



Published in final edited form as:

*J Adolesc Health*. 2012 March ; 50(3 0): S75–S82. doi:10.1016/j.jadohealth.2011.12.010.

## The Relationship between Sexual Behavior and Non-sexual Risk Behaviors among Unmarried Youth in Three Asian Cities

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### Abstract

**Background:** Health risk behaviors in adolescents and youth such as smoking, alcohol, drug use, violence, suicide, and unprotected sexual behavior are issues of major public health concern. Addressing the relationship between sexual behavior and non-sexual risk behaviors will make a significant contribution to the design of effective intervention programs for this population of adolescents and unmarried youth.

**Methods:** This cross-sectional study was conducted in three Asian cities with a common heritage of Confucian values: Hanoi, Shanghai and Taipei. Data were collected in 2006 from 17,016 youth aged 15-24 years residing in both urban and rural districts of the three settings. The relationships between sexual behavior and seven non-sexual risk behaviors among unmarried adolescents were examined using  $\chi^2$  tests, logistic regression models, Cox regression models, and cluster analysis.

**Results:** Sexual behavior was associated with seven non-sexual risk behaviors, especially with smoking, drinking, drug use and running away from home. In terms of the age at initiation of risk behaviors, smoking and drinking were usually initiated before sexual intercourse. Sexual behavior and non-sexual risk behaviors co-occurred in the high risk group in all three cities. Youth having the highest risk of sexual behavior were more likely to have the highest risk of nearly all non-sexual risk behaviors, with the exception of fighting in Hanoi, and gambling in Shanghai and Taipei.

**Conclusion:** Sexual behavior among unmarried youth is correlated with non-sexual risk behaviors but with different patterns across the three settings. Interventions aimed at reducing unprotected sex generally focus only on the sexual behavior; however, considering the correlations found here between sexual and non-sexual risk behaviors, they should target multiple risk behaviors.

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## Keywords

Sexual behavior; non-sexual risk behaviors; unmarried youth

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## Introduction

Health risk behaviors (HRBs) in adolescents, such as smoking, alcohol abuse, drug use, violence, suicide, and unprotected sexual intercourse, are issues of major public health concern. HRBs can damage an individual's health and well-being and are responsible for much of the mortality and morbidity of adolescents and young adults [1-3]. Efforts to reduce HRBs among adolescents have primarily focused on specific behaviors (e.g. cigarette smoking, sexual behaviors). However, there is increasing evidence suggesting that risk behaviors tend to co-occur [3-7], which indicates that prevention efforts need to address the interrelationship among multiple behaviors.

According to Jessor's problem behavior theory, adolescents' involvement in any one problem behavior or health behavior increases the likelihood of involvement in other problem behaviors or health behaviors due to their linkages in the social ecology of adolescents. This theory suggests that multiple problems or health risk behaviors may occur as a function of a single behavioral syndrome [8-10]. In the U.S. and other western countries, numerous studies have documented correlations between two or more risk behaviors. For example, previous studies have identified these behavior combinations: substance use, sexual activity, and suicide behavior [11]; substance use and violence [12]; substance use and sexual activity [13,14]; smoking and drinking [7]; smoking, drinking, and drug use [15]; binge drinking, suicide attempts, drug use and gambling [16]; Alcohol use and sexual risk behaviors [17]. Some problem behaviors relevant for younger adolescents, e.g. early drinking, may also predict later sexual risks [17-18]. Early drinking may shape subsequent functioning through multiple pathways, for example, by affecting judgment, school performance, peer selection, and exposure to environments that reward risk taking [19-21]. It has been suggested that the relationship between problem behaviors may differ across ethnic groups and it is possible that the "syndrome" of problem behaviors may have different patterns for various ethnic groups from diverse socioeconomic, historical, and cultural backgrounds [21,22]. As the AIDS epidemic continues to spread across Asia, increases in premarital sexual behaviors are issues of growing concern in this area [23]. Until recently, however, little evidence has been available on the relationship between sexual behaviors and non-sexual risk behaviors among adolescents in Asian countries.

Vietnam, China and Taiwan are three Asian countries/regions with Confucian-based cultures. Confucian culture is conservative regarding sexual issues. However, with the rapid change in the social, cultural and economic climate due to opening to the outside world, there is growing concern about increases in HRBs among adolescents and youth including, but not limited to, premarital sex, commercial sex work, and unprotected intercourse [24-33]. Examining the relationship between premarital sexual behavior and non-sexual risk behaviors will be helpful for designing effective intervention programs among adolescents in these settings. Although sharing a common cultural tradition, the three settings vary with

regard to social and economic transition; they have been influenced by the outside world socially, culturally and economically for different periods of time and in different ways [34]. Therefore, the level of HRBs and the relationship between sexual behaviors and non-sexual risk behaviors may differ in each of these settings.

The main objective of this study is to examine the relationship between sexual behavior and non-sexual risk behaviors including smoking, drinking, gambling, using drugs, running away from home, fighting and suicide among unmarried youth. We hypothesize that : First, sexual behavior among unmarried youth is associated with non-sexual risk behaviors; Second, sexual initiation is related to the timing of other non-sexual risk behaviors; Finally, sexual behavior and non-sexual risk behaviors co-occur in young people who fall into a “high risk cluster”, but the actual combination of these behaviors will differ in the three settings.

## Method

### Sample and procedures

Data for this article come from a 2006 cross-sectional survey of 17,016 male and female, married and unmarried youth, aged 15-24, conducted in urban Hanoi, Shanghai and Taipei and rural areas included in their large metropolitan districts by a team of researchers from the Johns Hopkins Bloomberg School of Public Health, the Population and Health Research Center in Taiwan’s Bureau of Health Promotion (BHP), the Shanghai Institute for Planned Parenthood Research (SIPPR) and the Hanoi Institute for Gender and Women’s Studies. In this paper, only the 16,554 unmarried respondents were included in the analysis.

The sampling methodology has been described in detail in “Levels of Change in Adolescent Sexual Behavior in Three Asian Cities” [34]. Multi-stage sampling methods were used to insure representativeness within each city. In Hanoi and Shanghai both private residences and group living facilities (GLFs) were sampled. In Taipei students were interviewed in school with a small non-student sub-sample interviewed at their private residences and GLFs. The survey was developed by the research team, translated, back-translated, and pilot tested in each site. Interviewers received extensive training. Most of the interview was conducted face-to-face, except that computer-assisted self interview (CASI) was used for sensitive questions. All aspects of this study received approval from the Committee on Human Research at the Johns Hopkins University as well as the collaborating local organizations.

### Measures

**Measures of health risk behaviors**—Eight measures were used to capture adolescents’ involvement in HRBs: smoking, drinking, gambling, drug use, running away from home, fighting, suicide, and sexual behavior. The measures combine answers to a number of questions on frequency, timing and severity of the behaviors examined. For smoking, drinking, drug use and sexual behavior, a question on the initial age of risk behavior was also included in the measures. In this paper, some of the analyses (Tables 2-4) are conducted based on measures on “ever having participated in an HRB in a given time period”, while

some (Tables 5-7) use a scale, presented in Table 1, which assesses the degree of risk within each behavior. For Tables 2-4, HRBs were defined as follows: (1) smoking: ever smoked in the past 30 days; (2) drinking: ever had a glass of beer, wine, or a shot of liquor in the past 30 days; (3) gambling: ever engaged in gambling for money; (4) drug use: ever tried an addictive or illicit substance; (5) running away from home: ever ran away from home for at least one night; (6) fighting: ever physically fought with anyone in the last 12 months; (7) suicide: ever thought about or attempted suicide; (8) sexual behavior: ever had sexual intercourse with the opposite sex. The scales presented in Table 1 range from never having experienced a specific behavior to regular or more severe experiences with the behavior. Respondents were categorized based on their response to questions about ever having participated in a behavior and how frequently they participated in it. For example, if a person reported never having had sex then he/she would be assigned a 0 for the sexual behavior measure. Those who reported having had sex are assigned a higher category based additionally on their answers regarding whether a contraceptive was used during the first and/or last sexual intercourse with their first partner. The raw response categories vary across measures; however, for the purpose of the current analysis, response scales were all rescaled to range from 0 to 3 (see Table 1). Higher values on response scales reflect greater exposure to risk. These scales were designed to distinguish the extent of risk within each behavior, and do not necessarily represent comparable risk across behaviors at a given level.

**Measures of demographic characteristics**—Demographic characteristics used in the analysis are based on self-report. These include age, gender, urban or rural residence, education level, in or out of school status, as well as family economic status.

**Statistical analysis**—All analyses were stratified by city and all tabulations were adjusted for weighting. The  $\chi^2$  test was used for bivariate analysis to examine the differences across gender and settings and associations between HRBs. Survival analysis (Life-table method) was used to compute the probability of smoking, drinking, drug use and sexual behavior by age and gender. Logistic regression models, Cox regression models and general linear models were used for multivariate analysis. Finally, cluster analysis was used to distinguish different clusters of adolescent HRBs. Using the method of *k*-means model, the clustering is done on the basis of Euclidean distances computed from the score measured by the response scales for each risk behavior presented in Table 1. Observations that are very close to each other are assigned to the same cluster, while observations that are far apart are in different clusters. Differences between clusters for the means of each risk behavior were tested using general linear models. Statistical analysis was performed using SAS 9.1.3 (SAS Institute Inc. Cary, NC).

## Results

### Status of eight HRBs

Table 2 presents the percentage of HRBs by gender in the three cities. Compared with females, males are significantly more likely to engage in seven of the eight HRBs, with the exception being thoughts or attempts of suicide. There are significant differences between the cities in terms of the levels of HRBs. The top three HRBs engaged in by respondents are

drinking, smoking and fighting in Hanoi; drinking, smoking and sexual behavior in Shanghai; sexual behavior, drinking and gambling in Taipei. In general, respondents in Taipei have the highest level of HRBs, followed by respondents in Shanghai and then in Hanoi. Similarly, the percentage of respondents who participated in three or more HRBs is also the highest in Taipei (22.4%), lowest in Hanoi (7.1%), and in the middle in Shanghai (12.5%) ( $p < 0.001$ , not shown).

### **The association between sexual behavior and non-sexual risk behaviors**

Table 3 shows the association between sexual intercourse and non-sexual risk behaviors. After controlling for demographic characteristics, both male and female respondents who have experienced sexual intercourse are significantly more likely to engage in non-sexual risk behaviors, with the exception of suicide for females in Hanoi and males in Taipei. Furthermore, youth who are sexually experienced are significantly more likely to engage in two or more non-sexual risk behaviors than are those who have had no sexual experience. After controlling for demographic characteristics, the average number of non-sexual risk behaviors engaged in by respondents in Hanoi, Shanghai and Taipei who have ever had sexual experience is 2.0, 1.6 and 1.8, respectively. In contrast, among those respondents in the three cities who have had no sexual experience, the average number of non-sexual risk behaviors engaged in stands at 0.8, 0.7 and 0.8, respectively. The difference in each city is statistically significant ( $p < 0.001$ , not shown).

### **Age at initiation of smoking, drinking, drug use and sexual intercourse**

The probability of adolescents participating in some of these behaviors (drug use in particular) is very low. Therefore, Table 4 presents estimates of the probability for smoking, drinking, drug use and sexual intercourse by age and gender based on survival curves of each behavior after controlling for demographic characteristics in each city. Each of the four risk behavior survival curves is significantly different ( $p < 0.001$ ) than the other three, regardless of gender or city. In general, for both male and female respondents in all three cities, smoking and drinking are initiated earlier than drug use and sexual intercourse.

### **Results of cluster analysis**

Males and females in the three cities were divided into three to five clusters based on the HRBs they had engaged in. The overall risk level varies across the clusters, ranging from 0.86 to 13.96 for males and from 0.39 to 11.68 for females.

Based on their own overall risk level, clusters of males and females in each city were divided into low risk, moderate risk and high risk groups. The majority of respondents in the three cities are in the low risk cluster. For both males and females, fewer than 4% of adolescents are in the highest risk cluster. The lowest risk clusters have significantly lower level of risk than other clusters on nearly every risk behavior. Other low risk clusters and moderate risk clusters are distinguished by highest means for one to two risk behaviors. In general, the low and moderate risk clusters for both males and females have very low risk levels of sexual behavior (see Table 5), except for female cluster 2 in Shanghai, and male and female clusters 2 in Taipei. Female cluster 2 in Shanghai and male cluster 2 in Taipei have the highest risk level of sexual behavior compared to the other clusters. With an

average mean risk level of sexual behavior of 2.23 and 2.17, respectively, respondents of female cluster 2 in Shanghai and male cluster 2 in Taipei are sexually active and did not use any form of contraception during their first or last sex or both the first and last sex with their first partner. In addition, female cluster 2 in Shanghai has the highest risk level of drinking and running away from home. In all the three cities, however, sexual behavior and non-sexual risk behaviors co-occur in the highest risk clusters. For both males and females, the highest risk clusters have higher or highest risk of sexual behavior as well as the highest risk of nearly all non-sexual risk behaviors, but not including fighting in Hanoi, and gambling in Shanghai and Taipei (Table 5).

## Discussion

This analysis presents a number of important findings regarding the relationship between sexual intercourse and non-sexual risk behaviors among unmarried youth in three Asian cities with Confucian-based cultures. First, sexual intercourse is associated with seven non-sexual risk behaviors, in particular smoking, drinking, drug use and running away from home. Sexual intercourse and non-sexual risk behaviors coexist in the high risk group. Our findings are consistent with those of other studies that found sexual behavior is associated with smoking, drinking, drug use [13,14,35-40], violence, suicide [39], and running away from home [40]. After controlling for demographic characteristic, sexual intercourse is not associated with suicide among females in Hanoi and males in Taipei. The reason might be that sexual behavior has more correlation with other factors than suicide for females in Hanoi and males in Taipei. For example, male cluster 2 in Taipei has the highest risk level of sexual behavior but has very low risk level of suicide and other risk behaviors. Besides Jessor's Problem Behavior Theory, other possible explanations for the association between sexual behavior and drug use include the actual effects of intoxication and the use of intoxication as a rationalization to justify sexual behavior [41]. The association between being sexually active and running away from home could be explained by the notion that youth who are encountering a difficult adolescence are more likely than other young people to leave home. It may also suggest that youth who wish to form sexual relationships find it easier to do so outside their parental home, or that youth who are running away from home find it much easier to form sexual relationships. Although this paper does not further explore the association between non-sexual risk behaviors and other sexual risk behaviors nor the causal directions of these associations, previous studies have suggested that smoking, drinking and drug use are associated with a lack of condom use and an increased likelihood of having multiple sexual partners [13,14,35-38].

Secondly, although sexual behavior and non-sexual risk behaviors coexist in the high risk group in our sample, unprotected sexual behavior is also found among moderate risk clusters with very low levels of non-sexual risk behaviors, for example female cluster 2 in Shanghai and Taipei, and male cluster 2 in Taipei. This suggests that unprotected sexual behavior among youth could be a major health concern, especially for females in Shanghai and Taipei.

Thirdly, the relationship between sexual behavior and non-sexual risk behaviors differ by gender. For example, in Hanoi, the association between sexual behavior and suicide is much



stronger among males than females; in Shanghai, sexual behavior does not coexist with most non-sexual risk behaviors among females; and in Taipei, the links between sexual behavior and gambling are much stronger among males than females. These findings are consistent with previous studies indicating the distinct difference between males and females in the co-occurrence of risk behaviors [39].

Fourthly, comparing the ages of first sex and these non-sexual risk behaviors reveals which are initiated prior to the others. Thus, initiating smoking and drinking could be used as a predictor of sexual behavior. Pragmatically, these findings suggest that interventions aimed to delay sexual debut may be more effective if efforts were also made to reduce smoking and drinking, or if more focused efforts were made to reduce sexual behavior among youth who are currently smoking or drinking.

Finally, as expected, significant differences in the levels of HRBs and the relationship between sexual behaviors and non-sexual risk behaviors have emerged across settings. Among Hanoi, Shanghai and Taipei, Hanoi is the most traditional and least developed of the three cities, with the lowest level of HRBs and lowest mean risk of HRBs, while Taipei is the most open and developed of the cities with the highest level of HRBs and highest mean risk of HRBs. In these respects, Shanghai stands in the middle. For both males and females, the highest risk clusters have higher or highest risk of sexual behavior as well as the highest risk of nearly all non-sexual risk behaviors, but not including fighting in Hanoi, and gambling in Shanghai and Taipei. The possible reason is that fighting in Hanoi or gambling in Shanghai and Taipei are more acceptable than sexual behavior in the society and thus are more likely to occur in groups with moderate risk. These findings support the assertion that social, cultural and economic context play an important role in adolescent risk behaviors.

Although this study makes a number of contributions to the knowledge of adolescent risk behaviors, it is also subject to a number of limitations. This analysis relied on self-reported data from young people. However, the likelihood of underreporting in this study is minimized by the use of CASI technology. In addition, we failed to examine the sequence of all risk behaviors because the questionnaire was not designed for this purpose. Finally, we failed to measure the frequency and severity of gambling, which may have magnified the risk level of this measure and the overall risk level of clusters with higher risk of gambling. Further exploration of the relationship between sexual behavior and gambling is needed.

Despite these limitations, policy implications can be drawn based on the results presented here. First, prevention and education efforts should continue. Young people who participate in none or very few of these health risk behaviors need support to continue making responsible and healthy decisions. Second, prevention and education efforts should be gender-specific to meet the unique needs of male and female adolescents. For example, compared with males, females are more likely to engage in suicide but less likely to engage in other risk behaviors. Third, for those adolescents and youth who do participate in health risks, prevention efforts must be implemented and must focus on reducing risk behaviors and their negative consequences. Interventions focusing on reducing unprotected sexual behaviors should not just target unprotected sex, but should target the array of other risk behaviors that precede or coexist with it. Given the association of risk behaviors, noticing

the existence of one risk behavior in a young adult should be a red flag that other risk behaviors may be concurrent or imminent, and thereby help to identify individuals in need of intervention.

## Acknowledgments

We are grateful for the comments and edits by Mark R. Emerson, David Bishai and Robert Wm. Blum from on an earlier draft of the manuscript. We also wish to thank contributions to the overall study from colleagues at the Johns Hopkins Bloomberg School of Public Health, the Population and Health Research Center in Taiwan's Bureau of Health Promotion, the Shanghai Institute of Planned Parenthood Research and the Hanoi Institute of Family and Gender Studies. The study was funded by the Bill and Melinda Gates Institute of Population and Reproductive Health at Johns Hopkins Bloomberg School of Public Health, with additional support for Taiwan's portion of the study from its own Ministry of Health.

## References

- [1]. World Health Organization. The health of young people: a challenge and a promise. World Health Organization; Geneva: 1993.
- [2]. Selles CW, Blum RW. Morbidity and mortality among U.S. adolescents: an overview of data and trends. *Am J Public Health.* 1996; 86:513–19. [PubMed: 8604781]
- [3]. Brener ND, Collins JL. Co-occurrence of health-risk behaviors among adolescents in the United States. *J Adolesc Health.* 1998; 22:209–13. [PubMed: 9502008]
- [4]. Zweig JM, Lindberg LD, McGinley KA. Adolescent health risk clusters: the co-occurrence of health risks among female and males. *J Adolesc Health.* 2001; 30:707–27.
- [5]. Rosal MC, Ockene JK, Hurley TG, Reiff S. Prevalence and co-occurrence of health risk behaviors among high risk drinkers in a primary care population. *Preventive Medicine.* 2000; 31:140–7. [PubMed: 10938214]
- [6]. Lindberg, LD.; Boggess, S.; Williams, S. Multiple treats: the co-occurrence of teen health risk-behavior. In: Brown, B.; Vandivere, S.; Lindberg, LD.; Boggess, S.; Porter, L.; Williams, S., editors. *Trends in the wellbeing of America's children and youth: 1999.* U.S. Government Printing Office; Washington, DC: 2000. p. 489-504.
- [7]. Weitzman ER, Chen YY. The co-occurrence of smoking and drinking among young adults in college: national survey results from the United States. *Drug and Alcohol Dependence.* 2005; 80:377–86. [PubMed: 16009507]
- [8]. Jessor R. Risk behavior in adolescence: A psychosocial framework for understanding and action. *Journal of Adolescent Health.* 1991; 12:597–605. [PubMed: 1799569]
- [9]. Jessor, R.; Jessor, SL. *Problem behavior and psychosocial development: A longitudinal study of youth.* Academic Press; New York: 1997.
- [10]. Donovan JE, Jessor R. Structure of problem behavior in adolescence and young adulthood. *J Consult Clin Psychol.* 1985; 53:890–904. [PubMed: 4086689]
- [11]. Burge V, Felts M, Chenier T, Parrillo AV. Drug use, sexual activity, and suicidal behavior in U.S. high school students. *J School Health.* 1995; 65(6):222–7. [PubMed: 7564284]
- [12]. Durkham CP, Byrd RS, Auinger P, et al. Illicit substance use, gender, and the risk of violent behavior among adolescents. *Arch Pediatr Adolesc Med.* 1996; 150:797–801. [PubMed: 8704884]
- [13]. Shrier LA, Emans SJ, Woods ER, et al. The association of sexual risk behaviors and problem drug behaviors in high school students. *J Adolesc Health.* 1996; 20:377–83. [PubMed: 9168385]
- [14]. Palen LA, Smith EA, Flisher AJ, et al. Substance use and sexual risk behavior among South African eighth grade students. *J Adolesc Health.* 2006; 39(5):761–3. [PubMed: 17046518]
- [15]. Vinder RM, Haines MM, Head JA, et al. Variations in associations of health risk behaviors among ethnic minority early adolescents. *J Adolesc Health.* 2006; 38:55. e15-55.e23.
- [16]. Langhinrichsen-Rohling J, Rohde P, Seeley JR, et al. Individual, family, and peer correlates of adolescent gambling. *J Gambl Stud.* 2004; 20(1):23–46. [PubMed: 14973396]



- [17]. Stueve A, O'Donnell LN. Early alcohol initiation and subsequent sexual and alcohol risk behaviors among urban youths. *Am J Public Health*. 2005; 95(5):887–93. [PubMed: 15855470]
- [18]. Ellickson PL, Tucker JS, Klein DJ. Ten-year prospective study of public health problems associated with early drinking. *Pediatrics*. 2003; 111:949–955. [PubMed: 12728070]
- [19]. Caspi, A.; Elder, GH. Emergent family patterns: the intergenerational construction of problem behavior and relations. In: Hinde, R.; Stevenson-Hinde, J., editors. *Relationships Within Families*. Clarendon Press; Oxford, England: 1988. p. 218-240.
- [20]. Zucker, RA.; Chermack, ST.; Curran, GM. Alcoholism: a life span perspective on etiology and course. In: Sameroff, AJ.; Lewis, M.; Miller, SM., editors. *Handbook of Developmental Psychopathology*. 2nd. Kluwer Academic/Plenum Publishers; New York, NY: 2000. p. 569-587.
- [21]. Barrera M, Biglan A, Ary D, et al. Replication of problem behavior model with American Indian, Hispanic, and Caucasian youth. *Journal of Early Adolescence*. 2001; 21:133–57.
- [22]. Zamboanga BL, Carlo G, Raffaelli M. Problem behavior theory: an examination of behavior structure system in Latino and non-Latino college students. *J Psychol*. 2004; 38:253–62.
- [23]. Brown, A.; Jejeebhoy, SJ.; Shah, I.; Yount, MK. Special programme of Research, Development and Research Training in Human Reproduction. World Health Organization; Geneva: 2001. Sexual relations among young people in developing countries: evidence from WHO case studies.
- [24]. Gao, E.; Tu, X.; Zhao, S., et al. A review of evidence from reproductive health studies among adolescents and unmarried youth in China. China Population Press; Beijing, China: 2002.
- [25]. Li N, Zhang H, He P, et al. Change in behavior and attitude toward sex among college students in Yunan province. *Chin J School Health*. 2003; 24(2):114–116.
- [26]. Wang X, Lou C, Gao E. Relationship between contraceptive use behavior and cognition among vocational high school students. *Chin J Prev Med*. 2006; 40(3):184–188.
- [27]. Lou C, Shen Y, Gao E, et al. Sex-related behaviors among unmarried migrant young people. *Reprod Contracept*. 2004; 24(1):34–8. 42.
- [28]. Cernada GP, Chang MC, Lin HS, et al. Implications for adolescent sex education in Taiwan. *Stud Fam Plann*. 1986; 17(4):181–87. [PubMed: 3750359]
- [29]. Chiao C, Yi CC. Adolescent premarital sex and health outcomes among Taiwanese youth: perception of best friends' sexual behavior and the contextual effect. *AIDS Care*. 2011; 23(9): 1083–92. [PubMed: 21562995]
- [30]. Wang RH, Wang HH, Hsu MT. Factors associated with adolescent pregnancy—a sample of Taiwanese female adolescents. *Public Health Nursing*. 2003; 21(1):33–41. [PubMed: 12492823]
- [31]. Ghuman S, Loi VM, Huy VT, Knodel J. Continuity and change in premarital sex in Vietnam. *Int Fam Plan Perspect*. 2006; 32(4):166–74. [PubMed: 17237013]
- [32]. Mensch BS, Clark WH, Anh DN. Premarital sex in Vietnam: looking beyond reproductive health. *Stud Fam Plann*. 2003; 34(4):249–63. [PubMed: 14758607]
- [33]. Kaljee LM, Green M, Riel R, et al. Sexual stigma, sexual behaviors, and abstinence among Vietnamese adolescents: implications for risk and protective behaviors for HIV, sexually transmitted infections, and unwanted pregnancy. *J Assoc Nurses AIDS Care*. 2007; 18(2):48–59. [PubMed: 17403496]
- [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]. Lowry R, Holtzman D, Truman BJ, et al. Substance use and HIV related sexual behaviors among US high school students: are they related? *Am J Public Health*. 1994; 84:1116–20. [PubMed: 8017535]
- [36]. Ohene SA, Ireland M, Blum RW. The clustering of risk behaviors among Caribbean youth. *Matern Child Health J*. 2005; 91(1):91–100. [PubMed: 15880978]
- [37]. Kalichman SC, Cain D. A prospective study of sensation seeking and alcohol use as predictors of sexual risk behaviors among men and women receiving sexually transmitted infection clinic services. *Psychol Addict Behav*. 2004; 18:367–373. [PubMed: 15631609]
- [38]. Kaiser Family Foundation. Hoff T, Greene L, Davis J. National survey of adolescents and young adults: sexual health knowledge, attitudes and experiences. Retrieved from the Henry J. Kaiser Family Foundation Web site: <http://www.kff.org/youthhivstds/loader.cfm?url=commonspot/security/getfile.cfm&PageID=14270>.

- [39]. Zweig JM, Lindberg LD, McGinley KA. Adolescent health risk clusters: the co-occurrence of health risks among females and males. *J Youth Adolesc.* 2001; 30(6):707–728.
- [40]. Kowaleski-Jones L, Mott FL. Sex, contraception and childbearing among high-risk youth: do different factors influence males and females? *Fam Plann Perspect.* 1998; 30(4):163–9. [PubMed: 9711453]
- [41]. Leigh BC, Stall R. Substance use and risky sexual behavior for exposure to HIV: issues in methodology, interpretation, and prevention. *Am Psychol.* 1993; 48:1034–45.

**Table 1**

## Response scales for each risk behavior

<b>Risk behavior measures</b>
<b>Smoking</b>
0.00: Never smoked
0.43: Smoked, but less than a whole cigarette
0.86: No smoking in past 30 days
1.29: Currently smoking, 1-5 days in the past 30 days
1.72: Currently smoking, 6-9 days in the past 30 days
2.15: Currently smoking, 10-19 days in the past 30 days
2.58: Currently smoking, 20-29 days in the past 30 days
3.00: Currently smoking, everyday in the past 30 days
<b>Drinking</b>
0.00: Never drank a glass of beer, wine, or a shot of liquor
0.43: No alcohol in the past 30 days
0.86: Drank alcohol 1-2 days in the past 30 days
1.29: Drank alcohol 3-5 days in the past 30 days
1.72: Drank alcohol 6-9 days in the past 30 days
2.15: Drank alcohol 10-19 days in the past 30 days
2.58: Drank alcohol 20-29 days in the past 30 days
3.00: Drank every day in the past 30 days
<b>Gambling</b>
0: Never engaged in gambling
3: Ever engaged in gambling
<b>Drug use</b>
0.0: Never used
1.5: Ever used, but no use in past 30 days
3.0: Ever used and used in the past 30 days
<b>Running away from home</b>
0: Never ran away from home
1: Ever ran away from home for 1 night
2: Ever ran away from home for 2-6 nights
3: Ever ran away from home for more than 6 nights
<b>Fighting</b>
0: No fighting in the past 12 months
1: Fought once in the past 12 months
2: Fought 2-3 times in the past 12 months
3: Fought more than 3 times in the past 12 months
<b>Suicide</b>
0.0: No serious thought of suicide in life
1.5: Serious suicide thought, no suicide attempts in life
3.0: Ever had suicide attempts in life

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**Risk behavior measures**

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**Sexual behavior**

- 0: Never had sex
  - 1: Used a contraceptive at both the first and last sex with the first partner
  - 2: Used a contraceptive during either the first or last sex with the first partner
  - 3: Did not use any contraceptive during either the first or last sex with the first partner
-

**Table 2**

Percentage of risk behaviors, by cities and gender (%)

Risk behavior	Hanoi			Shanghai			Taipei		
	Male n=3234	Female n=2921	Total n=6155	Male n=3034	Female n=3005	Total n=6039	Male n=2486	Female n=2364	Total n=4850
Drinking	53.0	13.9	34.5	38.1	17.7	28.0	37.3	29.3	33.4
Smoking	32.1	1.0	17.3	27.9	2.9	15.4	26.2	9.3	17.9
Gambling	15.1	2.0	8.9	17.7	3.7	10.7	37.6	12.8	25.5
Drug use	0.4	0.1	0.3	1.0	0.2	0.6	4.2	2.6	3.4
Running away	10.7	2.1	6.6	12.4	5.6	9.0	9.8	9.6*	9.7
Fighting	18.0	14.4	16.3	13.8	3.8	8.8	15.9	8.6	12.3
Suicidal	1.7	2.9	2.3	7.1	9.1	8.1	13.3	20.8	16.9
Sexual behavior	7.1	2.2	4.8	16.1	8.5	12.3	37.7	29.3	33.6

\*p>0.05 between gender in the city

**Table 3**

Percentage of non-sexual risk behaviors, by sexual experience, gender and cities

Risk behaviors	Ever had sexual intercourse					
	Hanoi		Shanghai		Taipei	
	Yes	No	Yes	No	Yes	No
<i>Male</i>	n=3234		n=3034		n=2486	
% smoking	75.3	28.8	64.9	20.8	48.8	12.5
OR <sup>a</sup>	4.6		4.6		7.2	
% drinking	88.6	50.3	65.5	32.9	55.7	26.1
OR <sup>a</sup>	4.2		2.6		2.8	
% gambling	40.1	13.2	39.2	13.6	47.8	31.5
OR <sup>a</sup>	3.4		3.6		2.2	
% using drugs	2.3	0.3	3.0	0.6	8.8	1.4
OR <sup>a</sup>	5.5		5.1		6.0	
% ever ran away	29.4	9.2	25.4	9.9	16.0	6.1
OR <sup>a</sup>	3.6		2.8		3.7	
% fighting	18.9	18.0*	19.0	12.8	18.1	14.5
OR <sup>a</sup>	1.5		2.6		3.4	
% of suicidal	4.0	1.5	9.5	6.7	11.9	14.1*
OR <sup>a</sup>	3.1		1.9		1.0*	
<i>Female</i>	n=2921		n=3005		n=2364	
% smoking	36.9	0.2	14.7	1.8	20.7	4.5
OR <sup>a</sup>	240.0 <sup>b</sup>		8.1		6.3	
% drinking	64.3	12.7	35.7	16.0	46.0	22.4
OR <sup>a</sup>	9.3		2.4		2.7	
% gambling	26.0	1.5	7.1	3.2	17.4	10.9
OR <sup>a</sup>	24.0		2.2		1.7	
% using drugs	1.3	0.0	1.0	0.1	7.7	0.4
OR <sup>a</sup>	35.3 <sup>b</sup>		7.7		18.1	
% ever ran away	25.5	1.6	12.8	4.9	20.2	5.2
OR <sup>a</sup>	25.8		2.3		5.0	
% fighting	22.9	14.2*	7.5	3.4	10.3	8.0*
OR <sup>a</sup>	2.6		3.3		1.9	
% of suicidal	6.1	2.9*	17.6	8.3	27.0	18.2
OR <sup>a</sup>	2.7*		2.5		2.2	

<sup>a</sup>: Adjusted for age, residence, education level, school status and economic status (logistic regression models).



*b* : Due to limited number of smokers (total 27) and drug users (total 2), only adjusted for school status in the logistic regression model.

\*  
 $p > 0.05$

**Table 4**

Estimates of probability for four risk behaviors, by age, gender and city

Risk behavior	Hanoi		Shanghai		Taipei	
	Male n=3095	Female n=3109	Male n=2893	Female n=3040	Male n=2168	Female n=2158
Smoking						
16	9.0 <sup>bcd</sup>	2.6 <sup>bcd</sup>	15.0 <sup>bcd</sup>	5.4 <sup>bcd</sup>	21.7 <sup>bcd</sup>	11.1 <sup>bcd</sup>
18	21.8	3.8	29.2	8.6	32.3	17.0
20	42.6	5.4	47.1	13.7	39.7	21.1
22	59.3	6.9	62.5	21.7	44.6	24.2
24	65.6	7.1	70.1	21.2	48.9	25.3
Drinking						
16	16.4 <sup>acd</sup>	6.4 <sup>acd</sup>	21.1 <sup>acd</sup>	11.9 <sup>acd</sup>	22.8 <sup>acd</sup>	14.8 <sup>acd</sup>
18	35.4	14.1	38.4	22.2	39.9	28.9
20	59.7	26.7	58.8	39.0	60.0	48.3
22	70.3	36.9	72.1	53.8	69.1	60.7
24	73.1	42.9	78.4	62.0	72.6	67.3
Drug use						
16	0.0 <sup>abd</sup>	0.0 <sup>abd</sup>	0.1 <sup>abd</sup>	0.0 <sup>abd</sup>	0.6 <sup>abd</sup>	0.4 <sup>abd</sup>
18	0.2	0.1	0.2	0.1	1.7	1.7
20	0.3	0.1	0.7	0.2	3.0	2.8
22	0.7	0.1	1.3	0.3	4.7	3.7
24	0.8	0.1	1.9	0.7	5.2	5.2
Sexual intercourse						
16	0.0 <sup>abc</sup>	0.0 <sup>abc</sup>	0.2 <sup>abc</sup>	0.2 <sup>abc</sup>	3.4 <sup>abc</sup>	2.4 <sup>abc</sup>
18	0.8	0.4	2.6	1.8	13.3	11.1
20	3.6	1.7	11.9	6.2	29.6	25.3
22	9.9	3.4	29.8	16.0	42.7	37.3
24	16.5	6.5	46.5	30.4	55.5	47.2

The probability was estimated by using life-table method, while the difference between behaviors was tested by using Cox regression models controlling for age, residence, education level, school status and economic status.

<sup>a</sup>: Compared with smoking p 0.05;

<sup>b</sup>: Compared with drinking p 0.05;

<sup>c</sup>: Compared with drug use p 0.05;

<sup>d</sup>: Compared with sexual behavior p 0.05.

**Table 5**  
 Mean (and standard errors) of health risk behaviors, by cluster of risk for males and females in three cities

Risk behaviors	Hanoi					Shanghai					Taipei							
	Total	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Total	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Total	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
<b>Males</b>																		
Smoking	0.84 (0.02)	0.26 <sup>bcd</sup> (0.01)	2.21 <sup>acde</sup> (0.03)	0.48 <sup>abde</sup> (0.03)	2.69 <sup>abce</sup> (0.03)	2.50 <sup>abcd</sup> (0.05)	0.78 (0.02)	0.15 <sup>bcd</sup> (0.02)	1.63 <sup>ad</sup> (0.02)	1.52 <sup>ad</sup> (0.03)	2.35 <sup>abc</sup> (0.07)	0.84 (0.02)	0.36 <sup>bde</sup> (0.03)	1.12 <sup>acde</sup> (0.04)	0.43 <sup>bde</sup> (0.03)	2.69 <sup>abc</sup> (0.05)	2.37 <sup>abc</sup> (0.09)	
Drinking	0.73 (0.01)	0.55 <sup>bcd</sup> (0.01)	0.71 <sup>ade</sup> (0.03)	0.75 <sup>ade</sup> (0.04)	1.42 <sup>abc</sup> (0.03)	1.41 <sup>abc</sup> (0.061)	0.58 (0.01)	0.32 <sup>bcd</sup> (0.01)	0.93 <sup>a</sup> (0.02)	0.94 <sup>a</sup> (0.02)	1.04 <sup>a</sup> (0.06)	0.57 (0.01)	0.37 <sup>bcd</sup> (0.02)	0.65 <sup>ade</sup> (0.02)	0.58 <sup>ade</sup> (0.02)	1.01 <sup>abc</sup> (0.03)	1.21 <sup>abc</sup> (0.06)	
Gambling	0.45 (0.02)	0.00 <sup>cde</sup> (0.01)	0.02 <sup>cde</sup> (0.04)	2.75 <sup>abcd</sup> (0.04)	1.11 <sup>abce</sup> (0.03)	2.82 <sup>abcd</sup> (0.06)	0.53 (0.02)	0.00 <sup>cd</sup> (0.01)	0.00 <sup>cd</sup> (0.01)	3.00 <sup>abcd</sup> (0.01)	0.77 <sup>abc</sup> (0.02)	1.13 (0.03)	0.00 <sup>cde</sup> (0.01)	0.00 <sup>cde</sup> (0.01)	3.00 <sup>abde</sup> (0.01)	2.90 <sup>abce</sup> (0.02)	2.62 <sup>abcd</sup> (0.03)	
Drug use	0.01 (0.00)	0.00 <sup>de</sup> (0.00)	0.01 (0.01)	0.00 <sup>e</sup> (0.01)	0.04 <sup>a</sup> (0.01)	0.07 <sup>ac</sup> (0.02)	0.02 (0.00)	0.01 <sup>cd</sup> (0.01)	0.01 <sup>d</sup> (0.01)	0.05 <sup>ad</sup> (0.01)	0.14 <sup>abc</sup> (0.02)	0.07 (0.01)	0.02 <sup>de</sup> (0.01)	0.06 <sup>de</sup> (0.02)	0.02 <sup>de</sup> (0.01)	0.25 <sup>abce</sup> (0.02)	0.72 <sup>abcd</sup> (0.04)	
Running away	0.16 (0.01)	0.04 <sup>bcd</sup> (0.01)	0.78 <sup>acd</sup> (0.03)	0.21 <sup>abe</sup> (0.03)	0.17 <sup>abe</sup> (0.02)	0.91 <sup>acd</sup> (0.05)	0.21 (0.01)	0.11 <sup>cd</sup> (0.01)	0.18 <sup>cd</sup> (0.02)	0.37 <sup>abd</sup> (0.03)	1.44 <sup>abc</sup> (0.06)	0.19 (0.01)	0.08 <sup>bde</sup> (0.02)	0.19 <sup>ae</sup> (0.03)	0.13 <sup>e</sup> (0.02)	0.22 <sup>ae</sup> (0.03)	2.04 <sup>abcd</sup> (0.06)	
Fighting	0.26 (0.01)	0.16 <sup>bce</sup> (0.01)	0.72 <sup>ade</sup> (0.04)	0.69 <sup>ade</sup> (0.04)	0.17 <sup>bce</sup> (0.03)	0.43 <sup>abcd</sup> (0.06)	0.19 (0.01)	0.11 <sup>cd</sup> (0.01)	0.16 <sup>cd</sup> (0.02)	0.40 <sup>abd</sup> (0.02)	0.73 <sup>abc</sup> (0.05)	0.25 (0.01)	0.18 <sup>e</sup> (0.02)	0.15 <sup>e</sup> (0.03)	0.26 <sup>e</sup> (0.03)	0.31 <sup>e</sup> (0.04)	1.48 <sup>abcd</sup> (0.07)	
Suicidal	0.03 (0.00)	0.02 <sup>b</sup> (0.00)	0.07 <sup>ad</sup> (0.01)	0.07 (0.01)	0.01 <sup>b</sup> (0.01)	0.06 (0.02)	0.12 (0.01)	0.11 <sup>d</sup> (0.01)	0.09 <sup>d</sup> (0.02)	0.14 <sup>d</sup> (0.02)	0.59 <sup>abc</sup> (0.05)	0.28 (0.02)	0.27 <sup>e</sup> (0.02)	0.20 <sup>e</sup> (0.04)	0.24 <sup>e</sup> (0.03)	0.12 <sup>e</sup> (0.05)	1.67 <sup>abcd</sup> (0.09)	
Sexual activity	0.15 (0.01)	0.06 <sup>bde</sup> (0.01)	0.16 <sup>ae</sup> (0.03)	0.06 <sup>de</sup> (0.03)	0.23 <sup>ace</sup> (0.02)	2.02 <sup>abcd</sup> (0.05)	0.38 (0.02)	0.06 <sup>bcd</sup> (0.02)	0.59 <sup>acd</sup> (0.03)	0.76 <sup>abd</sup> (0.03)	2.66 <sup>abc</sup> (0.07)	0.81 (0.02)	0.00 <sup>bcd</sup> (0.02)	2.17 <sup>acde</sup> (0.03)	0.56 <sup>abde</sup> (0.03)	1.91 <sup>abc</sup> (0.04)	1.77 <sup>abc</sup> (0.07)	
Total (0-24)	2.64 (0.05)	1.10 <sup>L</sup> (0.03)	4.68 <sup>M</sup> (0.08)	5.00 <sup>M</sup> (0.09)	5.84 <sup>M</sup> (0.07)	10.21 <sup>H</sup> (0.14)	2.81 (0.06)	0.86 <sup>L</sup> (0.04)	3.59 <sup>L</sup> (0.06)	7.19 <sup>M</sup> (0.07)	9.71 <sup>H</sup> (0.17)	4.13 (0.08)	1.27 <sup>L</sup> (0.06)	4.55 <sup>M</sup> (0.08)	5.18 <sup>M</sup> (0.08)	9.41 <sup>H</sup> (0.11)	13.96 <sup>H</sup> (0.21)	
N	3235	2161	286	253	432	103	3033	1760	664	512	97	2486	1067	464	597	279	79	
Weighted %	100%	66.8%	8.8%	7.8%	13.4%	3.2%	100%	58.0%	21.9%	16.9%	3.2%	100%	42.9%	18.7%	24.0%	11.2%	3.2%	
<b>Females</b>																		
Smoking	0.06 (0.01)	0.03 <sup>bc</sup> (0.00)	0.14 <sup>ac</sup> (0.02)	1.35 <sup>ab</sup> (0.03)	--	--	0.16 (0.01)	0.11 <sup>bc</sup> (0.01)	0.48 <sup>ac</sup> (0.02)	0.62 <sup>ab</sup> (0.04)	--	0.36 (0.02)	0.17 <sup>bcd</sup> (0.02)	0.34 <sup>acd</sup> (0.02)	0.66 <sup>abd</sup> (0.04)	2.57 <sup>ab</sup> (0.07)	--	
Drinking	0.21 (0.01)	0.20 <sup>c</sup> (0.01)	0.27 <sup>c</sup> (0.02)	0.93 <sup>ab</sup> (0.05)	--	--	0.30 (0.01)	0.26 <sup>bc</sup> (0.01)	0.56 <sup>a</sup> (0.02)	0.65 <sup>a</sup> (0.04)	--	0.44 (0.01)	0.33 <sup>bcd</sup> (0.01)	0.47 <sup>acd</sup> (0.02)	0.64 <sup>abd</sup> (0.03)	1.24 <sup>abc</sup> (0.05)	--	
Gambling	0.06 (0.01)	0.00 <sup>bc</sup> (0.01)	0.71 <sup>a</sup> (0.03)	0.75 <sup>a</sup> (0.05)	--	--	0.11 (0.01)	0.00 <sup>c</sup> (0.00)	0.02 <sup>c</sup> (0.01)	2.86 <sup>ab</sup> (0.01)	--	0.38 (0.02)	0.06 <sup>cd</sup> (0.01)	0.00 <sup>cd</sup> (0.01)	3.00 <sup>abd</sup> (0.01)	0.63 <sup>abc</sup> (0.03)	--	

Risk behaviors	Hanoi					Shanghai					Taipei					
	Total	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Total	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Total	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
Drug use	0.00 (0.00)	0.00 <sup>c</sup> (0.00)	0.00 <sup>c</sup> (0.00)	0.06 <sup>ab</sup> (0.01)	--	0.00 (0.00)	0.00 <sup>c</sup> (0.00)	0.01 (0.01)	0.03 <sup>a</sup> (0.01)	--	0.04 (0.01)	0.01 <sup>cd</sup> (0.01)	0.03 <sup>d</sup> (0.01)	0.07 <sup>ad</sup> (0.02)	0.55 <sup>abc</sup> (0.03)	--
Running away	0.03 (0.00)	0.01 <sup>c</sup> (0.00)	0.03 <sup>c</sup> (0.01)	1.20 <sup>ab</sup> (0.02)	--	0.09 (0.01)	0.06 <sup>bc</sup> (0.01)	0.34 <sup>a</sup> (0.02)	0.26 <sup>a</sup> (0.04)	--	0.19 (0.01)	0.05 <sup>bcd</sup> (0.01)	0.16 <sup>acd</sup> (0.02)	0.29 <sup>abd</sup> (0.03)	2.21 <sup>abc</sup> (0.06)	--
Fighting	0.23 (0.01)	0.09 <sup>bc</sup> (0.01)	1.95 <sup>ac</sup> (0.03)	0.64 <sup>ab</sup> (0.06)	--	0.05 (0.00)	0.04 <sup>c</sup> (0.00)	0.07 <sup>c</sup> (0.02)	0.19 <sup>ab</sup> (0.02)	--	0.13 (0.01)	0.09 <sup>cd</sup> (0.01)	0.12 <sup>d</sup> (0.02)	0.21 <sup>ad</sup> (0.03)	0.63 <sup>abc</sup> (0.05)	--
Suicidal	0.05 (0.01)	0.03 <sup>bc</sup> (0.01)	0.18 <sup>ac</sup> (0.02)	0.48 <sup>ab</sup> (0.04)	--	0.16 (0.01)	0.13 <sup>bc</sup> (0.01)	0.29 <sup>a</sup> (0.03)	0.42 <sup>a</sup> (0.05)	--	0.44 (0.02)	0.02 <sup>bcd</sup> (0.02)	0.94 <sup>acd</sup> (0.03)	0.45 <sup>abd</sup> (0.05)	2.25 <sup>abc</sup> (0.09)	--
Sexual activity	0.05 (0.01)	0.03 <sup>c</sup> (0.01)	0.07 <sup>c</sup> (0.02)	1.15 <sup>ab</sup> (0.04)	--	0.20 (0.01)	0.00 <sup>bc</sup> (0.00)	2.23 <sup>ac</sup> (0.02)	0.33 <sup>ad</sup> (0.02)	--	0.61 (0.02)	0.00 <sup>bcd</sup> (0.02)	1.44 <sup>acd</sup> (0.03)	0.76 <sup>abd</sup> (0.04)	1.91 <sup>abc</sup> (0.09)	--
Total (0.24)	0.69 (0.02)	0.39 <sup>L</sup> (0.02)	3.35 <sup>M</sup> (0.06)	6.57 <sup>H</sup> (0.12)	--	1.06 (0.03)	0.60 <sup>L</sup> (0.02)	3.99 <sup>M</sup> (0.07)	5.36 <sup>H</sup> (0.10)	--	2.54 (0.06)	0.65 <sup>L</sup> (0.05)	3.48 <sup>L</sup> (0.06)	6.04 <sup>M</sup> (0.10)	11.68 <sup>H</sup> (0.19)	--
N	2921	2671	203	47	--	3005	2644	250	111	--	2364	1250	746	285	83	--
Weighted %	100%	91.4%	6.9%	1.6%	--	100%	88.0%	8.3%	3.7%	--	100%	52.9%	31.6%	12.0%	3.5%	--

Differences between clusters for the means of each risk behavior were tested using general linear models controlling for age, residence, education level, school status and economic status.

<sup>a</sup>: Compared with cluster 1 p 0.01;

<sup>b</sup>: Compared with cluster 2 p 0.01 ;

<sup>c</sup>: Compared with cluster 3 p 0.01

<sup>d</sup>: Compared with cluster 4 p 0.01;

<sup>e</sup>: Compared with cluster 5 p 0.01;

<sup>L</sup>: Low risk;

<sup>M</sup>: Moderate risk;

<sup>H</sup>: High risk.