no significant difference of current-semester GPA between those who had never consumed alcohol with those who had (p=0.102). The cumulative GPA, however, significantly differed across consumption status (p=0.02). Those who consume alcohol are more likely to reflect themselves as having poor academic performance (p<0.001). Interestingly, they also consider module mark and GPA less important compared to non-drinkers (p=0.039, Table 2).

Self-reflection of academic performance

We followed-up by analyzing the students' self-reflection on their academic performance with their actual cumulative and current GPA (on a ratio scale) from the total sample as well as separately from drinker and non-drinker group (Table 3). From the total sample, students' self-reflection correlated well with their actual cumulative GPA (Kendall's tau R=-0.139, p<0.001) and their last GPA (R=-0.115. p=0.004). This correlation becomes stronger when the drinker group is analyzed separately (self-reflection to cumulative GPA: R=-0.211, p=0.003; self-reflection to current GPA: R=-0.181, p=0.013). Interestingly, among non-drinkers, there is not significant correlation for both current and cumulative GPA (p=0.149 and p=0.068, respectively).

Table 2: Comparison between alcohol consumers and non-consumers.

Variables	Total	Cons	Consumer		nsumer	Darolino
variables	1 Otal	n	%	n	%	P value
Sex						
Male	79	62	78.48	17	21.52	<0.001*
Female	338	59	17.46	279	82.54	
Year						
1	101	37	36.63	64	63.37	0.205
2	115	26	22.61	89	77.39	
3	64	19	29.69	45	70.31	
4	132	39	29.55	93	70.45	
>4	5	0	-	5	100.00	
Current GPA						
>3.50	179	40	22.35	139	77.65	0.102
3.00-3.50	217	73	33.64	144	66.36	
2.50-3.49	6	3	50.00	3	50.00	
2.00-2.49	11	4	36.36	7	63.64	
<2.00	4	1	25.00	3	75.00	
Cumulative GPA						
>3.50	79	16	20.25	63	79.75	0.020*
3.00-3.50	295	86	29.15	209	70.85	
2.50-3.49	36	17	47.22	19	52.78	
2.00-2.49	6	1	16.67	5	83.33	
<2.00	1	1	100.00	0	-	

Ethnicity						
Local	330	107	32.42	223	67.58	0.003*
Non-local	87	14	16.09	73	83.91	
Academic performance self-reflection						
No answer	9	3	33.33	6	66.67	<0.001*
Good	63	19	30.16	44	69.84	
Average	313	77	24.60	236	75.40	
Poor	32	22	68.75	10	31.25	
Importance of GPA						
Very important	5	1	20.00	4	80.00	0.039*
Somewhat important	389	108	27.76	281	72.24	
Not important	23	12	52.17	11	47.83	

Table 3: Correlation of self-reflected academic achievement with actual GPA (Kendall's tau).

Sample tested	n	Correlation	n with current GPA	Correlation	Correlation with cumulative GPA		
		R	р	R	p		
Total	417	-0.115	0.004*	-0.139	<0.001*		
Non-consumer only	296	-0.069	0.149	-0.085	0.068		
Consumer only	121	-0.181	0.013*	-0.211	0.003*		

Table 4: Specific characteristics of alcohol consumers.

Variables	n	%				
Sex						
Male	62	51.24				
Female	59	48.76				
Year						
1	37	30.58				
2	26	21.49				
3	19	15.70				
4	39	32.23				
Ethnicity						
Local	107	88.43				
Non-local	14	11.57				
Alcohol consumption						
Within the last year or more	44	36.36				
Within the last semester	19	15.70				
Within the last month	22	18.18				
Within the last week	21	17.36				
Yesterday	15	12.40				
Beverage*						
Beers	62	52.10				
Traditional light (saguer)	15	12.61				
Traditional mid (kasegaran, mixed drinks)	8	6.72				
Traditional hard (cap tikus)	30	25.21				
others, non-local	4	3.36				
Reason for drinking*						
"Warm up body"	63	27.39				
Show respect to peers who initiate	46	20.00				
Deliberately wanting to be drunk	27	11.74				
Have problem	26	11.30				
Celebrating something	49	21.30				
Admit as addict	5	2.17				
Not giving any answer	14	6.09				
Last GPA (mean±SD) 3.31±0.38						
Cumulative GPA (mean±SD) 3.22±0.33						
*Fach respondent can have more than 1 ontions Self-reflection						

^{*}Each respondent can have more than 1 options Self-reflection of academic performance.

We followed-up by analyzing the students' self-reflection on their academic performance with their actual cumulative and current GPA (on a ratio scale) from the total sample as well as separately from drinker and non-drinker group (Table 3). From the total sample, students' self-reflection correlated well with their actual cumulative GPA (Kendall's tau R=-0.139, p<0.001) and their last GPA (R=-0.115. p=0.004). This correlation becomes stronger when the drinker group is analyzed separately (self-reflection to cumulative GPA: R=-0.211, p=0.003; self-reflection to current GPA: R=-0.181, p=0.013). Interestingly, among non-drinkers, there is not significant correlation for both current and cumulative GPA (p=0.149 and p=0.068, respectively).

Drinker-only analysis

We extracted the non-drinker data out from the total sample for further analyses, resulting on 121 subjects who had consumed any amount of alcohol within the preceding one year, 62 of them were males (51.23%). Most of them (44 subjects) consumed alcohol more than 6 months ago, while 19, 22, 21, and 15 subjects consumed alcohol within the last semester, month, week. and day, respectively. Local students dominated this drinker group (107 subjects), ranging from year 1 to 4. The GPA for the last semester (on scale 0 to 4) ranged from 0.00 to 4.00, mean (SD) = 3.31 (0.38); while the cumulative GPA ranged from 1.46 to 4.00, mean(SD) = 3.22 (0.33) (Table 4). Males significantly consume alcohol more frequently than females (p=0.018). No difference was observed in ethnicity, batch, last GPA, as well as cumulative GPA between those who drink occasionally or frequently. However, there is a significant correlation between the usual alcohol consumption amount with consumption frequency (p<0.001), where those who drink more frequently also tend to drink in a higher dose. When assessed for the self-reflection of their drinking behavior, most of the subjects consider to reduce their drinking habit (77.69%); however, there is no correlation between drinking habit self-reflection with drinking frequency (p=0.644). Beers are the most common alcohol beverages consumed (52.1%), followed by traditional home-made liquor "cap tikus" (25.21%) and traditional home-made palm-wine "saguer"

(12.61%). The most common reason for having alcohol is "just to warm up" (27.39%), "celebrating an occasion" (21.30%), and "hesitate to refuse" (20%); 11.30% of them consume alcohol because of facing problems and only 2.17% declared themselves as addicted. There is no significant correlation between type of alcohol consumed with consumption frequency (p=0.06).

Table 5: Analysis of alcohol consumer only.

		Last alcol	nol consump	tion			
Variables	n	Last one	Last one	Last one	Last one	>6 months	P value
		day	week	month	semester	ago	
Sex							
Male	62	10	16	11	10	15	0.018*
Female	59	5	5	11	9	29	
Ethnicity							
Local	107	12	18	20	18	39	0.724
Non-local	14	3	3	2	1	5	
Year							
1	37	4	7	7	4	15	0.358
2	26	2	3	7	2	12	
3	19	4	3	2	2	8	
4	39	5	8	6	11	9	
Current GPA							
>3.50	15	5	9	1	0	0	0.249
3.00-3.50	21	6	12	1	2	0	
2.50-3.49	22	7	13	1	0	1	
2.00-2.49	19	9	8	0	2	0	
<2.00	44	13	31	0	0	0	
Cumulative GPA							
>3.50	15	0	13	2	0	0	0.294
3.00-3.50	21	2	14	4	1	0	
2.50-3.49	22	1	18	3	0	0	
2.00-2.49	19	3	13	2	0	1	
<2.00	44	10	28	6	0	0	
Amount per drinking episode*							
No answer	15	1	7	2	2	3	<0.001*
<1 shot	21	0	5	2	6	8	
1 to 3 shots	22	0	3	7	10	2	
4–6 shots	19	1	2	4	8	4	
>6 shots	44	5	1	22	9	7	
Self-reflection about drinking							
behavior							
Not answering	15	1	0	0	4	10	0.040*
Need to reduce	94	11	21	21	11	30	
I'm okay	12	3	0	1	4	4	
*1 -1 401							

^{*1} shot equals to approx. 40 ml.

DISCUSSION

In this current study, 417 samples were analyzed. This is the largest sample to date derived from the population of college students in the department.¹⁷ Majority of them (70.89%) do not consume alcohol, while the rest of them have ever consumed alcohol at some point in their life. We decided to consider any exposure to alcohol as

"consumer", because the initial contact is correlated with the current alcohol usage status. ¹⁸ In fact, in our study, only one-third (44 of 121) of the subjects who had contact with alcohol previously can keep abstain until the time of the study; while the rest two-third had been recurrently consuming alcohol within the last six months. This raises a health concern, because college students are also in a high-risk group of being exposed to alcohol consumption for the first time, which also means that the

other 296 students who never consume alcohol are also at high risk. ¹⁹ Therefore, a campus-based screening and counseling is highly favorable to be routinely employed among incoming and current college students. ^{20,21} In executing this intervention, a more focused attention needs to be paid to identify high risk groups. In this study we have found that males are consistently being alcohol consumer more than females. We also observed that local students tend to consume alcohol more compared to non-local students, after adjusting for the proportion rate. To investigate whether the sociocultural setting of our population affects this findings more than the locality *per se*, further replication studies in different population need to be conducted.

We found that alcohol consumption does not correlate with current GPA, but correlates with cumulative GPA. This finding needs to be interpreted cautiously. While a recent longitudinal study suggested that alcohol consumers tend score lower in their academic performance, a more tedious effort is needed to identify within-group variables that can confound this. In fact, a more recent study by the same group implied that alcohol consumers with an earlier initial exposure to alcohol can reach a plateau phase and maintain their academic activity better than the new-drinkers.²² The implication is enormous: while chronic consumers might be more difficult to rehabilitate, they can also display a homeostatic mechanism to cope with their daily life function- and for students, this means their academic activities and performance. This also explains why alcohol consumption status only correlates with cumulative GPA, not current GPA—because the current drinkers might have had some period of adjustment initially at the previous semesters, but are now able to maintain their academic performance despite their alcohol-consumption status. This does not mean, however, that the effort to quit is not necessary. Meda et al¹⁰ reported that students who managed to reduce their alcohol consumption could significantly increase their GPA compared to those who failed to. It is also important to note that in line with previous finding, our study also found that alcohol consumers do not value good grades compared to their non-consumer counterparts.8 Thus, any cognitive or behavioral intervention may utilize this goalresetting strategy as a targeted pathway for treatment.²

Most alcohol consumers judged themselves as performing poorly in academic activities. To address whether this merely reflects the humble opinion of alcohol consumers about themselves, we further analyze the rational correlation between the self-reflection on academic performance and the student's actual GPA. Surprisingly, alcohol consumers have the most robust correlation coefficient between self-reflection and both current and cumulative GPA. This suggests that their self-insight is still somehow preserved, although their ability to execute a goal-directed behavior might be impaired, as most of them failed to quit.²⁴ The implication of this is that any professional intervention to

assist the alcohol quitting would be really impactful when applied to this potential population. In fact, we would further argue this collegiate period may serve as a "golden period" to be intervened, as their life-goal has not been achieved yet, thus providing them a very good reason to reassign a facilitated goal-directed behavior over their ameliorative habitual drinking. In addition, majority of alcohol consumers are already considering to reduce their drinking habit. The fact that this intention does not correlate with the actual drinking frequency suggest that despite a strong desire to quit, they somehow keep failing to achieving the target, and thus, a professional intervention would be deemed necessary.

We also found that those who consume alcohol more frequently also tend to consume in a higher amount per drinking episode. This highlights the so-called *binge drinkers* as a special public health concern population, which has been consistent across studies. ^{25–27} This current research is thus in agreement to the established evidence, showing that the frequency and amount of drinking are intertwined, perhaps forming a vicious cycle that demand professional intervention. ²⁸

Investigating the reason of consuming alcohol in Minahasan college students is also necessary. It is interesting to find out that most of them have stated "body-warming" as a most cited reason to consume alcohol. The university where we conduct the study is located on a mountainous area, where the night temperature can fall to 12 degree Celsius, far colder compared to the average tropical temperature (24-30 degree). While this "alcohol-facilitated body-warming" has been practiced since the ancient time of Minahasa, it is also necessary to note that this behavior is not necessary, as many other strategies can be employed to "warm up" such as wearing layers of clothes or consumes other non-alcoholic hot drinks.²⁹ However, this also implies that a cognitive-behavioral therapy can be successfully applied to modify mal-behaviors, especially if the reason of performing that behavior is incorrect.³ The following reasons to consume alcohol are social; for celebrating some occasion or to ice-break a gathering. Serving alcoholic drinks have been considered as a tradition in Minahasa, where the host shows his respect to the guests. Since this practice is highly tolerable in this area, further follow-up studies would be needed, in particular the socio-cultural analysis, which is beyond the scope of this current study.

CONCLUSION

This study showed that most of the students have never consumed alcohol. However, among the consumers, male sex and local ethnicity are more prone to becoming alcohol users. The academic performance is also affected, and since most of the consumers consider to reduce their drinking behavior, professional interventions are necessary to facilitate recovery attempts.

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