

## Original Article

# Alcoholic beverage preferences and associated drinking patterns by socioeconomic status among high-school drinkers in three metropolises of China

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To examine the association between socioeconomic status (SES) and adolescent alcoholic beverage preferences and the associated drinking patterns in China. The study used cross-sectional data collected from 136 junior or senior high schools, using a self-administered questionnaire. A total number of 7,075 subjects of drinking students were selected from three metropolises (Beijing, Shanghai, and Guangzhou) via a two-stage stratified sampling method. Among the adolescent drinkers, 87.8% (95% CI: 86.5-89.0) reported that they drunk alcohol during the past years preceding the study, while 42.4% (95% CI: 40.4-44.4) of the subjects stated that they had drunk alcohol during the past 30 days. There were gradual increases in the usual quantity (>1 Standard Drink, SD) of alcoholic beverages with increasing SES, with highest rates reported by the high-level SES. Beer and grape wine were the most widely consumed alcoholic beverage, regardless of SES. Our findings suggest that high-level SES students have an increasing prevalence of drinking behaviour. Their confirmation by future studies which extend the sampling regions is required to further the prevention of adolescent alcohol abuse in China.

**Key Words:** alcohol consumption, high school students, socioeconomic status, drinking patterns, alcoholic beverage preference

## INTRODUCTION

There is now greater attention to the social determinants of adolescent alcohol consumption, such as personality traits, parental and peer influences, and cultural norms.<sup>1-4</sup> Socioeconomic status (SES) is also considered an important determinant of drinking behaviour of youngsters, which may determine the purchasing power of beverages types and associated drinking patterns.<sup>5-7</sup> Furthermore, the habitual drinking patterns, which are formed in adolescence, may persist alter in to adulthood.<sup>8,9</sup> Detailed information of drinking patterns is a significant gap in policy-making for teenage health and its life-long consequences.

China has a long history of drinking alcohol,<sup>10</sup> but now, it faced enormous economic growth with implications for alcohol consumption. A variety of alcoholic beverages, for example, distilled and yellow wine, are sold on the market at a wide range of prices. Thus, identifying the association of SES and drinking patterns may provide a better understanding of their drinking motives.<sup>11</sup> Previous studies have shown that the associations between SES and alcohol intake are not consistent, although some studies report positive associations,<sup>12-14</sup> indicating that a

high SES may contribute to a higher alcohol consumption, which others report negative findings.<sup>15</sup> Several studies have examine the alcoholic beverage preferences of young people in a variety of countries, but there is a paucity of information on family financial context for the adolescents drinking in China.

The peculiar economic and social conditions lead us to hypothesise that the association between SES and alcohol consumption in China may differ to that in more developed countries. In order to provide evidence about the influence of SES on adolescent alcohol consumption in emerging economies, as well as to provide information

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for intervention strategies, the present study aims to (1) describe alcoholic beverage preferences and drinking patterns; (2) evaluate the relationship between SES and alcoholic beverages preferences, and related alcohol practices in major cities of China.

## METHODS

### *Sampling procedures*

This study was a cross-sectional survey with a two-stage stratified sampling. Four administrative districts from each metropolis (4/16 in Beijing, 4/16 in Shanghai, and 4/12 in Guangzhou) were randomly selected. Totally, we selected 136 schools from the sampled districts, including three school types (junior high school, regular, and vocational senior high school). The population comprised of one class in 7<sup>th</sup> grade (G7) and one in 8<sup>th</sup> grade (G8) in junior high school, one class in 10<sup>th</sup> grade (G10), and one class in 11<sup>th</sup> grade (G11) in senior high school. All students in the selected classes were eligible to participate the study.

Participants were clearly informed of the purposes of the survey. Their teachers were required to leave the classroom, and the study assistants were in the classroom to answer the questions and to ensure the survey to be conducted in a confidential manner. All students in the selected classrooms were asked to complete a self-administered, anonymous, and voluntary questionnaire during a regular class period (about 40 minutes). The total response rate was 96.5%. Data collection was conducted from May to June 2013, the second semester of the academic year in China.

### *The questionnaire*

The questionnaire was developed based on the alcohol section of the questionnaire used in the 2012 National Nutrition and Health Survey in China,<sup>16</sup> the Global School-based Student Health Survey (GSHS) core questionnaire modules in China,<sup>17</sup> and the Youth Risk Behavior Survey (YRBS) questionnaire in the United States.<sup>18</sup> The questionnaire was modified by adding questions regarding the demographic characteristics (gender, age, etc.) and the drinking patterns (e.g. frequency of drinking, amount of alcohol per occasion). The questionnaire was composed of the following two sections: (1) general information on the sampling, including the class ranks of the students (divided into three levels), which were based on the most recent semester final exam. (2) drinking behaviour and patterns, including several branches: frequency and quantity of drinking, binge drinking, age of the first drinking, and occasion of drinking. Furthermore, all the questionnaires were reviewed by an expert panel from different professional fields, including psychiatrists, psychologists, teachers and administrators in schools, senior researchers on alcohol, and health promotion specialists. A pilot study questionnaire was provided in 3 schools in Beijing that was targeting students of each grade, and it was proved that our questionnaire was feasible and practical.

We used the family affluence scale (FAS) as an alternative measurement to estimate the students' family SES. The total score of FAS was calculated by adding the responses to the four indicators: does your family own a

car (0, 1, 2, or more); how many times did you travel away on holiday with your family during the past 12 months (0, 1, 2, 3 or more); do you have your own bedroom for yourself (0, 1 representing no, yes); and how many computers does your family own (0, 1, 2, 3, or more), thus the scores were ranged from 0 to 9. The FAS scores were subsequently recorded into tertiles within each district that stood for different SESs (high, middle, and low). The FAS scale was found to be a reliable method, which could report accurately on the component items in agreement with the results of their parents.<sup>19-21</sup>

### *Definitions*

The drinker was defined as the students who had consumed alcohol previously, regardless of the quantity of the alcohol consumed. The past-year drinker was defined as the students who had consumed alcohol during the past 12 months preceding this survey. The binge drinker was defined as the students who drink at least six drinks (equal to 60 grams pure alcohol) on an occasion, based on their immediate past 30-day drinking history.

One standard drink (SD) contains 10 grams of pure alcohol, which was defined as one can of beer (330 mL), one small glass of moderate distilled wine (25 mL), one glass of grape wine (100 mL), one glass of yellow wine (80 mL), or liquor (30 mL). Each respondent received a colourful graph that had a variety of common alcoholic beverages printed with their corresponding SDs.

### *Statistical analysis*

Statistical analysis was performed using the SAS software 9.3. Standard error (SE) and 95% confidence interval (CI) were adjusted in terms of the demographic characteristics of the complex sample surveys. Adjusted odd ratios were calculated from multiple logistic regression of the complex survey design and adjusted for socio-demographic variables. The Rao-Scott Chi-Square test was performed to examine the differences in characteristics between males and females.

For variables, the missing values were removed in the calculation of specific steps but the record was kept for the analysis of the other non-missing variables. The sampling weight for the two-stage survey was calculated by multiplication of the total number of districts in the developed and geographic area, divided by the number of selected district, and the total number of students in the selected district, divided by the number of sampled students in that district.<sup>22</sup> Data of the students in the district were obtained from the local education departments.

### *Quality control*

All the investigators were teachers, doctors, and workers of the local Centers for Disease Control and Prevention with experience in epidemiological surveys, and they were trained based on a standard training manual prior to the survey. Lecture presentations were used to explain the aim of the survey and the SD colourful graphs. The questionnaire was designed in the format of an answer sheet. At the data entering stage, an automatic laser reader was used to record the information on the answer sheet for twice, to compare the duplicate information with each other.

**Table 1.** Socio-demographic characteristics of school drinkers

Characteristics	Men	Women	Total	% (95% CI)
School category				
Junior high school	1413	1264	2677	49.4 (38.8, 60.0)
Regular senior high school	1063	909	1972	26.3 (17.4, 35.1)
Vocational senior high school	1143	1283	2426	24.3 (15.3, 33.4)
Metropolis				
Beijing	1050	873	1923	21.4 (14.5, 28.4)
Shanghai	922	733	1655	40.0 (29.7, 50.4)
Guangzhou	1647	1850	3497	38.5 (27.7, 49.3)
SES <sup>†</sup>				
Low	666	674	1340	18.5 (16.2, 20.8)
Middle	1817	1739	3556	51.2 (49.3, 53.0)
High	1014	945	1959	30.4 (27.2, 33.5)
Class rank				
High	978	1145	2123	31.4 (29.8, 33.1)
Middle	1608	1723	3331	47.0 (45.4, 48.6)
Low	922	500	1422	21.5 (20.1, 23.0)
Total	3619	3456	7075	\

<sup>†</sup>SES was stooed by the fas scores.

### Ethics

The research protocol was approved by the Ethics Committee for Research in Human Subjects of the National Institute for Nutrition and Health, Chinese Center for Disease Control and Prevention, and written informed consents were obtained from all the students and their parents.

### RESULTS

The whole drinker sample ( $n=7,075$ ) was screened from 13,811 high school students of in the selected three metropolises in China (Beijing, Shanghai, and Guangzhou), and 90.1% were aged between 12 and 17 years old ( $15.7\pm 1.73$ ). The socio-demographic characteristics of the student samples were showed in Table 1.

Among the drinkers, 87.2% reported that they had drunk alcohol during the past year preceding the study while 42.4% stated that they had drunk alcohol in the past 30 days. The majority of drinkers (80.3%) consumed less than five SDs (50 g) on a typical drinking day while 6.9% had five SDs or more ( $\geq 50$  g). The males consumed more alcohol (at least one SD) and had higher rate of binge drinking and drinking until intoxication. Totally, more than half of the drinkers drink and eat at the same time (Table 2).

There were gradual increases in the usual quantity (at least one SD) of alcoholic beverages with increasing SES, with the highest rates reported by high-level SES. The low-level SES drinkers have the highest rates of drinking less than one SD (49.5%) and never drinking during the past one year (16.8%), 7.0% of students reported binge drinking at least once a month, based of their immediate past 30-day drinking history, and this index increased gradually to 11.4%. The number of drinking until intoxication showed no differences among all the SES groups. There was a statistical difference in the behaviour of eating while drinking. More than half of each SES group drinkers were reported that drinking and eating at the same time. Nearly one-tenth of each SES group drinkers drank alcohols without any food. (Table 3)

Males reported a higher prevalence (18.3%) of first alcohol consumption  $\leq 7$  than females (14.2%), while nearly

a quarter of youngsters first tried to drink alcohol at the age of 12-13 years. Males had higher frequency of binge drinking in the past-year than females in different levels. For the types of alcoholic beverages, beer is the most popular choice (83.1%), followed by grape wine (48.3%). Males reported a higher prevalence of consumption of most types of alcoholic beverage, excluding grape wine and rice wine. Females were more likely to prefer grape wine (54.3% vs 43.6%,  $p<0.01$ ) and more likely to drink at home than males (56.3% vs 49.0%,  $p<0.01$ ). However, males preferred to drink in the restaurant (51.5% vs 42.9%,  $p<0.01$ ) (Table 4).

Table 5 shows the results on drinking patterns according to the SES. Gradual increases were observed in the prevalence of age of the first-time consumption of alcohol and past-year binge drinking with an increasing SES, whereas high SES group reported the highest rates. The finding shows that beer and grape wine were the most commonly consumed types of alcoholic beverages by different SES. No difference was observed in the prevalence of beer and yellow wine consumption by various SESs. The highest rates of drinking in the restaurants, bars, karaoke, and nightclubs were also reported by the high SES group ( $p<0.01$ ).

The correlates of drinking adverse outcomes were estimated by gender, school type, metropolis, SES, and academic performance. The odds of violence with intimate partner or family members were higher among males (aOR=1.4, 95% CI: 1.1-1.7). The students in the senior high school, especially in the vocational senior high students, were found to have significantly higher prevalence of adverse outcomes in comparison to junior high school students (regular senior high school: aOR=2.2, 95% CI: 1.7-2.8; vocational senior high school: aOR=6.0, 95% CI: 4.7-7.7). The probability of individuals who had low academic performance (aOR=1.7, 95% CI: 1.2-2.2) and exhibited violence was higher than the probability for students who had a high level of academic performance.

### DISCUSSION

This study describes the beverage preferences and

**Table 2.** Patterns of alcohol use by gender among school drinkers

	Men			Women			<i>p</i> value	Total		
	n	%	95% CI	n	%	95% CI		n	%	95% CI
Usual quantity in the past-year (SDs)							<0.01			
Never	300	10.7	(9.2, 12.3)	403	15.3	(13.5, 17.2)		703	12.8	(11.8, 13.8)
Less than 1 SD	1275	44.3	(41.7, 47.0)	1377	52.0	(49.0, 55.0)		2652	47.8	(45.6, 50.0)
1-4	1160	35.8	(33.6, 38.1)	828	28.4	(26.3, 30.5)		1988	32.5	(31.0, 34.0)
5 or more	329	9.1	(7.4, 10.8)	116	4.2	(3.3, 5.2)		445	6.9	(5.8, 8.0)
Frequency of Binge drinking							<0.01			
Never	2075	64.1	(61.9, 66.4)	2433	76.1	(74.1, 78.2)		4508	69.8	(68.0, 71.6)
Less than monthly	866	24.5	(22.6, 26.4)	649	18.8	(17.2, 20.3)		1515	21.8	(20.4, 23.2)
At least once a month	431	11.4	(9.7, 13.1)	174	5.1	(4.1, 6.1)		605	8.4	(7.4, 9.5)
Drinking until intoxication (times)							<0.01			
Never	1876	65.5	(62.3, 68.7)	1981	72.3	(68.8, 75.9)		3857	68.7	(65.7, 71.7)
1-2	865	26.4	(24.1, 28.8)	769	23.6	(20.3, 26.9)		1634	25.1	(22.6, 27.6)
3 or more	299	8.1	(6.5, 9.6)	133	4.1	(3.0, 5.2)		432	6.2	(5.1, 7.3)
Eating while drinking							<0.01			
Drinking first, then eating	199	7.1	(5.7, 8.5)	131	4.4	(3.4, 5.4)		330	5.8	(5.0, 6.7)
Drinking and eating at the same time	2023	56.6	(54.0, 59.2)	1727	50.6	(48.0, 53.2)		3750	53.8	(51.5, 56.0)
Eating first, then drinking	467	12.7	(11.1, 14.3)	499	13.8	(12.2, 15.4)		966	13.2	(11.9, 14.5)
Only drinking, eating nothing	290	9.4	(7.7, 11.1)	370	12.1	(10.6, 13.7)		660	10.7	(9.3, 12.0)
Uncertain	487	14.3	(12.9, 15.6)	599	19.1	(17.2, 21.1)		1086	16.5	(15.1, 18.0)

SDs: standard drinks.

**Table 3.** Patterns of alcohol use by socioeconomic status among school drinkers

	Low			Middle			High			<i>p</i> value
	n	%	95% CI	n	%	95% CI	n	%	95% CI	
Usual quantity in the past-year (SDs)										<0.01
Never	173	16.8	(14.0, 19.6)	365	13.2	(11.5, 14.9)	165	9.9	(8.2, 11.6)	
Less than 1 SD	501	49.5	(45.1, 53.9)	1421	49.0	(46.7, 51.2)	730	44.9	(41.9, 48.0)	
1-4	336	28.0	(24.2, 31.8)	1001	31.3	(29.5, 33.1)	651	37.0	(34.0, 40.1)	
5 or more	65	5.7	(3.8, 7.6)	218	6.5	(5.3, 7.7)	162	8.2	(6.5, 9.9)	
Frequency of Binge drinking										<0.01
Never	925	72.8	(69.3, 76.2)	2400	72.3	(70.1, 74.5)	1183	63.8	(60.5, 67.2)	
Less than monthly	283	20.3	(17.3, 23.2)	751	20.6	(18.7, 22.5)	481	24.7	(21.9, 27.6)	
At least once a month	92	7.0	(4.9, 9.0)	281	7.1	(6.0, 8.3)	232	11.4	(9.5, 13.4)	
Drinking until intoxication (times)										0.17
Never	728	67.2	(62.5, 71.2)	1997	69.6	(66.9, 72.4)	1132	68.2	(64.9, 71.4)	
1-2	337	26.4	(22.3, 30.5)	835	25.0	(22.5, 27.5)	462	24.5	(21.6, 27.3)	
3 or more	79	6.5	(4.8, 8.1)	204	5.4	(4.4, 6.4)	149	7.4	(5.8, 9.0)	
Eating while drinking										0.01
Drinking first, then eating	75	6.9	(4.9, 8.9)	170	5.8	(4.9, 6.7)	85	5.2	(3.8, 6.6)	
Drinking and eating at the same time	710	52.8	(49.6, 56.1)	1966	54.3	(51.6, 57.0)	1074	53.5	(50.7, 56.4)	
Eating first, then drinking	213	15.0	(12.5, 17.6)	503	13.3	(11.6, 15.0)	250	11.9	(10.5, 13.4)	
Only drinking, eating nothing	144	11.8	(9.2, 14.3)	333	10.4	(8.9, 12.0)	183	10.4	(8.9, 11.8)	
Uncertain	189	13.5	(11.3, 15.6)	548	16.2	(14.5, 17.9)	149	19.0	(17.1, 20.9)	

SDs: standard drinks.

**Table 4.** Patterns of alcohol use age by gender among school drinkers

	Men			Women			<i>p</i> value	Total		
	n	%	95% CI	n	%	95% CI		n	%	95% CI
Age of the first time use alcohol							<0.01			
<7 years	655	18.3	(16.3, 20.4)	446	14.2	(12.5, 16.0)		1101	16.4	(14.8, 18.0)
8-9 years	386	10.8	(9.1, 12.6)	287	9.3	(7.4, 11.3)		673	10.1	(8.5, 11.8)
10-11 years	619	18.5	(15.3, 21.8)	528	17.0	(13.9, 20.1)		1147	17.8	(14.8, 20.8)
12-13 years	789	22.6	(20.6, 24.6)	834	25.7	(23.4, 28.1)		1623	24.0	(22.3, 25.8)
Past-year binge drinking (times)							<0.01			
<1 time per month	866	24.5	(22.6, 26.4)	649	18.8	(17.2, 20.3)		1515	21.8	(20.4, 23.2)
1 time per month	329	8.7	(7.2, 10.2)	142	4.3	(3.4, 5.2)		471	6.6	(5.7, 7.5)
>2 times per month	102	2.7	(1.9, 3.4)	32	0.8	(0.5, 1.2)		134	1.8	(1.3, 2.3)
Alcoholic beverages (past year use) <sup>†</sup>										
Beer	2834	85.8	(83.4, 88.2)	2300	79.7	(76.9, 82.5)	<0.01	5134	83.1	(81.0, 85.2)
Distilled wine	527	14.2	(11.8, 16.6)	178	6.6	(4.8, 8.3)	<0.01	705	10.8	(9.0, 12.6)
Grape wine	1387	43.6	(41.2, 46.0)	1484	54.3	(51.9, 56.7)	<0.01	2872	48.3	(46.8, 49.9)
Liquor	465	12.5	(10.9, 14.1)	310	10.9	(9.2, 12.6)	0.15	775	11.8	(10.5, 13.0)
Yellow wine	153	6.0	(4.3, 7.7)	82	3.4	(2.4, 4.3)	<0.01	235	4.8	(3.6, 6.0)
Rice wine	319	10.4	(8.9, 12.0)	353	12.8	(10.7, 14.9)	0.08	672	11.5	(10.3, 12.7)
Others	120	4.2	(3.0, 5.5)	163	6.4	(4.9, 7.8)	0.03	283	5.2	(4.3, 6.1)
Place of frequently drinking <sup>†</sup>										
At home	1744	49.0	(47.8, 54.2)	1934	56.3	(52.7, 59.9)	<0.01	3818	52.5	(49.8, 55.2)
Friend's/parent's house	1420	31.5	(29.0, 34.1)	1434	32.5	(30.1, 35.0)	0.46	2854	32.0	(29.9, 34.1)
Restaurant	1906	51.5	(48.0, 55.1)	1442	42.9	(40.4, 45.5)	<0.01	3250	47.4	(44.6, 50.2)
Bars, Karaoke, night clubs	1973	54.3	(50.9, 57.7)	1508	45.5	(43.1, 47.9)	<0.01	3481	50.2	(47.6, 52.8)

<sup>†</sup>Multiple answers.

**Table 5.** Patterns of alcohol use age by socioeconomic status among school drinkers

	Low			Middle			High			<i>p</i> value
	n	%	95% CI	n	%	95% CI	n	%	95% CI	
Age of the first time use alcohol										<0.01
≤7 years	180	15.1	(12.8, 17.4)	522	15.6	(13.9, 17.3)	358	18.4	(15.8, 20.9)	
8-9 years	89	6.7	(4.9, 8.5)	314	9.5	(8.2, 10.8)	242	13.0	(10.8, 15.2)	
10-11 years	196	17.2	(14.2, 20.2)	560	16.8	(14.2, 19.4)	358	19.4	(16.3, 22.5)	
12-13 years	262	22.8	(19.2, 26.3)	837	23.8	(21.9, 25.7)	487	26.0	(23.6, 28.4)	
Past-year binge drinking (times)										<0.01
<1 time per month	283	20.3	(17.3, 23.2)	751	20.6	(18.7, 22.5)	481	24.7	(21.9, 27.6)	
1 time per month	73	5.5	(3.6, 7.5)	227	5.8	(4.8, 6.8)	171	8.6	(7.1, 10.1)	
≥2 times per month	19	1.4	(0.7, 2.2)	54	1.3	(0.9, 1.8)	61	2.9	(1.9, 3.8)	
Alcoholic beverages (past year use) <sup>†</sup>										
Beer	914	74.8	(71.6, 78.1)	2450	73.4	(71.3, 75.4)	1361	74.3	(71.8, 76.7)	0.65
Distilled wine	102	7.6	(5.4, 9.8)	311	9.2	(7.6, 10.7)	245	12.1	(9.7, 14.5)	<0.01
Grape wine	368	31.9	(27.7, 36.1)	1308	40.4	(38.0, 42.8)	959	53.1	(49.3, 56.9)	<0.01
Liquor	79	5.3	(3.5, 7.1)	324	9.0	(7.7, 10.3)	316	15.9	(13.5, 18.3)	<0.01
Yellow wine	35	3.3	(1.9, 4.7)	104	4.2	(2.7, 5.7)	79	5.14	(3.7, 6.6)	0.19
Rice wine	101	8.7	(6.1, 11.3)	280	9.0	(7.6, 10.4)	241	13.1	(10.8, 15.5)	0.01
Others	29	2.8	(1.6, 4.0)	133	4.5	(3.4, 5.5)	104	6.3	(5.1, 7.6)	0.01
Place of frequently drinking <sup>†</sup>										
At home	676	53.5	(49.2, 57.9)	1826	50.7	(48.2, 53.2)	1056	54.5	(51.5, 57.5)	0.10
Friend's/parent's house	495	35.8	(32.1, 39.5)	1281	34.7	(32.7, 36.7)	744	38.4	(34.7, 42.1)	0.11
Restaurant	540	40.5	(35.9, 45.1)	1625	46.1	(43.1, 49.1)	1085	54.7	(51.2, 58.2)	<0.01
Bars, Karaoke, night clubs	431	28.7	(24.9, 32.6)	1256	31.3	(28.6, 34.0)	807	38.7	(35.0, 42.4)	<0.01

<sup>†</sup>Multiple answers.

drinking patterns among adolescents in the high schools of three metropolises in China, as well as their patterns including, but not limited to, binge drinking frequency, types of alcoholic beverages, and first drinking. To our knowledge, the present research is the first population-based study on the correlation between SES and performances of alcoholic beverage in Chinese adolescents. This study has a large sample size, representative of junior and senior high school students, and drawn randomly from students across the metropolises.

Our findings reported higher rates of alcohol consumption among members of the higher socioeconomic SES, no matter for quantity or drinking frequency. Internationally, there are a number of studies showing no relationship between SES and drinking behavior among adolescents as in the Netherlands,<sup>23,24</sup> while in Brazil, the alcohol consumption of teenagers is significantly associated with social class,<sup>25</sup> the differences attributable to various national circumstances and social culture. From ancient times to now, drinking behaviour has been deemed a useful and necessary social skill in Chinese society. Some parents even encourage the older adolescents to drink alcohol, who are about to start their career, especially for males. In addition to a gender difference, our results revealed significant variations in alcohol consumption according to SES. Emerging evidence shows a vulnerability to alcohol consumption in upper-level SES. The present study cannot be generalized to adolescent in other Chinese cities with different situations. For teenagers in the upper-level SES, the availability of financial support might allow them to spend more money on alcoholic beverages, and in turn explain higher rates of alcohol consumption in this group.

Our findings revealed a peak age by which the drinkers started to drink at the age of 12 to 13, similar to that found in Western countries<sup>26</sup> and slightly earlier than that in Thailand.<sup>27</sup> For about 75% of 36 European countries, at least half of the students drink >1 glass of an alcoholic beverage at the age of 13 or younger, which is higher than our observations.<sup>28</sup> The Administration of Alcohol Circulation (2005) in China, which was enacted on January 1, 2006, prohibits the sale of alcohol to minors in order to reduce the initiation of drinking among novice drinkers, although this measure is not perfect for control of under-age drinking.

More than half of the drinkers consumed alcoholic beverage at home. Females were more likely to consume alcohol at home than males, and males preferred to drink in restaurants. The high-SES teenagers drank more in entertainment venues. There are probably a number of interconnected reasons. In the traditional Chinese festivals or family parties, drinking alcohol is accepted and sometimes encouraged by parents, since it brings on enjoyable festive atmosphere to parties. Thus, drinking at home is an attractive option. Meanwhile, owing to the Chinese drinking status in adults, most of the males tend to follow their father's drinking behaviours and thus consuming more alcohol outside. Particularly, subjects in the high-SES group have more pocket money to spend in the entertainment venues, for example, bars, karaoke, or nightclubs.

The drinking types in adolescence are different from adults. Nearly 75% of adolescent consumed beer, with grape wine is their second choice. Students with high-SES level are more likely to consume grape wine, liquor, and rice wine, for which there might be several reasons. Firstly, Chinese youth are now influenced by western culture, such portrayal in the films and videos. Secondly, beer has a lower alcoholic strength and is more accessible than other alcohol beverages. Majority of drinkers in this population may underestimate the harm of low-strength beverages. Thirdly, it is widely believed that grape wine may be good for health; hence harm to health may be ignored. In addition, grape wine, liquor, and rice wine are more expensive than beer in China, so low-SES students which a limited purchasing power may consume them less.

In China, drinking is usually followed by communication, so some teenagers drink and may ignore eating food. Nearly one in six of the young drinkers eat after drinking or eat nothing, which is a more harmful drinking behaviour. Our findings highlight the need for increased attention from schools and parents regarding setting of a positive example of drinking to minors. Meanwhile, due to the contribution of alcohol to with intimate partners or family quarrels, our findings may encourage officials and policy-makers to actively discourage alcohol excess.

There are some limitations to our study. First, as found in most observational studies, recall bias may affect the results. Moreover, the present voluntary and anonymous questionnaires made reporting bias to be less likely. All data were obtained through self-reports, which might lead to underestimation of the alcohol consumption in a student sample.<sup>29</sup> However, self-report was considered to be of moderate validity for alcohol consumption.<sup>30</sup> Second, this study is a cross-sectional design, which does not allow us to track possible alterations in the socioeconomic gradient from adolescence to adulthood. Thus, from our results, we cannot determine how this relationship changes with age. Third, although this survey was carried out in three metropolises of China, its results cannot represent the scenario in the other and smaller cities or country as whole.

In conclusion, we set out to discover whether there is a gradient of association of SES and drinking behaviours among high school students in metropolises of China. The findings suggest that students may have at an increased prevalence of drinking in the highest SES in all regions. Future studies are needed to confirm the current findings in larger areas because it might support the importance of preventing adolescent alcohol abuse in China. Prevention should focus on adolescents from high-SES families because of their vulnerability to alcohol consumption compared with those from low-SES families. In particular, the patterns and behaviours of alcohol consumption displayed by school students should provide insights into the preventive approaches adopted by principals in schools, investigators in institutions, and policy-makers in government.

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#### AUTHOR DISCLOSURES

The authors have no conflicts of interest to declare.

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## Original Article

# Alcoholic beverage preferences and associated drinking patterns by socioeconomic status among high-school drinkers in three metropolises of China

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## 中国三城市中学生饮酒种类选择与家庭经济状况关系研究

本研究旨在分析中国城市青少年饮酒种类选择与家庭经济状况的关系。研究采用两阶段分层整群抽样方法，以自填问卷形式进行横断面调查，共调查北京、上海、广州三城市初、高中 136 所，筛选出饮酒者 7075 名。饮酒者中，87.8% (95% CI: 86.5-89.0) 的人在过去一年中喝过酒，42.4% (95% CI: 40.4-44.4) 的人在过去 30 天喝过酒。随着家庭经济状况的提高，饮酒者的饮酒量 (大于 1SD) 也呈上升趋势，而且家庭经济水平高的学生中饮酒率最高。在全部饮酒学生中，啤酒和葡萄酒都是最受欢迎的酒类饮品。研究表明，家庭经济水平高的学生的饮酒率有上升趋势。此结论需要在更大区域的调查中进行验证，这对于今后中国青少年酒精滥用防控措施的研究意义重大。

**关键词：**酒精消费量、高中生、经济状况、饮酒习惯、酒品种类