

Alcohol Consumption and Depression Among University Students and Their Perception of Alcohol Use

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* Equal contribution

CME

Abstract

Objectives: To investigate the association between alcohol use and depression among university students in Hong Kong, their stress-coping methods, and their knowledge and perception of the effects of alcohol on health.

Methods: 345 full-time undergraduate students from The University of Hong Kong were invited to complete a questionnaire to assess their alcohol consumption (Alcohol Use Disorders Identification Test, CAGE questionnaire), depressive symptoms (Patient Health Questionnaire-9), and stress-coping methods (Coping Orientation to Problems Experienced Inventory), as well as knowledge and perception of alcohol consumption on health. Multiple linear regression was used to determine significant variables associated with depressive symptoms. Multinomial logistic regression was used to determine the effect of such variables on depressive symptom caseness and AUDIT drinking risk groups.

Results: 43.2% of respondents were moderate- to high-risk drinkers, but only 23.2% were self-reported as moderate- to high-level drinkers. 57.9% of respondents had mild to severe depressive symptoms. Probable depression was more likely to occur in female students, those with higher general stress, those who do not use social support for stress-coping, and those who smoke. High-risk drinkers were more likely to occur in older students, smokers, those with higher household income, and those with higher general stress levels. Students with higher levels of depressive symptoms and higher risk of alcohol consumption were more likely to use avoidance for stress-coping. 89.5% of students considered alcohol consumption moderately to very harmful to health, but students demonstrated only moderate knowledge levels of alcohol consumption on health.

Conclusion: Alcohol consumption and depressive symptoms are prevalent among university students in Hong Kong. The use of avoidance for stress-coping is common in those with higher levels of depressive symptoms and higher-risk drinkers. Students tend to avoid seeking help for depressive symptoms and potentially take up drinking as a coping strategy. Context-specific approaches should be used when providing counselling services for student wellbeing in university settings. Further education of university students on knowledge and perception of alcohol consumption on health should be provided.

Key words: Adaptation, psychological; Alcohol drinking in college; Depression; Mental health; Stress, psychological

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Introduction

Tertiary-level students have high levels of distress, mental illness (such as depression), and suicidal ideation.¹⁻⁷

Systematic reviews in different countries have shown that these students have a high prevalence of depressive symptoms (11.0% to 34.0%),⁸⁻¹¹ which is higher than the World Health Organization estimated global prevalence of depression of 4.4%.¹² In Hong Kong, 68.5% of university students were reported to have mild-to-severe levels of depressive symptoms.¹³ In addition, alcohol use, dependence, and abuse have increased substantially among university students.¹⁴ 61% of Hong Kong university students self-report alcohol use,^{15,16} which is lower than their counterparts in Europe or the United States.^{17,18}

Alcohol use and depression account for a significant portion of the global disease burden in terms of disability-adjusted life-years. The onset of anxiety and depression is associated with alcohol use in excess in the general population.¹⁹ Depressive symptoms are associated with earlier onset and higher frequency of alcohol

consumption.²⁰⁻²³ Common mental disorders (such as depression) are positively associated with alcohol drinking and misuse among the general public²⁴ and nurses²⁵ in Hong Kong as well as university students elsewhere.²⁶⁻²⁸

Coping strategies for psychological wellbeing vary in different population sub-groups, cultural contexts, and social behaviours,^{29,30} as does perception of alcohol use.³¹ Students are reluctant to seek help for mental health-related issues,³²⁻³⁴ and alcohol presents a possible coping mechanism for stress and depression.³⁵ There is evidence that drinking to cope with negative emotions is a mediator between depressive symptoms and alcohol-related behaviour and perceptions.³⁶⁻³⁸ Thus, the present study aims to investigate the association between alcohol use and depression among university students in Hong Kong, their stress-coping methods, and their knowledge and perception of the effects of alcohol on health.

Methods

This cross-sectional study was approved by the Institutional Review Board of The University of Hong Kong / Hospital Authority Hong Kong West Cluster (reference: HKU/HA HKW IRB UW 18-666). Written informed consent was obtained from each participant.

Between January and March 2019, full-time undergraduate students aged ≥ 18 years from the University of Hong Kong were recruited at various locations on campuses during school days. Those with known alcohol allergy, long-term disease, mental diseases other than depression, or medical advice not to drink alcohol were excluded (Figure).

Based on a study of depression in Hong Kong tertiary

education institutions,¹³ a sample of 332 was estimated to provide 90% power to detect $68.5\% \pm 10\%$ prevalence of mild-to-severe depression.

The 10-item Alcohol Use Disorders Identification Test (AUDIT)³⁹ was used to assess the level of alcohol consumption. Total scores range from 0 to 40; scores 0 to 7 indicate low risk, 8 to 15 moderate risk, 16 to 19 high risk, and 20 to 40 likely addiction, which is in line with World Health Organization recommendations.⁴⁰ Internal consistency is good for both the English (Cronbach's $\alpha=0.97$) and Chinese (Cronbach's $\alpha=0.74$) versions of AUDIT.^{40,41} For comparison, the four-item CAGE questionnaire⁴² was used to assess the level of alcohol consumption. Total scores range from 0 to 4; scores of 0 to 1 indicate low risk of problem drinking, scores of 2 to 3 indicate high suspicion of alcoholism, and a score of 4 indicates virtually diagnostic of alcoholism.⁴³ In addition, students were asked to self-report their drinking status as non-drinkers, low-, moderate-, or high-level drinkers. Data related to circumstances and location of drinking, familial drinking habits, type and quantity of alcohol typically consumed were collected.

The nine-item Patient Health Questionnaire (PHQ-9) was used to measure the extent and presence of depressive symptoms. It is reliable and valid and has specificity of 88% and sensitivity of 88%.⁴⁴ It has been validated in the general Hong Kong populations⁴⁵ and university populations.^{46,47} Total scores range from 0 to 27; scores of 1 to 4 indicate minimal, 5 to 9 mild, 10 to 14 moderate, 15 to 19 moderately severe, and 20 to 27 severe depressive symptoms. A cut-off score of ≥ 10 (range, 0-27) indicates probable depression, with a specificity of 85% and sensitivity of 88%.

The 28-item Coping Orientation to Problems Experienced (COPE) Inventory was used to assess coping methods in response to stress. There were four dimensions: social support, problem solving, avoidance, and positive thinking. Scores for each item range from 1 to 4; the mean score for each dimension was calculated. The four dimensions had satisfactory psychometric properties,⁴⁸ with Cronbach's α of 0.64 to 0.82 and test-retest reliability of >0.42 .⁴⁹ The use of the four dimensions avoids dichotomisation of the inventory into adaptive or maladaptive coping,⁵⁰ while preserving analytical simplicity and ease.

The current level of general stress and stress experienced at university was self-rated on a five-point Likert scale from not stressed (1) to very highly stressed (5).

Knowledge of the risk of excessive alcohol consumption to the liver, pancreas, stomach, cardiovascular system, and malignancies of the skin, breast, and bowels was assessed, as was perception of drinking behaviour and trend of alcohol use and alcohol abuse among peers. Students were asked the degree of harm to health by alcohol consumption from 'not harmful', 'moderately harmful', 'harmful', to 'very harmful'.

Sociodemographic data such as age, sex, ethnicity, year of study, faculty, major, university admission scheme, monthly domestic household income, current residence,

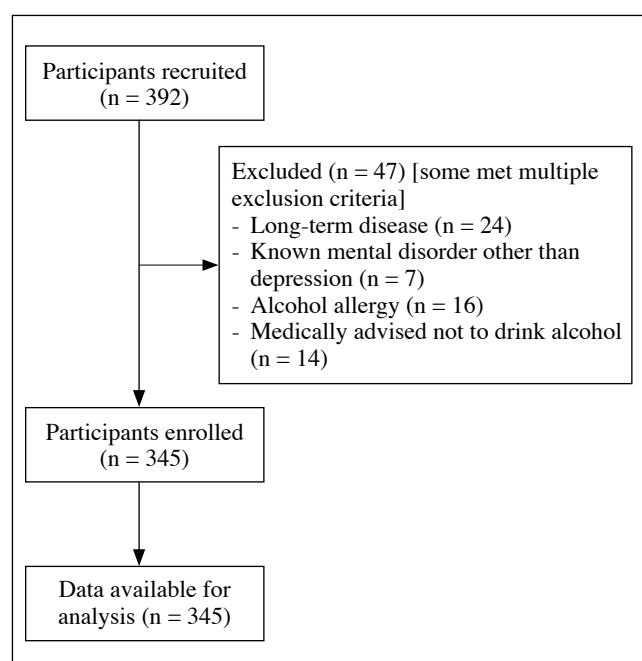


Figure. Flowchart indicating the study procedure

and smoking status were collected.

SPSS (Windows version 25; IBM Corp, Armonk [NY], US) was used for statistical analyses. Medical and non-medical students were compared using independent samples t-test for continuous variables and Chi square test

for categorical variables. Multiple linear regression was used to determine significant variables associated with PHQ-9 scores. Multinomial logistic regression was used to determine the effect of such variables on PHQ-9 caseness and AUDIT drinking risk groups.

Table 1. Descriptive characteristics of study population

	Total sample (n = 345)*	Medical students (n = 202)*	Non-medical students (n = 143)*	p Value
Age, y	20.71 ± 2.29	20.74 ± 2.08	20.67 ± 2.55	0.798
Sex				0.688
Male	44.6	45.5	43.3	
Female	55.4	54.5	56.6	
Ethnicity				<0.001
Chinese	91.3	98.5	81.1	
Pakistani	0.9	0.5	1.4	
Others	7.8	1.0	17.5	
Year				0.369
1	21.4	12.4	34.3	
2	38.3	40.6	35.0	
3	10.7	4.0	20.3	
4	27.5	42.6	6.3	
5	1.7	0.5	3.5	
6	0	0.0	0.0	
N/A	0.3	0.0	0.7	
Admission route				0.316
Joint University Programmes Admissions System (JUPAS)	58.6	60.4	55.9	
Non-JUPAS	41.2	39.6	43.4	
Monthly household income, HK\$				0.074
2000 to <25 000	20.9	18.4	24.5	
25 000 to <40 000	25.5	25.2	25.9	
40 000 to <60 000	17.7	15.8	20.3	
≥60 000	35.9	40.6	29.4	
Residence				<0.001
Home	78.8	89.1	64.3	
Hall	17.1	10.4	26.6	
Others	4.1	0.5	9.1	
Smoking status				0.944
Current smoker	2.3	2.5	2.1	
Ex-smoker	2.9	3.0	2.8	
Experimental smoker	3.8	3.0	4.9	
Non-smoker	91.0	91.6	90.2	
Alcohol Use Disorders Identification Test				0.959
Low-risk drinker	55.9	56.9	54.5	
Moderate-risk drinker	35.4	33.7	37.8	
High-risk drinker	7.8	8.4	7.0	
Addiction-risk drinker	0.9	1.0	0.7	

* Data are presented as mean ± standard deviation or % of participants

Table 1. (cont'd)

	Total sample (n = 345)*	Medical students (n = 202)*	Non-medical students (n = 143)*	p Value
CAGE questionnaire				0.048
Low risk of problem drinking	92.2	90.1	95.1	
High suspicion for alcoholism	7.2	8.9	4.9	
Virtually diagnostic for alcoholism	0.6	1.0	0	
Patient Health Questionnaire-9				0.110
Minimal depressive symptoms	42.0	47.5	34.3	
Mild depressive symptoms	44.6	39.1	52.4	
Moderate depressive symptoms	11.6	11.4	11.9	
Moderately severe depressive symptoms	1.7	2.0	1.4	
Severe depressive symptoms	0	0	0	
Alcohol consumption in past 2 weeks				0.216
≤1 time	75.9	78.7	72.0	
2-3 times	18.8	15.8	23.1	
4- times	3.5	4.0	2.8	
≥6 times	1.7	1.5	2.1	
Self-perceived drinking status				0.712
Non-drinker	24.3	24.8	23.8	
Low-level drinker	52.5	51.0	54.5	
Moderate-level drinker	21.7	22.3	21.0	
High-level drinker	1.5	1.9	0.7	
Alcohol use in your peers is...				0.453
Not at all a problem	19.4	20.3	18.2	
Minor problem	58.6	57.4	60.1	
Big problem	17.1	19.3	14.0	
Serious problem	4.9	3.0	7.7	
Alcohol abuse in your peers is...				0.501
Not a problem at all	15.4	14.4	16.8	
Minor problem	40.6	43.1	37.1	
Big problem	27.2	28.2	25.9	
Serious problem	16.8	14.4	20.3	
Degree of harm to health by alcohol consumption?				0.254
Not harmful	10.4	12.9	7.0	
Moderately harmful	37.4	37.1	37.8	
Harmful	41.7	39.1	45.5	
Very harmful	10.4	10.9	9.8	
Primary reason for young people to drink				0.049
Have a good time at a party	70.7	75.7	63.6	
Sad and want to feel better about themselves	13.0	10.9	16.1	
Wish to fit in or be accepted	9.0	8.9	9.1	
Knowledge on whether excessive alcohol consumption causes the following conditions				
Pancreatitis	72.2	77.2	65.0	0.013
Breast cancer	53.9	62.9	41.3	<0.001
Skin cancer	42.3	49.0	32.9	0.003
Bowel cancer	83.2	86.6	78.3	0.042

Results

Of 392 respondents, 345 (55.4% female) [mean age, 20.71 \pm 2.29 years] were included for analysis (Table 1). 91.3% of them were ethnic Chinese. Based on the AUDIT score, 55.9% were classified as low-risk drinkers, 35.4% as moderate-risk drinkers, 7.8% as high-risk drinkers, 0.9% as addiction-risk drinkers. This contrasted with the self-reported rates of 24.3% as non-drinkers, 52.5% as low-level drinkers, 21.7% as moderate-level drinkers, and 1.5% as high-level drinkers. Based on the CAGE questionnaire, 7.2% were at high suspicion of alcoholism and 0.9% were virtually diagnostic for alcoholism. In addition, 24.1% of respondents consumed alcohol more than twice over the past 2 weeks.

Based on the PHQ-9 score, 44.6%, 11.6%, and 1.7% of respondents had mild, moderate, and moderately severe depressive symptoms, respectively. The prevalence of probable depression was 13.3%. 19.1% reported depression problems or feelings before drinking alcohol, whereas 11.9% experienced depressive symptoms during and after drinking. When drinking, students reported feeling relaxed (67.0%), happy (44.3%), and excited (25.5%), as well as

negative emotions including tiredness (13.3%), depression (16.2%), loneliness (6.4%), and anger (2.9%).

49.3% of respondents reported moderate to very high levels of general stress. 60% reported moderate to very high levels of university-related stress.

In multiple linear regression, higher PHQ-9 scores correlated with non-medical faculty students ($\beta = 0.100$, $p = 0.040$), smoking status ($\beta = 0.099$, $p = 0.033$), high levels of general stress ($\beta = 0.282$, $p < 0.001$), high suspicion to virtually diagnostic of alcoholism ($\beta = 0.100$, $p = 0.040$), high to addiction risk of alcohol consumption ($\beta = 0.134$, $p = 0.006$), and stress-coping method of avoidance ($\beta = 0.330$, $p < 0.001$) [Table 2].

In multinomial logistic regression, using minimal depressive symptoms as the reference, students with mild depressive symptoms were more likely to be female (odds ratio [OR] = 2.098, $p = 0.007$), non-medical faculty (OR = 2.175, $p = 0.005$), have high levels of general stress (OR = 2.928, $p = 0.002$), and less likely to use the stress-coping method of social support (OR = 0.922, $p = 0.047$) [Table 3]. Students with moderate to severe depressive symptoms were more likely to be female (OR = 3.325, $p = 0.005$), smokers (OR = 3.289, $p = 0.049$), and have high

Table 2. Multiple linear regression analysis of variables associated with Patient Health Questionnaire-9*

Variable	Standardised β (95% confidence interval)	p Value
Age	0.066 (-0.070 to 0.361)	0.185
Female sex	0.029 (-0.627 to 1.211)	0.532
Non-medical faculty	0.098 (0.053 to 1.939)	0.038
Non-Joint University Programmes Admissions System admission route	-0.087 (-1.850 to 0.077)	0.071
High monthly household income	0.021 (-0.712 to 1.126)	0.658
Living in residence other than home	-0.009 (-1.264 to 1.054)	0.858
Smoker	0.099 (0.139 to 3.339)	0.033
High levels of general stress	0.282 (1.630 to 4.021)	<0.001
High levels of university-related stress	0.046 (-0.702 to 1.635)	0.433
CAGE questionnaire		
High suspicion to virtually diagnostic of alcoholism	0.100 (0.088 to 3.650)	0.040
Low risk of problem drinking (reference)	-	-
Alcohol Use Disorders Identification Test		
Moderate-risk drinker	-0.034 (-1.326 to 0.604)	0.462
High- to addiction-risk drinker	0.134 (0.684 to 4.074)	0.006
Low-risk drinker (reference)	-	-
Knowledge score	-0.021 (-0.449 to 0.276)	0.638
Coping Orientation to Problems Experienced Inventory		
Social support	-0.086 (-0.231 to 0.046)	0.189
Problem solving	0.042 (-0.144 to 0.283)	0.522
Avoidance	0.330 (0.245 to 0.478)	<0.001
Positive thinking	-0.051 (-0.247 to 0.110)	0.453

* $R = 0.616$; $R^2 = 0.380$, adjusted $R^2 = 0.348$, standard error of the estimate = 4.055

Table 3. Multinomial logistic regression for Patient Health Questionnaire-9 caseness (minimal depressive symptoms as reference)

Variable	Mild depressive symptoms		Moderate to moderately severe depressive symptoms	
	Exp (B) [95% confidence interval]	p Value	Exp (B) [95% confidence interval]	p Value
Age	1.031 (0.909-1.168)	0.639	1.118 (0.939-1.331)	0.210
Female sex	2.098 (1.230-3.578)	0.007	3.325 (1.449-7.632)	0.005
Non-medical faculty	2.175 (1.265-3.741)	0.005	1.798 (0.804-4.022)	0.153
Non-Joint University Programmes Admissions System admission route	1.039 (0.598-1.806)	0.892	0.965 (0.429-2.170)	0.932
High monthly household income	1.024 (0.606-1.730)	0.928	1.422 (0.649-3.117)	0.379
Smoker	1.232 (0.449-3.379)	0.685	3.289 (1.004-10.772)	0.049
Living in residence other than home	0.612 (0.316-1.186)	0.146	0.863 (0.322-2.315)	0.770
High levels of general stress	2.928 (1.508-5.687)	0.002	3.972 (1.330-11.861)	0.013
High levels of university-related stress	1.261 (0.661-2.405)	0.481	0.597 (0.213-1.673)	0.327
Alcohol Use Disorders Identification Test				
Medium-risk drinker	1.029 (0.599-1.768)	0.917	0.527 (0.215-1.292)	0.161
High- to addiction-risk drinker	1.030 (0.358-2.965)	0.956	2.227 (0.678-7.316)	0.187
Low-risk drinker (reference)	-	-	-	-
CAGE questionnaire				
High suspicion to virtually diagnostic of alcoholism	1.133 (0.348-3.685)	0.836	3.011 (0.799-11.352)	0.104
Low risk of problem drinking (reference)	-	-	-	-
Knowledge score	1.072 (0.871-1.319)	0.511	0.918 (0.677-1.243)	0.579
Coping Orientation to Problems Experienced Inventory				
Social support	0.922 (0.850-0.999)	0.047	0.988 (0.880-1.109)	0.839
Problem solving	1.110 (0.982-1.256)	0.096	1.075 (0.890-1.298)	0.452
Avoidance	1.032 (0.963-1.150)	0.372	1.088 (0.989-1.196)	0.082
Positive thinking	1.040 (1.508-5.687)	0.447	0.948 (0.808-1.113)	0.518

levels of general stress (OR = 3.972, $p = 0.013$) [Table 3].

In multinomial logistic regression, using low-risk drinkers (AUDIT scores of 0 to 7) as the reference, moderate-risk drinkers were more likely to have high monthly household income (OR = 1.999, $p = 0.007$) and high levels of general stress (OR = 2.679, $p = 0.003$) [Table 4]. High- to addiction-risk drinkers were more likely to be older students (OR = 1.272, $p = 0.007$) and smokers (OR = 6.609, $p = 0.001$) [Table 4].

A post-hoc one-way analysis of variance was used to determine differences in stress-coping methods in different levels of alcohol consumption. The score of the coping method of avoidance was significantly higher in high- to addiction-risk drinkers than moderate-risk or low-risk drinkers (19.93 ± 6.05 vs 17.03 ± 4.14 vs 16.37 ± 4.41 , $p < 0.001$). High scores indicate more use of avoidance for stress-coping. In addition, a post-hoc linear regression

analysis showed a significant interaction effect of avoidance and stress on PHQ-9 score ($\beta = 0.226$, $p = 0.003$).

Regarding knowledge and perception of drinking on health, 89.5% of students considered alcohol consumption moderately to very harmful to health. 78.0% of students considered alcohol use in their peers as a minor problem or not a problem at all, whereas 56.0% of students considered so for alcohol abuse. 74.2% considered drinking and depression are at least a moderate problem.

Discussion

In the present study, 43.2% of students were moderate- to high-risk drinkers, and 57.9% of students had mild to moderately severe depressive symptoms, which is comparable to the 68.5% reported in another study of Hong Kong university students.¹³ The prevalence of probable

Table 4. Multinomial logistic regression for Alcohol Use Disorders Identification Test alcohol consumption risk caseness (low risk as reference)

Variable	Moderate-risk drinker		High- to addiction-risk drinker	
	Exp (B) [95% confidence interval]	p Value	Exp (B) [95% confidence interval]	p Value
Age	1.091 (0.970-1.226)	0.146	1.272 (1.067-1.517)	0.007
Female sex	1.081 (0.662-1.765)	0.755	1.355 (0.579-3.173)	0.484
Non-medical faculty	1.128 (0.679-1.873)	0.642	0.731 (0.295-1.809)	0.498
Non-Joint University Programmes Admissions System admission route	0.770 (0.459-1.293)	0.323	0.537 (0.221-1.304)	0.169
High monthly household income	1.999 (1.210-3.305)	0.007	1.186 (0.506-2.781)	0.695
Smoker	1.923 (0.786-4.701)	0.152	6.609 (2.142-20.391)	0.001
Living in residence other than home	1.646 (0.888-3.049)	0.113	2.301 (0.804-6.582)	0.120
High levels of general stress	2.679 (1.405-5.107)	0.003	3.157 (0.966-10.310)	0.057
High levels of university stress	0.670 (0.347-1.293)	0.233	0.945 (0.281-3.179)	0.927
Knowledge score	1.063 (0.870-1.299)	0.549	1.195 (0.803-1.780)	0.380

depression was 13.3%, which is lower than the 21% of moderate-to-severe depression reported in Hong Kong university students.⁵¹ The differences may be due to the use of different mental health screening scales and our exclusion of those with mental illnesses other than depression and those medically advised not to drink alcohol. Severity of probable depression was associated with high- to addiction-risk drinkers and high suspicion to virtually diagnostic of alcoholism. This finding is consistent with previous studies reporting strong associations between student psychological distress and alcohol consumption.⁵²⁻⁵⁴ Depressive symptoms may motivate hazardous drinking behaviour, particularly if students are reluctant to seek professional help for mental health-related issues. However, reverse causality cannot be ruled out owing to our cross-sectional study design.

There was a discrepancy between self-reported drinking status and AUDIT scores. Students underestimated their drinking status, which may result in further hazardous behaviour. 52.1% of respondents considered alcohol consumption harmful or very harmful to health. Further health education to target misconceptions was recommended, as was advice on alcohol intake (setting goals and limits) and referral for counselling and therapy in more severe cases.

Many universities provide structured support such as counselling services to prevent mental health-related issues. However, many students are reluctant to seek help or deny any mental distress. Counselling services reply on self-perception of need, which results in a passive delivering of care and decreased utilisation of mental health services. Thus, it is important to promote accessibility of screening tools for mental health-related issues,⁵⁵ in order to publicise, demystify, and normalise the help-seeking

process via engaging campaigns. In addition, there should be sufficient counsellors and psychologists to fulfil unmet and unrecognised demands. The advisor-advisee and mentor-mentee systems are implemented to identify those with risk,³⁴ but they are highly dependent on students' comfort and willingness to share personal experiences. As 13.3% of students reported moderate to severe depressive symptoms, teaching institutions should devise context-specific approaches to aid students to improve psychological wellbeing.

Most students considered alcohol use and alcohol abuse among their peers as a minor problem or not a problem at all. Fewer medical students than non-medical students considered alcohol abuse as a serious problem (14.4% vs 20.3%, $p = 0.147$). This may be because medical students tend to focus on specific risk factors of disease. For instance, hepatocellular carcinoma is mainly associated with hepatitis B and C or liver cirrhosis, lung cancer is mainly associated with smoking, and colorectal cancer is mainly associated with increased red meat intake, longstanding ulcerative colitis, obesity, and genetic factors including familial polyposis coli or hereditary nonpolyposis colorectal cancer. Medical students may consider alcohol consumption a less important risk factor than those specific to the disease. It is crucial to inform correct perception of drinking behaviour to university students, particularly medical students who will provide health advice to the public in future.

Students with higher levels of depressive symptoms were more likely to use avoidance (rather than social support, problem-solving, and positive thinking) for stress-coping. This was consistent with studies that reported increased tendency for avoidant coping in students with higher depressive levels.^{56,57} Passive coping mechanisms

such as avoidance may result in pessimistic thinking, thereby increasing the risk of depression.^{58,59} Our post hoc analysis confirmed that students who used avoidance to cope with psychological distress were more likely to consume alcohol in managing depressive symptoms. An interaction effect between the use of avoidance coping and stress on depression was observed. Studies with longitudinal design may prove such interrelationships. It is suggested that psychological support should be customised to individual university students based on their coping strategy.

Regarding knowledge of harmful effects of alcohol on health, the least recognised adverse effect of alcohol on health was the increased risk of breast cancer and pancreatitis. Interestingly, medical students were more likely to associate skin cancer with harmful effects of alcohol, but alcohol consumption is not a fully established risk factor for such disease,⁶⁰ although it is correlated with an increased risk of developing melanoma, especially in body parts protected from sun exposure.⁶¹ It is imperative to instil correct knowledge about the risks of excessive alcohol intake on health that may pose detrimental effects on the students.

The prevalence of drinking among university students is rising in Hong Kong. The current policies of zero duty for wine and liquor with an alcoholic content of <30%⁶² may have exacerbated the problem.

There are limitations to this study. The exclusion criteria (alcohol allergy, long-term disease, mental diseases other than depression, and medical advice not to drink alcohol) may have resulted in underestimation of effect sizes and study results. Our sample was from one university only and may not be representative of all undergraduate students in Hong Kong. However, our sample's demographics closely concur with those of all tertiary-level students. Students who self-segregated from social contact owing to severe depression, drinking habits, or other reasons are unlikely to be included. Reverse causality and residual confounding cannot be fully excluded owing to the cross-sectional design, as temporal sequences between exposure and outcome cannot be established. Further studies are warranted to delineate relationships between alcohol consumption and depression, as are further longitudinal studies to establish temporal relationships and subgroup variations of correlations identified in this study.

Conclusion

Alcohol consumption and depressive symptoms are prevalent among university students in Hong Kong. The use of avoidance for stress-coping is common in those with higher levels of depressive symptoms and higher-risk drinkers. Students tend to avoid seeking help for depressive symptoms and potentially take up drinking as a coping strategy. Context-specific approaches should be used when providing counselling services for student wellbeing in university settings. Further education of university students on knowledge and perception of alcohol consumption on

health should be provided.

Contributors

All authors designed the study. MSCC, SHLP, KLL, and CCYC acquired the data. MSCC, SHLP, and WWTL analysed the data and drafted the manuscript. All authors critically revised the manuscript for important intellectual content. All authors had full access to the data, contributed to the study, approved the final version for publication, and take responsibility for its accuracy and integrity.

Conflicts of Interest

All authors have disclosed no conflicts of interest.

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Data Availability

All data generated or analysed during the present study are available from the corresponding author on reasonable request.

Ethics Approval

The study was approved by the Institutional Review Board of The University of Hong Kong / Hospital Authority Hong Kong West Cluster (reference: HKU/HA HKW IRB UW 18-666). Written informed consent was obtained from each participant.

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