

Underage alcohol drinking and medical services use in Hong Kong: a cross-sectional study

Man Ping Wang, Sai Yin Ho, Tai Hing Lam

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School of Public Health,
The University of Hong Kong,
Hong Kong, Hong Kong

Correspondence to

Dr Daniel S Y Ho;
syho@hku.hk

ABSTRACT

Objectives: To investigate the association of underage alcohol drinking with medical consultation and hospitalisation in Hong Kong.

Design: Cross-sectional study.

Setting: Secondary schools in Hong Kong.

Participants: A total of 33 300 secondary 1 (US grade 7) to secondary 5 students (47.6% boys; mean age 14.6 years, SD 1.6) in 85 randomly selected schools.

Outcome measures: An anonymous questionnaire was used to obtain information about medical consultation in the past 14 days, hospitalisation in the past 12 months, drinking alcohol, smoking, illicit drug use, physical activity, secondhand smoke exposure, feeling depressed, feeling anxious and sociodemographic characteristics. Drinking alcohol was categorised as non-drinking (reference), <1, 1–2 and 3–7 days/week. Logistic regression yielded adjusted ORs (AORs) of medical consultation and hospitalisation for drinking, adjusting for different potential confounders. Subgroup analysis was conducted among adolescents who did not report feeling anxious or depressed.

Results: More than one-fourth (27.6%) of adolescents drank alcohol, 15.9% had medical consultation and 5.1% had been hospitalised. In the fully adjusted model, the AORs (95% CI) for medical consultation were 1.14 (1.06 to 1.23) for <1 day/week, 1.30 (1.13 to 1.50) for 1–2 days/week and 1.70 (1.41 to 2.06) for 3–7 days/week of drinking compared with non-drinking (p for trend <0.001). The corresponding AORs (95% CI) for hospitalisation were 1.14 (1.02 to 1.28), 1.68 (1.32 to 2.14) and 2.38 (1.90 to 2.98) (p for trend <0.001). Similar associations were observed among students who did not feel anxious or depressed.

Conclusions: Alcohol consumption was associated with medical services use in Chinese adolescents. More rigorous alcohol control policies and health promotion programmes are needed to reduce alcohol drinking and related harms in adolescents.

INTRODUCTION

The prevalence of underage drinking is increasing in most countries.¹ Underage drinking of alcohol impairs brain

ARTICLE SUMMARY

Article focus

■ To investigate the associations of drinking alcohol with medical consultation and hospitalisation among adolescents in Hong Kong, the most westernised city in China, but with a much lower adult drinking prevalence than the West.

Key messages

- Alcohol drinking is prevalent among adolescents (one-fourth) in Hong Kong.
- Underage alcohol drinking was significantly associated with medical consultation and hospitalisation.
- More rigorous alcohol control policies and health promotion programmes are needed to reduce alcohol drinking and related harms in adolescents.

Strengths and limitations of this study

- This is the first study to show dose-response relation between alcohol drinking and medical services use among a large sample of Chinese adolescents in an Asian city with low adult drinking prevalence. The findings are representative of Hong Kong adolescents from random sampling and with a high response rate. The cross-sectional design, self-reported alcohol use and medical services use were major limitations. Prospective studies with objective measures are warranted.

development, causes violence and injury, increases risky sexual behaviours and unplanned pregnancy and leads to psychological problems.² Psychosocial and educational primary prevention programmes were not effective in reducing alcohol drinking among youth.³ Only small preventive effects on binge drinking and drunkenness were observed in family-based and school-based programmes.^{4 5}

Although the effects of underage drinking on health are well documented, less is known about the effects on medical services use. In adults, some studies found moderate drinking associated with lower hospitalisation

than abstinence or heavy drinking (U-shaped association),^{6–9} but other studies found that hospitalisation increased with alcohol consumption.^{10–11} As regards outpatient services use, an inverse association with alcohol consumption was found in several studies.^{9–12–13} These inconsistent associations are complex and may not be directly comparable given the differences in outcome measures, settings and methods.

In adolescents, many consequences of alcohol drinking such as unintended injuries, risky sexual behaviours and intoxication, often require acute medical care and hospitalisation. For example, 16% of ambulance calls concerning college students were attributable to alcohol drinking in the USA, alcohol intoxication occupied 1.5% of adolescent hospital admissions in the Slovak Republic and the prevalence of hospitalisation owing to alcohol intoxication was increasing in the Netherlands.^{14–16} Existing data were mainly based on Western countries, where prevalence of alcohol drinking is high. For example, in US adolescents, 49% drank monthly and 23% had ever binge,² and 5.8% of hospitalisation among adolescents were attributable to alcohol use disorders.¹⁷ Little is known about the effects of alcohol drinking on medical services use in Chinese adolescents, who consume less alcohol than their Western counterparts.¹

In Hong Kong, the most westernised city in China, 22–26% of the adolescents drank monthly.¹⁸ Health services are easily accessible with primary care medical consultations provided mainly by general practitioners, and inpatient services by public hospitals at very low costs.¹⁹ We investigated the association between drinking alcohol and medical services use among Chinese adolescents in Hong Kong. The results may have implications for alcohol control also in mainland China and other Asian countries experiencing a growing epidemic of underage and adult alcohol use.²⁰

METHODS

Sampling

A school-based youth health survey was conducted among secondary 1 (US grade 7) to secondary 5 students in Hong Kong in 2003–2004. Details of the survey have been reported elsewhere.^{21–22} Briefly, 85 secondary schools were randomly selected from all secondary schools (about 500) with a probability proportional to the school enrolment size.²³ All form 1 class and 2 randomly selected classes in each upper forms and completed an anonymous questionnaire in the schools. To encourage candid reporting, separate answer sheets were provided. Teachers were present to maintain classroom order, but avoided patrolling or seeing the answers. Completed answer sheets were immediately put in an opaque envelope and collected by research assistants. Ethics approval was granted by a local institutional review board.

Measurement

Alcohol consumption was measured using the question “Do you drink alcohol including beer in usual days?”

with drinking frequencies categorised as ‘non-drinking (reference)’, ‘less than 1 day/week’, ‘1–2 days/week’ and ‘3–7 days/week’. Medical consultation was defined as any Chinese or Western medical consultations in the past 14 days. Hospitalisation was defined as any hospital admission in the past 12 months. A shorter period was used for medical consultation as this is more common than hospitalisation and a longer period was used for hospitalisation to identify more cases. The 2-week period of medical consultation is also used in government surveys.²⁴ Data collected also included housing type and parental highest education attainment (proxies of socioeconomic status), sex, age, family structure (intact or non-intact), parental smoking (both, either or none), peer smoking (any or none), secondhand smoke exposure at home (any or none) and outside home (any or none), physical activity (never/rarely, sometimes or frequently), illicit drug use (ever or never), smoking (ever or never), feeling anxious (yes or no) and feeling depressed (yes or no).

Statistical analysis

Stata V.10.1 was used for data analysis. After excluding questionnaires with dubious response patterns or excessive missing data (>50% missing items) (n=718, 2.0%), and students with age ≥ 18 (n=2094, 5.8%), 33 300 (92.2%) students remained for complete case analysis. The sample was representative of the corresponding population in Hong Kong.²¹ Logistic regression was used to calculate the crude and adjusted ORs (AOR) of medical consultation and hospitalisation for alcohol drinking in models that progressively adjusted for more covariates: basic demographic factors, socioeconomic status and family structure (model 1); unhealthy behaviours (model 2) and parental smoking and peer smoking (model 3). The linear associations between alcohol drinking and medical services use were tested by treating categorised alcohol drinking frequency as a continuous variable of 0, 1, 2 and 3 to derive p for trend. Psychological distress of feeling anxious and depressed is a common risk factor of alcohol drinking and use of medical services.^{2–25} To control for such potential confounding, subgroup analyses were conducted among students who did not report feeling anxious or depressed (Model 4).

RESULTS

Of all 33 300 students, 47.6% were boys, mean age was 14.6 years (SD 1.6), 36.7% reported highest parental education of primary or below and half (43.6%) were living in public housing estates (table 1). One in four (27.6%) students drank alcohol most commonly <1 day/week (21.1%). Medical consultation in the past 14 days (15.9%) was more frequently reported than hospitalisation in the past 12 months (5.1%). Girls were more likely to have medical consultation, but less likely to be hospitalised than boys. Younger students were more

Table 1 Prevalence of medical consultation and hospitalisation by basic characteristics among students aged 11–17

	n (per cent)	Medical consultation		Hospitalisation	
		Per cent	χ^2 p	Per cent	χ^2 p
Sex			<0.001		<0.001
Boys	15 845 (47.6)	15.1		5.9	
Girls	17 455 (52.4)	16.6		4.4	
Age			0.30		0.02
11–14	13 812 (41.5)	16.1		5.5	
15–17	19 488 (58.5)	15.7		4.9	
Highest parental education			<0.001		<0.001
Unknown	5 749 (18.0)	14.1		4.4	
Uneducated or kindergarten	514 (1.6)	19.8		7.8	
Primary school	3 885 (12.2)	15.4		4.6	
Form 1–3	7 361 (23.1)	15.2		4.5	
Form 4–5	8 082 (25.4)	16.0		5.3	
Form ≥ 6	6 269 (19.7)	18.1		6.2	
Housing type			<0.001		<0.001
Public housing estate	13 470 (42.6)	14.2		4.4	
Subsidised private housing	3121 (9.9)	15.2		5.1	
Private (owner)	10 290 (32.5)	17.2		5.0	
Private (tenant)	2676 (8.5)	16.6		6.0	
Temporary	326 (1.0)	27.9		18.1	
Others	1771 (5.6)	18.0		7.2	
Feeling depressed			<0.001		0.05
No	28 350 (85.1)	15.4		5.1	
Yes	2950 (14.9)	18.4		5.6	
Feeling anxious			<0.001		<0.001
No	30 485 (91.6)	15.4		4.9	
Yes	2815 (8.5)	20.8		7.7	
Smoking			<0.001		<0.001
Never-smokers	2 520 (76.1)	14.8		4.0	
Ever-smokers	7914 (23.9)	19.3		8.6	
Illicit drugs			<0.001		<0.001
Never-use	31 111 (93.6)	15.1		4.6	
Ever-use	2130 (6.4)	26.4		13.2	
Physical activity			<0.001		0.05
Frequently	7448 (22.4)	15.9		5.6	
Sometimes	14 668 (44.1)	15.2		4.9	
Never/rarely	11 155 (33.5)	17.2		5.2	
Alcohol drinking (day/week)			<0.001		<0.001
Non-drinker	24 097 (72.4)	14.6		4.2	
<1	7014 (21.1)	17.5		5.8	
1–2	1285 (3.9)	22.1		11.8	
3–7	904 (2.7)	28.4		16.8	

likely to be hospitalized, but medical consultation was similar by age. Lower socioeconomic status, feeling depressed, feeling anxious, smoking, illicit drug use, physical inactivity and alcohol drinking were associated with medical consultation and hospitalisation.

Associations between alcohol drinking and the use of medical services were consistently observed in crude and adjusted logistic regression models (models 1–4). In the fully adjusted model (model 3), the AORs (95% CI) for medical consultation were 1.14 (1.06 to 1.23) for <1 day/week, 1.30 (1.13 to 1.50) for 1–2 days/week and 1.70 (1.41 to 2.06) for 3–7 days/week of alcohol

drinking (p for trend <0.001), compared with non-drinking. The corresponding AORs (95% CI) for hospitalisation were 1.14 (1.02 to 1.28), 1.68 (1.32 to 2.14) and 2.38 (1.90 to 2.98) (p<0.001 for trend). Similar associations were observed for medical consultation and hospitalisation among adolescents who did not feel anxious or depressed. The associations were also similar in boys and girls (p for interaction >0.05, table 2).

DISCUSSION

To the best of our knowledge, this is the first non-Western study that investigates the association

Table 2 Associations of underage alcohol drinking with medical consultation and hospitalisation

Alcohol drinking (day/week)	Crude OR (95% CI)	Adjusted OR (95% CI)			
		Model 1	Model 2	Model 3	Model 4
Medical consultation					
Non-drinker	1	1	1	1	1
<1	1.23 (1.14 to 1.33)***	1.24 (1.16 to 1.32)***	1.17 (1.08 to 1.26)***	1.14 (1.06 to 1.23)**	1.09 (1.00 to 1.19)*
1–2	1.66 (1.44 to 1.90)***	1.64 (1.44 to 1.86)***	1.40 (1.22 to 1.61)***	1.30 (1.13 to 1.50)***	1.26 (1.07 to 1.49)**
3–7	2.32 (2.00 to 2.69)***	2.24 (1.89 to 2.65)***	1.77 (1.46 to 2.15)***	1.70 (1.41 to 2.06)***	1.63 (1.36 to 1.95)***
p for trend†	<0.001	<0.001	<0.001	<0.001	<0.001
Hospitalisation					
Non-drinker	1	1	1	1	1
<1	1.41 (1.26 to 1.59)***	1.42 (1.27 to 1.59)***	1.20 (1.08 to 1.35)**	1.14 (1.02 to 1.28)*	1.12 (0.99 to 1.28)
1–2	3.10 (2.58 to 3.71)***	2.87 (2.30 to 3.59)***	1.95 (1.55 to 2.44)***	1.68 (1.32 to 2.14)***	1.64 (1.27 to 2.11)***
3–7	4.66 (3.87 to 5.61)***	4.09 (3.37 to 4.97)***	2.63 (2.12 to 3.28)***	2.38 (1.90 to 2.98)***	2.42 (1.93 to 3.05)***
p for trend†	<0.001	<0.001	<0.001	<0.001	<0.001

Model 1: Adjusted for sex, age, parental education, housing type, family structure and school clustering effects.

Model 2: Additionally adjusted for smoking, illicit drug use and physical activity.

Model 3: Additionally adjusted for peer smoking, parental smoking and secondhand smoke exposure.

Model 4: Among students who did not report feeling anxious or depressed, and adjusting for Model 3 variables.

*p<0.05, **p<0.01, ***p<0.001.

†p for trend by treating alcohol drinking as 0, 1, 2 and 3.

between medical services use and alcohol drinking among underage adolescents. Previous studies have documented the association between alcohol drinking and risk factors of medical services use (eg, digestive problems, respiratory symptoms, injury, etc) among Chinese adolescents.²⁶ Our results were consistent with Western studies that linked alcohol consumption to hospitalisation owing to alcohol intoxication among adolescents and ambulance use among college students.^{14–16} The present study did not require medical consultation and hospitalisation to be alcohol-related and stronger associations between alcohol drinking and medical services use were expected otherwise.

Contrary to the U-shaped^{6–9} or inverse^{12–13} associations between alcohol drinking and medical services use among adults in other studies, we found a positive linear association among adolescents. The U-shaped or inverse associations in adults could reflect that light and moderate drinkers were more health conscious and less likely to seek medical care than heavy drinkers; some abstainers might also have quit drinking owing to illness. Such healthier profile in moderate drinkers was not apparent in adolescents, and potential differences in background characteristics and health behaviours were adjusted for in different regression models. The putative health benefits of moderate alcohol drinking, such as that for heart disease, among adults are also controversial owing to the favourable characteristics of moderate drinkers.²⁷

In Hong Kong, beer and wine taxes were unprecedently abolished in 2008 to boost alcohol trading,²⁸ and this was followed by aggressive promotion by the industry. Alcohol drinking is increasingly publicised as stylish and fashionable without any legislation regulating such promotion in Hong Kong. Our findings suggest that any increase in adolescent drinking may be accompanied by a rise in medical service use. Following the success of the WHO Framework Convention on Tobacco Control, a similar international treaty for alcohol control is needed to guide policies on alcohol taxation and promotion,^{20–29} two of the most important strategies in reducing adolescent drinking.

Our study has several limitations. All data were self-reported including alcohol drinking, medical consultation and hospitalisation. We only have data on the frequency of alcohol drinking; future studies should also consider the amount of alcohol consumed. Medical consultation and hospitalisation are obvious events and similar questions have been used by other studies, which supported the validity of such self-reported data by children and adolescents.^{30–31} Using the same data, we also found significant associations of medical consultation and hospitalisation with health complaints (medical consultation OR=2.27, 95% CI 2.07 to 2.50; hospitalisation OR=1.29, 95% CI 1.13 to 1.47) and poor self-rated health (medical consultation OR=3.46, 95% CI 3.27 to 3.67; hospitalisation OR=2.09, 95% CI 1.91 to 2.29) supporting the validity of these data (data not shown in tables). Owing to the cross-sectional design, causality

between alcohol consumption and medical services use could not be ascertained, although it seemed unlikely that the use of medical services had led to alcohol drinking. On the other hand, health services use might prompt the students to avoid drinking or influence their reporting of alcohol consumption, which could bias the associations in either direction. Although robust and dose-response associations were observed in this study, prospective studies are needed to ascertain temporality. Given the limited time provided by the schools, we used simple questions adapted from other studies to measure depression and anxiety.³² Their validity was supported by our previous findings on a positive association with a weight misperception using the same sample.³³ Finally, although the associations have been adjusted for many potential confounders including smoking, drug use and physical inactivity, residual confounding cannot be ruled out in observational studies.

CONCLUSIONS

Alcohol consumption was associated with the use of medical services in Chinese adolescents. More rigorous alcohol control policies and health promotion programmes are needed to reduce alcohol drinking and related harms in adolescents.

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Contributors SYH and THL conceived and designed the study. MPW and SYH analysed the data. MPW, SYH and THL wrote the paper and approved the final version.

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Competing interests None.

Ethics approval Institutional Review Board of the University of Hong Kong/Hospital Authority Hong Kong West Cluster.

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