

## Is Cigarette and Alcohol Use Associated With High-Risk Sexual Behaviors Among Youth in China?

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### ABSTRACT

**Background:** Very few studies have explored the association between cigarette or alcohol use and high-risk sexual behaviors (HRSBs) among Chinese youth.

**Aim:** To identify the associations between cigarette and/or alcohol use and HRSBs in unmarried youth 15 to 24 years old in China.

**Methods:** Data were obtained from a nationally representative survey of youth 15 to 24 years old in China. Population numbers, prevalences, and proportions were calculated where appropriate. The  $\chi^2$  test was used to examine the different proportions of cigarette and alcohol use behaviors and HRSBs in female vs male youth. Logistic regression with propensity score-based weighting was used to elucidate the separate and combined associations of cigarette use and alcohol use with each HRSB.

**Outcomes:** The sexual behaviors of condom non-use during the first sexual experience, sexual activity with multiple partners, being forced to have sexual intercourse, taking part in casual sex, engaging in commercial sex, taking part in anal sex, and condom non-use during the most recent sexual encounter were classified as HRSBs.

**Results:** Of youth 15 to 24 years old, 23.2% ever used cigarettes, 38.1% used alcohol, and 19.9% used cigarettes and alcohol. Compared with cigarette and alcohol non-use, cigarette and alcohol use showed a significantly increased risk of condom non-use during the first sexual experience (odds ratio = 2.9, 95% CI = 2.5–3.3), sexual activity with multiple partners (4.9, 3.8–6.2), forced sex (2.7, 1.1–6.9), casual sex (4.0, 3.1–5.3), commercial sex (2.9, 2.1–3.9), anal copulation (3.1, 2.1–4.6), condom non-use during the most recent sexual encounter (2.5, 2.1–3.0), and any HSRB (3.2, 2.8–3.6) among youth. The relations between cigarette and alcohol use and HRSBs were stronger among female youth than among male youth for all HRSBs.

**Clinical Implications:** More efforts should be made to implement HIV and AIDS prevention that consider the role of cigarette and alcohol use in precipitating HRSBs.

**Strengths and Limitations:** This study provided a more detailed evaluation with greater confidence of the association between cigarette and/or alcohol use and HRSBs with sex disparity taken into account using nationally representative data, although no detailed information about cigarette and alcohol use behaviors such as dependence and cessation was gathered in this survey.

**Conclusion:** Youth who use cigarette and alcohol are at greater risk of HRSBs, especially female youth. **Guo C, Wen X, Li N, et al. Is Cigarette and Alcohol Use Associated With High-Risk Sexual Behaviors Among Youth in China? J Sex Med 2017;XX:XXX–XXX.**

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**Key Words:** Cigarette Use; Alcohol Use; High Risk Sexual Behaviors; Youth; China

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### INTRODUCTION

Currently, HIV and AIDS are among the most serious health problems among youth in developed and developing countries. The United Nations estimated that worldwide approximately 4 million youth 15 to 24 years old were living with HIV at the end of 2013 and that at least one third of new infections occurred in youth 15 to 24 years old.<sup>1</sup> In China, the number of people living with HIV increased to approximately 780,000 by the end of

2011,<sup>2</sup> with 63.9% of people infected through sexual transmission and more than 60% of those infected 15 to 29 years old.<sup>3</sup>

There is growing evidence that different problem behaviors (eg, sexual irresponsibility, alcohol and other drug abuse, and delinquency) are interrelated. Multiple studies have indicated that people who use cigarettes<sup>4–7</sup> and alcohol<sup>8,9</sup> are more likely to engage in high-risk sexual behaviors (HRSBs) that could increase the risk of HIV infection through potential contact with semen, blood, or vaginal secretions of a person infected with HIV.<sup>10</sup> For male and female youth, higher risks of younger age of onset to sexual activity, multiple or casual sex partners, less consistent use of condoms, sexual abuse, and commercial sex have been found among those who used cigarettes or alcohol in the United States, Europe, Australia, and Sub-Saharan African countries.<sup>11–15</sup> Several studies also have found that the associations between substance use and HRSB such as condom non-use differed in male and female youth.<sup>14,16,17</sup>

As the most populous nation, China has an estimated number of 175 million youth 15 to 24 years old, accounting for 11% of the total population.<sup>18</sup> In China, cigarette and alcohol use among youth and HRSBs are forbidden by the traditional culture, although the attitude to risky behaviors of Chinese youth might have changed with the development of society and the economy.<sup>19</sup> Studies on the association between cigarette or alcohol use and HRSBs among Chinese youth are rare. A study conducted in Shanghai indicated that cigarette smoking was related to sexual intercourse without condom use among senior high school students 15 to 24 years old.<sup>20</sup> A study focusing on college students 15 to 26 years old recruited from two universities in Henan province indicated that alcohol users were more likely to become victims of campus violence including sexual assault.<sup>21</sup> However, these studies used local samples with small sizes and most previous studies estimated the association of cigarette smoking and alcohol use with HRSBs separately. That could cause an overestimate of any of the two behaviors if the other is not controlled because cigarette use and alcohol use are always interrelated. In this study, we aimed to identify the associations between cigarette and/or alcohol use and HRSBs in male and female youth 15 to 24 years old in China based on a nationally representative survey.

## METHODS

### Data Source

Data were obtained from the Survey of Youth Access to Reproductive Health in China (YARHC) in 2009.<sup>22</sup> This cross-sectional survey aimed to describe the knowledge, attitude, and behavior of sexual and reproductive health among Chinese youth and to explore accessibility to reproductive health services for youth in China. The study protocol was reviewed and approved by the institutional review board of the Peking University Health Science Center (Beijing, China). All respondents gave their consent to participate in the survey; for those younger than 18 years, consent forms were signed by their guardians.

### Samples

The target population was composed of Chinese unmarried youth 15 to 24 years old living in mainland China. The inclusion criteria were (i) Chinese citizens living in urban or rural areas in mainland China; (ii) unmarried; and (iii) 15 to 24 years of age at the time of the survey. Youth living in Tibet, Hong Kong, Macao, and Taiwan were excluded because of their geographic location, political situation, and economic and cultural development.

The probabilistic samples were assembled in four stages using stratified random cluster sampling with probability proportional to size. The final samples were distributed across 40 cities and counties from 25 provinces, autonomous regions, and municipalities in China. The final estimated sample size was 22,535, with a sampling ratio of 11.4 per 100,000. Given the refusal rate of 24.9%, when the selected subject could not be contacted or there was no youth 15 to 24 years old in the selected household, we followed the samples substitution principle in which the neighbor of non-respondents would be taken as the replacement, with a swing priority from right to left within 5 U. We collected 22,465 questionnaires, of which 22,288 were valid (validity rate = 98.9%).

### Setting and Interview Procedures

Five hundred seventy-nine interviewers received rigorous training in the standard set by the survey expert committee; preliminary interviews were conducted in a pilot study in May 2009. The formal survey was conducted from October 20 to November 30, 2009. The selected subjects were contacted by the residents' committee, the administrative department in a school, or the human resource department in a company.

During the survey, necessary measures were taken to protect the privacy of youth. All subjects were interviewed face-to-face in independent environments (eg, a special room of the selected school, household, or company) without a third party present. The name and contact information of interviewees were not required and the sensitive questions related to sexual experiences and behaviors in the questionnaire were self-administered and completed by the respondents. All questionnaires were collected in ballot boxes after being completed. In addition, sex was respected in the process, with interviewees being interviewed by interviewers of the same sex.

### Measurements

#### High-Risk Sexual Behaviors

Those who responded affirmatively to the question "Have you ever had a sexual experience (whether it was with your current/latest girlfriend/boyfriend or with any others)?" were identified as sexually experienced. HRSBs were defined as any sexual activity that would bring a person into potential contact with the semen, blood, or vaginal secretions of a person infected with HIV.<sup>10</sup> In this survey, the sexual behaviors of condom non-use during the first sexual experience, sexual activity with multiple partners,

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