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Cigarette Smoking and Drinking Behavior of Migrant Adolescents and Young Adults in Hanoi, Vietnam

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Abstract

Background—There has been a large migration from rural to urban areas in much of the developing world. In the past this was less true in Vietnam, which remains largely agricultural; however, since the 1990's, economic reforms and loosening of government policies that had previously limited movement have led to a large increase in this rural to urban population movement. Risky health behaviors have been found among migrants in many other settings. The purpose of this research is to determine whether migrant adolescents and young adults in the city of Hanoi are more or less likely than local ones to engage in cigarette smoking and alcohol drinking health risk behaviors, to identify factors associated with these behaviors and to suggest interventions to reduce these health risk behaviors among the study population.

Methods—A cross-sectional survey of 4550 adolescents and young adults aged 15–24 was conducted in urban Hanoi in 2006. This study examines current use of cigarettes and alcohol by migration status using multivariate logistic regressions.

Results—Cigarette smoking and drinking alcohol are male phenomena. The prevalence of cigarette smoking and alcohol drinking is high among adolescents and young adults in Hanoi, and is more common among migrants who came from rural areas of other provinces than non-migrants in the city. However, multivariate analysis revealed that migrants were neither more likely to smoke cigarettes nor drink alcohol than non-migrants after controlling for other factors such as age, full-time worker status, depression, and having close friends who smoke and/or drink.

Conclusion—The results suggest that interventions aiming at smoking and/or drinking reduction should pay more attention to adolescents, especially males, changing health risk behaviors at school and at work, and peer influence than their migration status.

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Keywords

Rural-to-urban migration; health risk behavior; cigarette smoking; alcohol drinking; city; adolescent; young adult; Hanoi; Vietnam

Introduction

Migration can have both positive and negative impacts on health. Migrants, especially rural to urban migrants, often experience lifestyle changes and gain access to services that result in improved health, while at the same time they may be exposed to new risks, hazards and stresses [1]. Previous studies have largely found that migrants face significant psychological and social stress due to unstable living conditions, changes in lifestyle, social alienation, insecure employment, poor working conditions, long working hours, and adapting to a new environment; Both population and laboratory based studies confirm that these social stresses are linked to health risk behaviors, particularly an increased urge to smoke and drink [2, 3, 4–6]. As a result, it was found that migrants engage in higher levels of risky behaviors, including alcohol use [7–12] and smoking [2, 13], when compared to rural inhabitants or the urban born population.

While Vietnam is still primarily an agricultural society with the majority of its population living in rural areas, rapid migration to urban centers has occurred alongside economic liberalization since the 1990s. Since the beginning of *Doi Moi*, or the socioeconomic reforms initiated in 1986, the increase in economic opportunities in urban centers has dramatically outpaced rural economic growth. Rural poverty and increasing rural-urban income differentials have driven many people from the countryside to urban centers, particularly to Hanoi and Ho Chi Minh City [14–16]. Findings from the last three Censuses indicate that both migration and urbanization have accelerated, especially during the last decade. The inter-provincial migrant population increased to 3.4 million people in 2009 from 2.0 million in 1999 and 1.3 million in 1989, and the urban share of the population has increased from 19.4% in 1989 to 23.7% in 1999 and to 29.6% in 2009 [17, 18].

The migrant population in Vietnam is largely young; more than half of migrants are under the age of 25 and the majority of rural to urban migrants are between ages 20 and 22 [14, 16, 18]. Migrants form a critical population for smoking and drinking interventions as those unfavorable health behaviors are often initiated in adolescence when health consequences are perceived to be distant and not urgent [19, 20].

While much is known about the overall prevalence rates of smoking and drinking behaviors in urban areas of Vietnam, little is known specifically about the risk for rural to urban migrants who, for the reasons discussed above, are thought to be at especially high risk for engaging in unfavorable health behaviors. The concern is greater among rural-to-urban migrants as smoking and drinking are more common in their rural areas of origin [21].

While research has shown that migration is an important factor influencing smoking and drinking behaviors, strong associations also exist between smoking and drinking behaviors and other socioeconomic factors. Elders et al. found that as adolescents age, they become

more vulnerable to experimenting with smoking and alcohol use [22]. Higher levels of smoking and drinking are also associated with higher levels of personal disposable income - especially among adolescents [2, 23–26], social isolation or a lack of support from families and friends [2, 10], and marriage or living arrangement [11, 27, 28]. Studies from a range of countries have consistently found males to be more likely to drink and to have a higher risk of becoming alcoholic than females [12, 19, 28–30]. Previous studies have also revealed a strong influence of peer behavior on the smoking and drinking behavior of young people [31–33].

In this study we examine the cigarette smoking and alcohol drinking habits of rural to urban migrants in comparison to urban born populations in order to determine whether migrants at adolescent and young adult ages in Hanoi are indeed more or less likely than the local ones to engage in these health risk behaviors, to identify other factors associated with these behaviors and to suggest interventions to reduce these health risk behaviors among adolescents and young adults.

Methods

Data and sample

This study utilized from a 2006 cross-sectional survey of 17,016 male and female, married and unmarried adolescents and young adults, aged 15–24, conducted in urban Hanoi, Shanghai and Taipei and their surrounding rural areas by a team of researchers from the Johns Hopkins Bloomberg School of Public Health, the Hanoi Institute for Gender and Women's Studies, the Population and Health Research Center in Taiwan's Bureau of Health Promotion, and the Shanghai Institute for Planned Parenthood Research. Data was collected through face-to-face interviews. Only the 4550 respondents from urban Hanoi are included in this article.

Stratified-cluster random sampling was applied to select participants for the study. A representative sample of adolescents and young adults was selected from each residence group and weights for each group were calculated. The sampling methodology has been described in detail in "Levels of Change in Adolescent Sexual Behavior in Three Asian Cities" [34]. In total, three categories of adolescents and young adults, defined by place of residence, are included in this study; these are (1) 3010 adolescents and young adults living in households; (2) 505 adolescents and young adults living in formal group living facilities (GLFs) or school dormitories; and (3) 1035 adolescents and young adults living in informal-GLFs or guesthouses. Inclusion of GLFs is an important characteristic of this study as it allowed inclusion of temporary migrants in cities who are excluded from most population-based surveys.

Working concepts and definitions

In this study, non-migrants are defined as those who have always lived in the same dwelling in Hanoi and have never moved. Among migrants, there are three distinct groups; (1) inter-provincial migrants from rural areas (PMR) are those who moved to Hanoi from rural areas of other provinces; (2) inter-provincial migrants from urban areas (PMU) are those who

moved to Hanoi from urban areas of other provinces; and (3) inner-city migrants (CM) are those who moved to their current dwelling or place of residence from other places of Hanoi. PMR, hereafter referred to as rural migrant, is the major group of interest, while PMU and CM serve as control groups.

This study examines current alcohol and cigarette usage. For smoking, those who have smoked at least one cigarette during the period 30 days prior to the time of interview are recorded as current (cigarette) smokers and the rest are recorded as non-smokers. Similarly, those who ever drank alcohol during the 30 days prior to the time of the interview are recorded as current drinkers and the rest are recorded as non-drinkers.

Adolescents were defined as respondents aged 15 to 19 and young adults were defined as respondents aged 20 to 24. Household economic status was constructed through the number of valuable goods in each respondent's home when they were 13 or 14 years old. "Above average" households are those with more than 6 valuable items of household goods. "Below average" households are those with less than 4 valuable items of household goods, and "Average households" are the remaining ones. The cut-off points are taken at 33 and 66 percentiles of the number of valuable items of household goods of the total population.

Statistical Analysis

Logistic regressions were used to identify factors associated with cigarette smoking and drinking. Determinants of cigarette smoking and drinking that came from the review of previous studies were included in the regression models. Education was considered but it has a strong association to age and hence is not included in these models to avoid collinearity. Similarly, the measure of association between migration status and place of residence also shows that these are redundant and hence only migration status is included in the regressions.¹ The number of smoking females is so small that only males are included in that regression (Table 5). Because of the great gender difference in this study, regression models predicting drinking behaviors are presented in total and stratified by gender.

Results

Characteristics of the study population

Relevant characteristics of the study population are provided in Table 1, which shows that almost half of the respondents are non-migrants, a fourth of the respondents are rural migrants, and the remaining respondents are either inter-provincial urban migrants or inner-city migrants.

There are significant differences in socioeconomic characteristics between non-migrants and rural migrants (Table 1). Females account for more than half of the respondents among rural migrants while they account for less than a half of the respondents among non-migrants. There is a greater share of young adults aged 20 to 24 relative to adolescents among participating rural migrants compared to non-migrants (79% young adults among migrants vs. 42% among non-migrants). A large share of the respondents, especially among the non-

¹Cramer's V > 0.6.

migrants, are students. The proportion of respondents who are working students are similar in the non-migrant and rural migrant populations; but the proportion of respondents who are not working is slightly higher among non-migrant population. The proportion of full-time workers account for more than half of the respondents among the rural migrants, which is much greater than that of the non-migrants. Rural migrants live in poorer households overall than non-migrants.

Rural migrants reported worse psychological health than non-migrants. A greater proportion of rural migrants reported depression experience within the 6 months prior to the time of the survey. In both groups, females are more likely to report experiencing depression than males.

The ‘social environment’ of rural migrants places them at greater risk for smoking and drinking than non-migrants. The proportion of rural migrants who report that most of their friends smoke and/or drink is significantly higher than that of non-migrants.

Migration status and cigarette smoking behaviors

On average, about one fifth of adolescents and young adults in the study population currently smoke cigarettes. Current cigarette smoking behavior by migration status, gender and age groups is shown in Table 2. Smoking is more common among rural migrants (22%) compared to non-migrants (15%). The higher proportion of smokers among the rural migrants can be attributed to the high proportion of smokers among young adults (26%) as the proportion of smokers among adolescents in both rural migrant and non-migrant populations are very similar (at 8% and 9% respectively). Clearly, smoking is more common among young adults (25%) than adolescents (8%).

Interestingly, but not surprisingly, smoking is a male phenomenon. The vast majority of smokers are males; fewer than 1% of female adolescents and 2% of female young adults smoke. Among males, the proportion of the current adolescent smokers is 16% and the proportion of the current young adult smokers is 46%; the combined proportion is 33%. Those are figures of real interest as females should not be included while looking at smoking behavior given their near zero-participation to this health risk behavior.

Migration status and alcohol consumption

Overall, a little more than one third of adolescents and young adults in Hanoi currently drink alcohol. Current alcohol drinking by migration status, gender and age group is shown in Table 3. As with smoking, the prevalence of drinking is higher among rural migrants (41%) than non-migrants (31%). However, this is due to male drinkers and not true for females. Drinking is also more common among young adults (47%) than adolescents (20%).

Alcohol drinking is more common among males than females in both adolescent and young adult populations but it is not overwhelmingly dominant as it is for smoking behavior. Among females, the prevalence of alcohol drinking is similar between adolescent non-migrants (9%) and rural migrants (10%), and young adult non-migrants (20%) and rural migrants (17%). Among males, however, the prevalence of alcohol drinking is higher among

both adolescent (45%) and young adult migrants (73%) compared to non-migrants of the same age group (29% and 66% respectively).

The association between smoking and drinking is strong, especially among rural migrants. Table 4 reveals that almost half of male drinkers also smoke while only 14% of the male non-drinkers smoke. Similarly, while 80% of the male smokers also drink, only 42% of the male non-smokers drink. The smoking prevalence of male drinkers among rural migrants (54%) is higher than that of non-migrants (42%). Likewise, the drinking prevalence of male smokers among rural migrants (84%) is higher than that of non-migrants (71%).

The independent effect of migration on cigarette smoking and alcohol use: Results of logistic regressions

Multiple models of logistic regression were used to analyze this data to determine association between socioeconomic factors and the presence of smoking and drinking behavior; results are presented in Tables 5 and 6. By only analyzing current smoking and drinking behaviors, we believe that our findings imply the effect of migration on smoking and drinking behaviors. As smoking is predominately a male behavior among adolescents and young adults, only males are included in the models for smoking.

Results of logistic regressions fortify the findings from the descriptive analysis showing the high prevalence of smoking among rural migrants compared to non-migrants. Before controlling for other factors, male migrants from rural areas are significantly more likely to smoke than male non-migrants (Model I). When additional explanatory and control variables are included (Model II), however, the significance disappears; in other words, the likelihoods of smoking among male migrants from rural areas and male non-migrants are not different.

Regression results for the presence of drinking behaviors were similar. As with presence of smoking, migration is significantly associated with current drinking behavior before controlling for other covariates; however, the significant level is marginal (Model III). The significance of the effect of migration on drinking also disappears and the odds ratios also come near 1, i.e. the difference is trivial even if it is statistically significant, when additional explanatory and control variables are added (Model IV).

Other determinants of cigarette smoking and alcohol use: results of logistic regressions

In this study, we found that smoking and drinking are initiated at very early ages. Age of initiation of both smoking and drinking among the study population on average is between 16 and 18.² Moreover, results from this study suggest substantial increases of the likelihoods of smoking and drinking during the transition from adolescence to young adulthood. Previous studies have had similar findings [19, 20, 22].

For presence of current smoking, results from multivariate analysis reveal that being a student is strongly associated with a much lower likelihood of smoking but not drinking among adolescents and young adults. The multivariate analysis suggests that working status

²Results not showed.

affects drinking behaviors. Full-time workers have a higher likelihood of drinking than those who are not working; and female working students are more likely to drink than female students who are not working.

In addition to these demographic and socioeconomic characteristics, depression – a factor that may partially result from migrant status – is also seen in this research to influence health risk taking behaviors. As shown in Table 6, depression was positively associated with current drinking: the higher likelihood of depression, the more likely one drinks. Although the association is not statistically significant, a similar tendency was found in the relationship between depression and smoking.

The smoking and drinking behaviors of adolescents and young adults have a very strong association with the same behavior of peers. Adolescents and young adults are more likely to smoke and drink if they believe most of their close friends have the same behavior³ as seen in the high odds ratios in tables 5 and 6. Although the difference is not significant, males who live with friends or classmates tend to drink and smoke more than males who live with parents or spouses or children.⁴

Finally, the strong association between smoking and drinking among adolescents and young adults should be recognized. It was found in all regression models with both variables that adolescent and young adult smokers also have a higher likelihood of drinking and vice versa.

Discussion

The prevalence of smoking and drinking among adolescents aged 15–19 and young adults aged 20–24 in Hanoi was high, especially among males and/or young adults. The current smoking rate of studied adolescents and young adults was 18 percent and the current drinking rate was 36 percent; the current smoking and drinking rates among young adults were as high as 25 percent and 47 percent respectively. The high prevalence of smoking and drinking and the higher prevalence among males were also found in other studies in Vietnam. For instance, findings from various studies showed that the smoking rates to be between 50 to 73 percent among males and 1 to 5 percent among females [19, 21, 35–37]. The 2002 National Health Survey found that 46 percent of males and 2 percent of females aged 15 and above drank alcohol at least once a week and the rate was 20 percent for young people aged 15 to 24 [37]. Results from another survey of 2500 adults aged 25 to 74 in 2005 found that the drinking rate was 67 percent among males and 3 percent among females [29]. A survey of 480 youth between 15 and 20 years old in Khanh Hoa province found that 29 percent of the respondents had consumed alcohol [30]. The 2006 Survey Assessment of Vietnamese Youth showed that the current smoking rate among youth aged 14 to 25 was 28 percent and 60 percent of adolescents and young adults reported having consumed alcohol [38]. Despite the difficulty of comparing results across the available studies as they used different definitions of smoking and drinking, different age groups, and geographic

³As reported by the interviewed adolescents and young adults.

⁴Results are not presented. This variable is redundant to migration status and place of residence and hence it was not included in the presented regression models.

boundary. Nonetheless, all of them provided evidence for a high prevalence of smoking and drinking in Vietnam; The prevalence of smoking in Vietnam, although high, is similar to other countries in the region, but drinking prevalence is noticeably higher [37]. This study adds further evidence regarding adolescents and young adults in Hanoi.

The higher prevalence of smoking and drinking among males implies that efforts to reduce the risky behaviors of smoking and drinking in Vietnam – two of the major preventable causes of morbidity and mortality – should targeted at males. Similarly, the significant increase in the prevalence of drinking and smoking during the transition from adolescence to adulthood suggests that interventions aiming at smoking and/or drinking reduction should pay particular attention to adolescents.

Findings from the present study not only enrich our knowledge of health risk behaviors of smoking and drinking among adolescents and young adults in Hanoi, but also the health risk behaviors of migrants from rural areas - an emerging population in the urban areas of many developing countries in general and Vietnam in particular. At first glance, smoking and drinking are more common among migrants from rural areas compared to non-migrants in the city. This aligns with the public concern regarding unfavorable lifestyle and behaviors of rural-to-urban migrants in large cities. However, results from multivariate analysis indicate that inter-provincial migrants from rural areas were neither more likely to smoke nor drink if they have similar characteristics to non-migrants in the city. The findings suggest that the higher likelihood of engaging in unfavorable behaviors of smoking and drinking among migrants from rural areas compared to non-migrants are largely due to their socioeconomic characteristics, which have a strong and independent association with higher likelihood of smoking and drinking.

Compared to non-migrants in Hanoi, rural migrants is composed of a larger share of young adults, an age group with significantly higher likelihood of engaging in smoking and drinking behavior. They also had a larger share of full-time workers and a smaller share of non-working students, and full-time workers are significantly more likely to engage in smoking and drinking behavior than non-working students and this association remained after controlling for other covariates or characteristics of the respondents. These findings imply the importance of smoking and drinking interventions in professional settings.

A larger share of people who experienced depression in the 6 months prior to the time of the survey among the rural migrants compared to the non-migrants. Depression had an independent and strong effect on the higher likelihood of drinking. These findings suggest that depression reduction interventions for migrants may help to reduce their high prevalence of smoking and drinking.

Peer behavior was found to have the strongest association with smoking and drinking. Rural migrants report a larger share of their close friends smoking and/or drinking compared to non-migrants. Given that the majority of respondents probably have the same working status as their friends, we infer that interventions at school are more important for non-migrants and interventions at work are more important for rural migrants.

Finally, findings from this study suggest that rural migrants face the dual risks of smoking and drinking as the proportions of people engaging in the both behaviors simultaneously as well as each of the behaviors among rural migrants were greater than that of non-migrants while the two behaviors were strongly associated.

This study has several limitations. First, adolescents and young adults self-reported all of the measures of health risk behaviors; no biologic confirmation was obtained to confirm of the status of cigarette and/or alcohol use. Also, there may have been some recall bias as the respondents were asked about their smoking and drinking behavior over the 30 day period prior to the time of the survey. Nonetheless, self-reported health risk behaviors are considered a reliable measurement and are widely used in public health studies. Second, while the sampling strategy used in this study allowed inclusion of temporary migrants living in both formal and non-formal GLFs, a group who are usually excluded from most population-based surveys, it is impossible to obtain weight values because the overall size of the population living in GLFs was unknown. Therefore, estimates of the overall smoking and drinking prevalence could face biases due to weighting. Nonetheless, the main purpose of this study was not identifying the overall prevalence but the difference in prevalence between the rural migrants and non-migrants. Finally, this study presents a case-specific of urban Hanoi and the generalization of findings may be limited.

References

1. Evans J. Introduction: Migration and health. *International Migration Review*. 1987; 21(3):v–xiv. Special Issue: Migration and Health. [PubMed: 12314909]
2. Chen X, Li X, Stanton B, et al. Cigarette smoking among rural-to-urban migrants in Beijing, China. *Preventive Medicine*. 2004; 39(4):666–673. [PubMed: 15351531]
3. Johnson TP, VanGeest JB, Cho YI. Migration and substance use: Evidence from the US national health interview survey. *Substance use & Misuse*. 2002; 37(8–10):941–972. [PubMed: 12180572]
4. Niaura R, Shadel WG, Britt DM, Abrams DB. Response to social stress, urge to smoke, and smoking cessation. *Addictive Behaviors*. 2002; 27:241–250. [PubMed: 11817765]
5. Conway TL, Vickers RR, Ward HW, Rahe RH. Occupational stress and variation in cigarette, coffee, and alcohol consumption. *Journal of Health and Social Behavior*. 1981; 22:155–165. [PubMed: 7240714]
6. Dobbs SD, Strickler DP, Maxwell WA. The effects of stress and relaxation in the presence of stress on urinary pH and smoking behaviors. *Addictive Behaviors*. 1981; 6:345–353.
7. Lin D, Li X, Yang H, et al. Alcohol intoxication and sexual risk behaviors among rural-to-urban migrants in China. *Drug and Alcohol Dependence*. 2005; 79 (1):103–112. [PubMed: 15943949]
8. Santana VS, Khoury M, de Andrade C. Recent migration, petrochemical industry jobs and alcohol consumption. *Revista Brasileira De Epidemiologia*. 1998; 1 (2):149–160.
9. Worby PA, Organista KC. Alcohol use and problem drinking among male Mexican and Central American Immigrant laborers: A review of the literature. *Hispanic Journal of Behavioral Sciences*. 2007 Nov; 29(4):413–455.
10. Watson JM. National Institute on Drug Abuse. Alcohol and drug abuse by migrant farm workers: Past research and future priorities. *Rural substance abuse: State of knowledge and issues*. 1997:443–58. NIDA research monograph, No 168.
11. Schwarzer R, Schröder K, Schröder H. Alcohol consumption in a time of macrosocial stress: Migration, social isolation, and anger as risk factors. *Anxiety, Stress, & Coping*. 1994; 7 (2):173–184.

12. Madsen MH, Gonbaek M, Bjerregaard P, Becker U. The Greenland Population Study. Urbanization, migration and alcohol use in a population of Greenland Inuit. *International Journal of Circumpolar Health*. 2005; 64 (3):234–245. [PubMed: 16050317]
13. Ma GX, Tan Y, Toubbeh J, et al. Acculturation and smoking behaviors in Asian-American populations. *Health Education Research*. 2004; 19 (6):615–625. [PubMed: 15199009]
14. Dang, NA.; Tacoli, C.; Thanh, Hoang Xuan. Migration in Vietnam: A review of information on current trends and patterns, and their policy implications. Department for International Development; UK: 2003.
15. White M, Djamba YK, Anh DN. Implications of economic reform and spatial mobility on fertility in Vietnam. *Population Research and Policy Review*. 2001; 20:207–28.
16. Liem, Nguyen Thanh. Migration and health impacts. In: Duong, Le Bach; Hong, Khuat Thu, editors. *Migration and Social Protection in a transitioning Vietnam*. The Gioi Publisher; 2008. p. 115-58.
17. Central Population and Housing Census Steering Committee. *The 2009 Vietnam Population and Housing Census: Major Findings*. 2010:492.
18. General Statistics Office. *Migration and Urbanization in Vietnam: Patterns, Trends and Differentials*. 2011:139.
19. VanMinh, Hoang; Nawi, Ng; Wall, Stig, et al. Smoking epidemics and socioeconomic predictors of regular use and cessation: Findings from WHO STEPS risk factor surveys in Vietnam and Indonesia. *The Internet Journal of Epidemiology*. 2006; 3(1)
20. Kaplan CP, Naples-Springer A, Stewart S, Perez-Stable E. Smoking acquisition among adolescents and young Latinas: The role of socioenvironmental and personal factors. *Addictive Behaviors*. 2001; 26:531–550. [PubMed: 11456076]
21. Morrow M, Barraclough S. Tobacco control and gender in south-east Asia. Part II: Singapore and Vietnam. *Health Promotion International*. 2003; 18(4):373–80. [PubMed: 14695368]
22. Elders MJ, Perry CL, Eriksen MP, Giovino GA. The report of the Surgeon General: Preventing tobacco use among young people. *American Journal of Public Health*. 1994; 84(4):543–547. [PubMed: 8154552]
23. Griesbach D, Amos A, Currie C. Adolescent smoking and family structure in Europe. *Social Science & Medicine*. 2003; 56 (1):41–52. [PubMed: 12435550]
24. Tyas SL, Pederson LL. Psychosocial factors related to adolescent smoking: A critical review of the literature. *Tobacco Control*. 1998 Dec 1; 7(4):409–20. [PubMed: 10093176]
25. Thorlindsson T, Vilhjalmsson R. Factors related to cigarette smoking and alcohol use among adolescents. *Adolescence*. 1991; 26 (102):399. [PubMed: 1927671]
26. Ettner SL. New evidence on the relationship between income and health. *Journal of Health Economics*. 1996; 15(1 2):67–85. [PubMed: 10157429]
27. Chi PS, McClain J. Drinking, farm and camp life. *Journal of Rural Health*. 1992; 1:45–51.
28. Almeida-Filho N, Lessa I, Magalhaes L, et al. Alcohol drinking patterns by gender, ethnicity, and social class in Bahia, Brazil. *Revista Saude Publica*. 2004; 38(1):45–54.
29. VanMinh, Hoang; Huong, Dao Lan; Giang, Kim Bao. Self-reported chronic diseases and associated sociodemographic status and lifestyle risk factors among rural Vietnamese adults. *Scandinavian Journal of Public Health*. 2008; 36(6):629–34. [PubMed: 18775819]
30. Kaljee LM, Genberg BL, Minh TT, et al. Alcohol use and HIV risk behaviors among rural adolescents in Khanh Hoa Province Vietnam. *Health Education Research*. 2005; 20(1):71–80. [PubMed: 15198997]
31. Grenard JL, Guo Q, Jasuja GK, et al. Influences affecting adolescent smoking behavior in China. *Nicotine & Tobacco Research*. 2006; 8(2):245–55. [PubMed: 16766417]
32. Kulbok PA, Rhee H, Botchwey N, Hinton I, Bovbjerg V, Anderson NLR. Factors influencing adolescents' decision not to smoke. *Public Health Nursing*. 2008; 25(6):505–15. [PubMed: 18950415]
33. Chaveepojnkamjorn W, Pichainarong N. Factors associated with alcohol consumption among upper secondary school students. *The Southeast Asian Journal of Tropical Medicine and Public Health*. 2007; 38(1):146–51. [PubMed: 17539261]

34. Zabin LS, Emerson MR, Li N, et al. Levels of Change in Adolescent Sexual Behavior in Three Asian Cities. *Studies in Family Planning*. 2009; 40(1):1–12. [PubMed: 19397181]
35. MOH. Government Resolution on “National Tobacco Control Policy”. Medical Publishing House; 2000.
36. Minh, Nguyen Thac; VanKinh, Hoang; Lam, Nguyen Tuan, et al. Financial burden of cigarette smoking on households (in Vietnamese). 2002. Available on website of VINACOSH at <http://www.vinacosh.gov.vn/?mPage=0FN80J01T178>
37. MOH & GSO. The report: Results of the Vietnam National Health Survey 2001–2002. 2003
38. ADB, GOPFP, UNFPA. The Analysis Result of Survey Assessment of Vietnamese Youth 2003 & 2008 (SAVY). Hanoi: 2010. Using Alcohol, Beers and Cigarette among Vietnamese Youth. monograph

Table 1

Characteristics of the study populations

Variable	Categories	Non-migrant			Inter-provincial migrant from rural areas			All		
		F	M	Both	F	M	Both	F	M	Both
Basic characteristics										
Migration status	Non-migrant									
	Inter-prov. migrant from rural							46%	50%	48%
	Inter-prov. migrant from urban							28%	24%	26%
	Inner-city migrant							16%	11%	14%
								10%	15%	12%
Male	Female			45%			52%			47%
	Male			55%			48%			53%
Age	Adolescent (15–19)	59%	58%	58%	24%	17%	21%	43%	41%	42%
	Young adult (20–24)	41%	42%	42%	76%	83%	79%	57%	59%	58%
Working status	Student	65%	65%	65%	31%	29%	30%	54%	55%	54%
	Not working	6%	9%	7%	2%	4%	3%	4%	7%	5%
	Full-time worker	16%	18%	17%	57%	55%	56%	29%	28%	29%
	Working student	13%	8%	11%	10%	12%	11%	13%	10%	12%
Household economic status	Below average	8%	7%	7%	70%	75%	73%	32%	27%	29%
	Average	30%	27%	29%	17%	17%	17%	26%	24%	25%
	Above average	62%	66%	64%	13%	8%	10%	42%	49%	46%
Psychological health										
Depression	Depressed in last 6 months	39%	25%	32%	44%	31%	37%	42%	30%	36%
	Did not depressed in last 6 months	61%	75%	68%	56%	69%	63%	58%	70%	64%
Peer behaviors										
Peer smoking	Most of close friends smoke	38%	68%	55%	53%	77%	64%	42%	70%	57%
	... did not smoke	62%	32%	45%	47%	23%	36%	58%	30%	43%
Peer drinking	Most of close friends drink	30%	56%	45%	50%	78%	63%	37%	65%	52%

Variable	Categories	Non-migrant			Inter-provincial migrant from rural areas			All		
		F	M	Both	F	M	Both	F	M	Both
		70%	44%	55%	50%	22%	37%	63%	35%	48%
... did not drink										
Number of observations		1153	1132	2285	542	560	1102	2306	2243	4549

Note: Total column percentages of all categories within each group is 100%.

Table 2

Current smoking behavior among adolescents and young adults

Variable	Adolescent			Young adult			All		
	F	M	Both	F	M	Both	F	M	Both
Non-migrant	0 %	16 %	9 %	1 %	40 %	23 %	1 %	26 %	15 %
Inter-prov. migrant from rural	0 %	19 %	8 %	2 %	49 %	26 %	2 %	44 %	22 %
Inter-prov. migrant from urban	0 %	16 %	7 %	0 %	43 %	20 %	0 %	37 %	16 %
Inner-city migrant	1 %	11 %	6 %	1 %	52 %	36 %	1 %	38 %	23 %
All	0 %	16 %	8 %	1 %	46 %	25 %	1 %	33 %	18 %
Number of observations	1090	1026	2116	1216	1218	2434	2306	2244	4550

Table 3

Current drinking behavior among adolescents and young adults

Variable	Adolescent			Young adult			All		
	F	M	Both	F	M	Both	F	M	Both
Non-migrant	9 %	29 %	20 %	20 %	66 %	45 %	14 %	44 %	31 %
Inter-prov. migrant from rural	10 %	45 %	24 %	17 %	73 %	45 %	15 %	68 %	41 %
Inter-prov. migrant from urban	12 %	43 %	24 %	17 %	77 %	44 %	16 %	69 %	39 %
Inner-city migrant	10 %	24 %	17 %	30 %	74 %	60 %	20 %	56 %	42 %
All	10 %	31 %	20 %	19 %	71 %	47 %	15 %	55 %	36 %
Number of observations	1090	1026	2116	1216	1218	2434	2306	2244	4550

Table 4

Current smoking & drinking behavior among male adolescents and young adults

	Non-migrant	Inter-provincial migrant from rural	All
% smoke only	8 %	7 %	7 %
% drink only	26 %	32 %	28 %
% smoke & drink	19 %	37 %	27 %
% smoke among drinkers	42 %	54 %	49 %
% smoke among non-drinkers	14 %	23 %	14 %
% drink among smokers	71 %	84 %	80 %
% drink among non-smokers	35 %	56 %	42 %
Number of observations	1132	561	2244

Table 5

Results of Logistic Regression Predicting Presence of Current Smoking among Male Adolescents and Young Adults in Hanoi

Independent Variables	Model I OR/ (95% CI)	Model II OR/ (95% CI)
Migration Status		
Non-migrant ^a	1	1
Inter-provincial migrant from rural	2.17 ** (1.15–4.11)	1.01 (0.66–1.55)
Inter-provincial migrant from urban	1.61 * (0.99–2.63)	1.09 (0.70–1.69)
Inner-city migrant	1.67 * (0.97–2.86)	1.45 ** (1.08–1.96)
Age		
Adolescents (15–19 yo.)		1
Young adults (20–24 yo.)		1.81 *** (1.33–2.46)
Current Working Status		
Student ^a		1
Not working		2.75 *** (1.58–4.79)
Full-time worker		2.52 *** (1.36–4.69)
Working student		0.73 (0.38–1.39)
Household Economic Status		
Below average ^a		1
Average		0.97 (0.67–1.39)
Above average		0.88 (0.55–1.42)
Depression		1.25 (0.84–1.85)
Peer Smoking		4.18 *** (3.17–5.49)
Currently drinking		3.61 *** (2.27–5.76)
Number of observations	2,244	2,241

* p 0.10,

** p 0.05,

*** p 0.01;

^aReference category.

Table 6

Results of Logistic Regression Predicting Drinking Behavior among Adolescents and Young Adults in Hanoi

Independent Variables	Model III OR/ (95% CI)	Model IV OR/ (95% CI)	Model V OR/ (95% CI) Among Male	Model VI OR/ (95% CI) Among Female
Migration Status				
Non-migrant ^a	1	1	1	1
Inter-provincial migrant from rural	1.57 * (0.92–2.68)	0.99 (0.74–1.31)	1.16 (0.77–1.75)	0.77 (0.51–1.18)
Inter-provincial migrant from urban	1.47 ** (1.06–2.03)	1.29 (0.84–2.00)	1.67 * (0.87–3.19)	0.95 (0.60–1.50)
Inner-city migrant	1.66 * (0.98–2.82)	1.16 (0.74–1.83)	1.07 (0.60–1.90)	1.43 * (0.98–2.09)
Male		4.81 *** (3.50–6.61)	-	-
Age				
Adolescent (15–19 yo.)		1	1	1
Young adult (20–24 yo.)		2.49 *** (1.85–3.34)	2.86 *** (1.93–4.23)	1.89 *** (1.30–2.73)
Current Working Status				
Student ^a		1	1	1
Not working		0.78 (0.49–1.25)	0.81 (0.45–1.45)	0.76 (0.31–1.89)
Full-time worker		1.25 * (1.00–1.57)	1.24 (0.89–1.74)	1.41 * (0.93–2.16)
Working student		1.09 (0.79–1.51)	0.83 (0.51–1.36)	1.47 ** (1.02–2.13)
Household Economic Status				
Below average ^a		1	1	1
Average		0.80 (0.58–1.11)	0.83 (0.57–1.22)	0.67 (0.36–1.26)
Above average		1.04 (0.74–1.45)	0.89 (0.55–1.44)	1.33 (0.88–2.00)
Depression		1.48 *** (1.17–1.87)	1.36 ** (1.00–1.83)	1.73 *** (1.23–2.43)
Peer drinking		2.22 *** (1.94–2.55)	2.50 *** (1.96–3.18)	1.94 *** (1.47–2.56)
Currently smoking		3.92 *** (2.52–6.01)	3.44 *** (2.17–5.44)	^b
Number of observations	4,550	4,545	2,241	2,304

* p 0.10,

** p 0.05,

*** p 0.01;

^aReference category;

^bNot included as the majority of females did not smoke