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Gender differences in cigarette smoking and alcohol drinking among adolescents and young adults in Hanoi, Shanghai and Taipei

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Abstract: The study aims to explore gender differences in smoking and drinking in three Asian cities—Hanoi, Shanghai and Taipei, and assesses the magnitude of these gender differences across cities. A total of 17,016 adolescents and young adults, aged 15 to 24 years, residing in both urban and rural area of Hanoi, Shanghai and Taipei were selected by multistage sampling methods and surveyed by face to face interview. The gender differences are significant for smoking-only, drinking-only, and both behaviors in each city. With respect to smoking-only, males are more than 30.66 times as likely to report it compared with females in Hanoi, followed by Shanghai and Taipei. The above trend holds true when further examining drinking-only and both smoking and drinking. The magnitude of gender differences in smoking-only, drinking-only, and both behaviors widely vary across the three cities. Future research is needed to further examine the mechanisms behind these gender differences and how these differences may be utilized to prevent and reduce smoking and drinking in the adolescent and young adult population.

Keywords: adolescent; young adults; gender; smoking; drinking; Asian city

1. Introduction

Adolescence is a risk period when many adolescents can get involved in different problem behaviors such as smoking, drinking and fighting [1,2,3]. Smoking and drinking in adolescence are high-priority public health concerns as they are associated with a variety of adverse health consequences [4]. Smoking is associated with lung cancer, cardiovascular disease and nicotine addiction, and it is also one important preventable cause of premature mortality and mobility [5].Alcohol use is related to liver disease, high blood pressure and alcohol addiction, and it is also one of the main risk factors contributing to global disability-adjusted life-year in 10-24-year-olds [6] .

The significant gender differences in adolescents' smoking and drinking have been reported in previous research [7,8,9]. Comparing to men, women are more likely to be responsive to health concerns and are less likely to engage in risky health behaviors [10,11]. In general, men smoke and drink more than women in different societies and cultures, and women have a higher expectation of self-control than do men [12,13]. Previous research found that the gender differences in adolescents' smoking and drinking were related to the social sanction [14]. The smoking and drinking are usually considered as part of the male characteristics, which could demonstrate male masculinity and improve male bonding[15].But for women, smoking and drinking are discouraged as part of

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traditionally feminine traits, and different countries have different acceptance levels of women smoking and drinking which are linked to their socioeconomic levels and cultures[15,16] .Compare to the country in which women are expected to be confined to domestic chores or to be subordinated to their husbands or partners, the country in which women are independent and work outside has a higher proportion of women smoking and drinking[13].

Although research on gender differences in smoking and drinking can be found in many cities, relatively little work has been conducted in Asian cities with different socioeconomic levels and cultures. To fill this gap, this study using data from three Asian cities-Hanoi, Shanghai and Taipei to answer two questions: First, whether the gender differences in smoking and drinking exist in Asian cities with different socioeconomic levels and cultures? Second, whether the gender differences in smoking and drinking vary across the three cities with different socioeconomic levels and cultures? and if they do the extent to which the gender differences vary across cities?

This study focuses on three Asian cities--Hanoi, Shanghai and Taipei. While the three cities are all influenced by Confucian culture for thousands of years, they are experiencing different stages of economic and social transitions, with Taipei the most industrialized city, followed by Shanghai and Hanoi. Their traditional cultures have also changed to different extents as the three cities have opened to outside influences in different ways for different periods. Based on the literature, we accordingly hypothesize that gender differences in smoking and drinking exist in the three cities, and they vary across cities with different socioeconomic levels and cultures. The largest gender differences are in Hanoi, whereas the smallest differences are in Taipei, and Shanghai's are between them.

2. Methods

2.1. Sampling and data collection

Data for this study were drawn from a cross-sectional study, conducted in Hanoi, Shanghai, and Taipei by researchers from the Johns Hopkins Bloomberg School of Public Health, the Population and Health Research Center in Taiwan's Bureau of Health Promotion, the Shanghai Institute for Planned Parenthood Research and the Hanoi Institute for Family and Gender Studies. In this study, 17,016 adolescents and young adults, aged 15 to 24 years, residing in both urban and rural area of Hanoi, Shanghai and Taipei were selected by multistage sampling methods. In Hanoi and Shanghai, both private residences and group living facilities were sampled. In Taipei, students were interviewed in school, with a small nonstudent subsample interviewed at their private residences and group living facilities. More details on the study design have been described by Zabin[17]. Most of the interview was conducted face-to-face, and computer-assisted self-interview was used for sensitive questions. This study obtained ethical approval from the Committee on Human Research at the Johns Hopkins University as well as the collaborating local organizations. In this article, only the 16,554 unmarried adolescents are included.

2.2. Measures

The questionnaire was constructed based on review of the literature and discussion of researchers from Johns Hopkins University and partners from three local organizations.

2.2.1 Cigarette smoking and alcohol drinking

In the present study, the dependent variables were current cigarette smoking and alcohol drinking. Respondents were classified as current cigarette smokers if they had smoked in the past 30 days, and the rest were classified as current nonsmokers. Similarly, those who drank in the past 30 days were recorded as current alcohol drinkers, and the rest were nondrinkers. Respondents who

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had both smoked and drank in the past 30 days were defined as both current smokers and drinkers. Respondents who only smoked or drank in the past 30 days were defined as only current smokers or drinkers.

2.2.2 Control variables

Independent variables include age, gender, residence, economic status (above average, average and below average), education level (senior high school or lower, college and university or higher), employment, living with parents, peer smoking and peer drinking. Respondents were divided into two groups according to their ages: older adolescents (age 15-19 years) and young adults (age 20-24 years). Employment was divided into four categories: a student without a job, a student with a job, not a student with a job, or not a student without a job.

2.2.3 Statistical analysis

First, the descriptive statistical analysis was conducted to describe the distribution of demographics by gender across the three cities. Second, Chi-square test was used to assess differences in smoking-only, drinking-only, or both smoking and drinking by site, age group and gender. Finally, odds ratios(ORs) and 95% confidence intervals (CIs) for the associations between gender and outcome variables (smoking-only, drinking-only, both smoking and drinking) were estimated using logistic regression models, adjusting for the effects of covariates such as age, gender, residence, economic status, education level, employment, living with parents, peer smoking and peer drinking. Statistical significance was judged by a p value of 0.05 or less. The sample was weighted according to the probability of each respondent being selected from the sample. Statistical analysis was conducted with SAS software 9.2 (SAS Institute, Inc., Cary, NC).

3. Results

3.1 Demographic characteristics

The descriptive results for demographic characteristics by city and gender are presented in Table 1. The sample for this study includes 16554 adolescents and young adults aged 15-24 years, with 6204 from Hanoi, 6023 from Shanghai, and 4327 from Taipei. Respondents in each city are equally distributed in terms of gender. Almost half of the study participants are aged 15-19 years in each city. Slightly more than two-thirds of the respondents in the three cities live in urban areas. More than half of respondents in three cities are students without a job. Males are more likely than females to report peers smoke and drink.

Table 1. Characteristics of the study population in Hanoi, Shanghai and Taipei

Characteristic	Hanoi			Shanghai			Taipei		
	Male (n=3095) N(%)	Female (n=3109) N(%)	Total (n=6204) N(%)	Male (n=2983) N(%)	Female (n=3040) N(%)	Total (n=6023) N(%)	Male (n=2168) N(%)	Female (n=2159) N(%)	Total (n=4327) N(%)
Age, y									
15-19	1554(50.21)	1616(51.98)	3137(51.10)	1697(56.89)	1812(59.61)	3509(58.26)	1123(51.80)	1147(53.15)	2270(52.47)
20-24	1541(49.79)	1493(48.02)	3034(48.90)	1286(43.11)	1228(40.39)	2514(41.74)	1045(48.20)	1011(46.85)	2056(47.53)
Residence									
Rural	876(28.30)	858(27.60)	1734(27.95)	848(28.43)	761(25.03)	1609(26.71)	280(12.92)	237(10.98)	517(11.95)
Urban	2219(71.70)	2251(72.40)	4470(72.05)	2135(71.57)	2279(74.97)	4414(73.29)	1888(87.08)	1922(89.02)	3810(88.05)
Economic status									
Low	964(31.15)	920(29.59)	1884(30.37)	960(32.18)	1011(33.26)	1971(32.72)	470(21.68)	491(22.74)	961(22.21)

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Middle	1053(34.02)	1024(32.94)	2077(33.48)	905(30.34)	866(28.49)	1771(29.40)	805(37.13)	795(36.82)	1600(36.98)
High	1078(34.83)	1165(37.47)	2243(36.15)	1118(37.48)	1163(38.26)	2281(37.87)	893(41.19)	873(40.44)	1766(40.81)
Education level									
Senior high school or lower	1445(53.16)	1260(47.48)	2705(50.35)	1806(60.54)	1593(52.40)	3399(56.43)	1007(46.45)	987(45.72)	1994(46.08)
College	489(17.99)	547(20.61)	1036(19.29)	456(15.29)	517(17.01)	973(16.15)	102(4.70)	135(6.25)	237(5.48)
University or higher	784(28.84)	847(31.91)	1631(30.36)	721(24.17)	930(30.59)	1651(27.41)	1059(48.85)	1037(48.03)	2096(48.44)
Employment/school status									
A student without a job	1756(56.83)	1872(60.27)	3628(58.55)	1724(58.40)	1837(60.43)	3579(59.42)	1329(61.30)	1278(59.19)	2607(60.25)
A student with a job	289(9.35)	390(12.56)	679(10.96)	163(5.46)	270(8.88)	433(7.19)	668(30.81)	729(33.77)	1397(32.29)
Not a student with a job	767(24.82)	677(21.80)	1444(23.31)	844(28.29)	816(26.84)	1660(27.56)	120(5.54)	109(5.05)	229(5.29)
Not a student without a job	278(9.00)	167(5.38)	445(7.18)	234(7.84)	117(3.85)	351(5.83)	51(2.35)	43(1.99)	94(2.17)
Living with parents									
Yes	2337(75.51)	2314(74.43)	4651(74.97)	1839(61.65)	1697(55.82)	3536(58.71)	1531(70.62)	1540(71.33)	3071(70.97)
No	758(24.49)	795(25.57)	1553(25.03)	1144(38.35)	1343(44.18)	2487(41.29)	637(29.38)	619(28.67)	1256(29.03)
Peer smoking									
Yes	1951(63.04)	1182(38.02)	3133(50.50)	1624(54.44)	799(26.28)	2423(40.23)	1550(71.49)	1090(50.49)	2640(61.01)
No	1144(36.96)	1927(61.98)	3071(49.50)	1359(45.56)	2241(73.72)	3600(59.77)	618(28.51)	1069(49.51)	1687(38.99)
Peer drinking									
Yes	1837(59.35)	1063(34.19)	2900(46.74)	1695(56.82)	900(29.61)	2595(43.08)	1399(64.53)	1058(49.00)	2457(56.78)
No	1258(40.65)	2046(65.81)	3304(53.26)	1288(43.18)	2140(70.39)	3428(56.92)	769(35.47)	1101(51.00)	1870(43.22)

3.2 Prevalence of smoking-only, drinking-only, and both smoking and drinking across cities, age group, and gender

The percentages of males and females with smoking-only, drinking-only, and both smoking and drinking are displayed in Table 2. The prevalence of smoking-only, drinking-only, and both are significantly higher for males than for females across the three cities, except drinking-only in Taipei. When stratifying by age-group, the significantly higher prevalences are observed in males compared to females for smoking-only and both smoking and drinking across age-groups in all the three cities. These gender differences are also observed for drinking-only among respondents aged 15-19 years and aged 20-24 years in Hanoi and among respondents aged 15-19 years in Shanghai. In general, the prevalence of each of the three behaviors (smoking-only, drinking-only, both smoking and drinking) increases from Hanoi to Shanghai to Taipei among females aged 15-24 years. The three cities all show the higher prevalence of smoking-only, drinking-only, and both smoking and drinking for both males and females at older age-groups (20-24-year-old) compared with those at younger age-groups (15-19-year-old). In addition, the prevalence of both smoking and drinking and drinking-only is higher than that of smoking-only among males and females across the three cities.

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Table 2. Percentage of adolescents and young adults who reported smoking or drinking, by study site, gender, and age

	Only smoking N(%)	Only drinking N(%)	Smoking and drinking N(%)
Hanoi			
All			
Male	210(6.79)***	873(28.21)***	685(22.13)***
Female	6(0.19)	398(12.80)	23(0.74)
15-19 years			
Male	97(6.24)***	338(21.75)***	153(9.85)***
Female	2(0.12)	150(9.28)	4(0.25)
20-24 years			
Male	113(7.33)***	535(34.72)***	532(34.52)***
Female	4(0.27)	248(16.61)	19(1.27)
Shanghai			
All			
Male	255(8.55)***	603(20.21)***	602(20.18)***
Female	38(1.25)	497(16.35)	52(1.71)
15-19 years			
Male	128(7.54)***	324(19.09)***	215(12.67)***
Female	23(1.27)	262(14.46)	19(1.05)
20-24 years			
Male	127(9.88)***	279(21.70)	387(30.09)***
Female	15(1.22)	235(19.14)	33(2.69)
Taipei			
All			
Male	181(8.35)***	448(20.66)	318(14.67)***
Female	55(2.55)	451(20.89)	132(6.11)
15-19 years			
Male	92(8.19)***	170(15.14)	131(11.67)***
Female	31(2.70)	166(14.47)	70(6.10)
20-24 years			
Male	89(8.52)***	278(26.60)	187(17.89)***
Female	24(2.37)	284(28.09)	62(6.13)

Chi-square test for differences between males and females.

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

3.3 Multivariate results: gender correlates of smoking-only, drinking-only and both smoking and drinking

Table 3 shows the results of the multivariate logistic regression models to estimate the association of gender with outcome variables (smoking-only, drinking-only, both smoking and drinking). The gender differences are significant for smoking-only, drinking-only, and both smoking and drinking in each city. The magnitude of gender differences in smoking-only, drinking-only and both behaviors widely vary across the three cities. With respect to smoking-only, males are more than

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30.66 times as likely to report it compared with females in Hanoi (OR 30.66, 95% CI = 12.18-77.18), followed by Shanghai (OR 4.84, 95% CI = 3.38-6.93) and Taipei (OR 3.27, 95% CI = 2.41-4.44). The above trend holds true when further examining drinking-only (Hanoi: OR 2.53, 95% CI = 2.18-2.94; Shanghai: OR 1.05, 95% CI = 0.91-1.21; Taipei: OR 0.82, 95% CI = 0.71-0.95) and both smoking and drinking (Hanoi: OR 34.89, 95% CI = 22.73-53.55; Shanghai: OR 10.91, 95% CI = 7.98-14.93; Taipei: OR 2.09, 95% CI = 1.70-2.58). The smoking-only, drinking-only and both behaviors of adolescents and young adults have significant positive associations with the same behavior of peers. Respondents are more likely to smoke or drink if they report most of their close friends have the same behavior.

Table 3. Association of sociodemographic characteristics with smoking only, drinking only, and both smoking and drinking among adolescents and young adults in Hanoi, Shanghai and Taipei

Characteristic	Only smoking OR(95%CI)			Only drinking OR(95%CI)			Smoking and drinking OR(95%CI)		
	Hanoi	Shanghai	Taipei	Hanoi	Shanghai	Taipei	Hanoi	Shanghai	Taipei
Age, y									
15-19	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20-24	0.80	0.61	1.32	1.28	0.98	1.09	2.68	1.56	1.52
	(0.55-1.16)	(0.44-0.84)**	(0.91-1.91)	(1.07-1.54)**	(0.82-1.17)	(0.89-1.32)	(2.07-3.47)***	(1.22-2.00)***	(1.14-2.01)**
Gender									
Female	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Male	30.66	4.84	3.27	2.53	1.05	0.82	34.89	10.91	2.09
	(12.18-77.18)***	(3.38-6.93)***	(2.41-4.44)***	(2.18-2.94)***	(0.91-1.21)	(0.71-0.95)***	(22.73-53.55)***	(7.98-14.93)***	(1.70-2.58)***
Residence									
Rural	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Urban	0.99	0.94	0.64	0.83	0.76	1.24	1.19	0.72	0.91
	(0.68-1.46)	(0.71-1.25)	(0.46-0.89)**	(0.68-0.99)*	(0.65-0.90)**	(0.95-1.60)	(0.92-1.55)	(0.57-0.90)**	(0.69-1.21)
Economic status									
Low	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Middle	0.92	1.30	1.02	0.99	1.02	0.95	1.01	0.83	0.86
	(0.62-1.38)	(0.93-1.81)	(0.71-1.47)	(0.82-1.20)	(0.84-1.23)	(0.77-1.17)*	(0.78-1.31)	(0.64-1.07)	(0.66-1.13)
High	1.05	1.18	1.1	1.28	1.23	1.28	0.93	0.96	0.95
	(0.66-1.66)	(0.82-1.71)	3(0.79-1.63)	(1.03-1.59)**	(1.01-1.49)*	(1.05-1.57)***	(0.69-1.26)	(0.73-1.27)	(0.73-1.25)
Education level									
Senior high school or lower	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
College	1.01	1.37	0.53	1.64	1.52	1.64	0.98	1.01	0.65
	(0.67-1.50)	(0.98-1.94)*	(0.30-0.95)	(1.35-1.99)*	(1.25-1.85)	(1.15-2.34)	(0.75-1.28)	(0.77-1.34)	(0.43-0.96)
University or higher	0.64	0.92	0.35	1.91	1.84	2.71	0.97	0.70	0.32
	(0.40-1.05)***	(0.61-1.40)	(0.24-0.52)***	(1.54-2.36)***	(1.52-2.24)***	(2.19-3.35)***	(0.71-1.31)	(0.51-0.97)*	(0.24-0.43)***
Employment/school status									
A student without a job	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
A student with a job	1.10	1.40	2.37	1.12	1.20	1.21	0.98	2.53	1.68
	(0.63-1.93)	(0.77-2.53)	(1.73-3.24)**	(0.90-1.38)	(0.92-1.55)	(1.03-1.43)*	(0.70-1.37)***	(1.66-3.86)	(1.31-2.14)*
Not a student with a job	1.20	2.80	1.63	0.96	1.05	1.19	3.01	3.72	2.76
	(0.63-1.93)	(1.98-3.98)***	(1.05-2.54)	(0.78-1.17)	(0.87-1.28)	(0.91-1.55)	(2.30-3.95)***	(2.82-4.90)***	(2.00-3.82)**
Not a student without a job	1.43	2.72	1.70	0.91	0.95	0.75	2.30	3.59	3.75
	(0.89-2.30)	(1.77-4.17)**	(0.98-2.96)	(0.69-1.20)	(0.69-1.29)	(0.51-1.12)*	(1.64-3.23)**	(2.53-5.10)**	(2.55-5.54)***

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Living with parents									
No	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Yes	1.47	1.31	1.23	0.82	1.03	0.87	0.99	0.65	0.62
	(0.89-2.41)	(0.97-1.78)	(0.87-1.74)	(0.66-1.01)	(0.87-1.21)	(0.73-1.04)	(0.75-1.33)	(0.52-0.82)***	(0.49-0.79)***
Peer smoking									
No	1.00	1.00	1.00				1.00	1.00	1.00
Yes	3.48	4.98	5.95				2.66	3.30	12.49
	(2.26-5.35)***	(3.58-6.94)***	(3.72-9.52)***				(1.91-3.30)***	(2.42-4.50)***	(6.59-23.68)***
Peer drinking									
No				1.00	1.00	1.00	1.00	1.00	1.00
Yes				1.32	2.04	2.52	2.51	2.12	3.75
				(1.13-1.53)***	(1.76-2.36)***	(2.15-2.96)***	(1.91-3.30)***	(1.58-2.85)***	(2.62-5.37)***

4. Discussion

To our knowledge, this is the first study to explore the gender differences in smoking and drinking among adolescents and young adults aged 15-24-year-olds in three Asian cities-Hanoi, Shanghai and Taipei, which share Confucian values for thousands of years but in different stages of economic and social transitions. Results from this study present that prevalences of smoking and drinking differ significantly between males and females across the three cities, and the magnitude of gender differences widely vary across the three cities.

Data from this study indicate that females reported smoking-only were the lowest in Hanoi (0.19%), followed by Shanghai (1.25%) and Taipei (2.55%). The same trend can be observed for drinking-only and both smoking and drinking across the three cities. This finding may be related with social sanction. Each society has different acceptance levels for female smoking and drinking, which are related to their socioeconomic levels and culture [15]. In the traditional culture, smoking and drinking are discouraged for females as they are incompatible with traditionally feminine traits. In this study, the three cities--Hanoi, Shanghai and Taipei influenced by the traditional Confucian culture for thousands of years, have been open to outside influences socially, culturally, and economically for different periods and in different ways. Among them, Taipei is the most industrialized city and has the most anti-Confucian values, followed by Shanghai and Hanoi. So Taipei has the greater acceptance of smoking and drinking among women compared with Shanghai and Hanoi.

Gender differences in smoking-only, drinking-only and both smoking and drinking can be observed among adolescents and young adults across the three cities. The possible explanations are as follows. Firstly, the key period that adolescents move towards adulthood marked by a series of developmental challenges such as growing independence from the family and restructuring social network systems. The increased need for autonomy is a special characteristic of this period, especially true for males. Males display a greater tendency to substance use in coping with their problems, but females are more likely to seek help from parents, friends and professionals [18]. Secondly, in the cities influenced by the traditional values, alcohol and cigarette use are perceived as part of the male gender role, and they can demonstrate their masculinity and serve to establish and maintain interpersonal and social bonds [19]. However, women are not encouraged to smoke and drink as they are disaccord with traditional female gender role. Finally, previous research found parental monitoring is associated with substance use among girls and boys [20,21,22]. Parents who hold more traditional gender role attitudes are more likely to express a double standard for the monitoring and punishment of deviance for girls and boys, which serves as a protective factor against female smoking and drinking [20,22,23].

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The magnitude of gender differences in smoking and drinking widely vary across the three cities, with the largest in Hanoi, followed by Shanghai and Taipei, which accord with socioeconomic status and social concepts of the three cities. In the last decades, rapid socioeconomic changes have improved the women's social status and made the restrictions concerning their behaviors diminish, which resulted in an increasing similarity of male and female roles[24,25]. The changes in traditional gender roles are accompanied by the improvement of the social acceptance for females smoking and drinking, which led to the increase in female smoking and drinking prevalence and the narrowed gender gap in smoking and drinking. Hanoi, Shanghai and Taipei—three cities rooted in Confucian values—are experiencing different stages of economic and social transitions, which result in differences in social acceptance for females smoking and drinking and gender gap in smoking and drinking [26]. Both social and economic connections with the western world were already occurring in Taiwan in the 1950s and were increasing throughout the following decades. By far, it seems to parallel many developed regions in Asia. The social and economic transformation of China mainland began in reforms of 1979, and powerful economic developments increased from then on, with major social changes as well. Vietnam's economic transformation began in 1986 with the policies of Doi Moi; rapid development has followed with expansion of foreign trade and investment and considerable exposure to education and western ideas.

Peer behaviors increase in importance during adolescence and adulthood, the period that they become independent from their family and establish new peer networks. In this study, peer behaviors are found to have significant association with smoking and drinking, which is consistent with previous studies[27,28,29]. Peer influences on smoking or drinking may be direct or indirect[30,31].Direct influences may be from the encouragement, dares, or actual offers of the substance by peers. Indirect peer influences are from the associations of adolescents and young adults with peers who smoke or drink, which could increase the availability of these substances, provide role models, establish substance use as normal, and create the perception that using these substances might increase social acceptance.

Several limitations of this study should be noted. First, because the study design was cross-sectional, causal relationships cannot be determined. Second, the study relies on self-report. It was likely that some female under-reported substance use due to social desirability bias. However, computer-assisted self-interviewing software was adopted in this study, which could safeguard respondents' privacy and may help limit response bias [32]. Finally, although the study involves a large sample in three Asian metropolitan cities, the findings are of limited generalizability to the entire adolescents and young adults.

Despite these limitations, the results of this study provide additional evidence about gender differences in smoking and drinking among adolescents and young adults in the Asian cities. The results of this study have important implications for the design of programs for the prevention and intervention of smoking and drinking among adolescents and young adults. Future research is needed to further examine the mechanisms behind these gender differences and how these differences may be utilized to prevent and reduce smoking and drinking in the adolescent and young adult population. The findings of this study suggest peers have important influences on smoking and drinking, so interventions should be directed at the peer group and designed to alter their social norms [33].

5. Conclusions

Our study reveals that the gender differences are significant for smoking-only, drinking-only, and both smoking and drinking among adolescents and young adults in Hanoi, Shanghai and Taipei, the three cities which are all influenced by Confucian culture for thousands of years and are experiencing different stages of economic and social transitions now. The magnitude of gender differences in smoking-only, drinking-only and both behaviors widely vary across the three cities.

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The smoking-only, drinking-only and both behaviors of adolescents and young adults have significant positive associations with the same behavior of peers.

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