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Concurrent alcohol and cigarette use among school-going adolescents in Korea

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ABSTRACT

Background: Conrurrent alcohol and tobacco use may increase the risk for substance abuse in adolescents. The aim of this study was to investigate concurrent alcohol and cigarette use and the co-occurrence risks of each substance in school-going adolescents in Korea.

Methods: In a cross-sectional nationally representative survey in 2016, 65,528 students (Mean age = 15.1 years, SE = 0.02) responded to a questionnaire that included measures of substance use and substance use exposure.

Results: In all, 13.3% of the students were concurrent lifetime smokers and drinkers (19.3% among boys and 6.7% among girls), 25.5% lifetime alcohol users only (24.2% among boys and 26.9% among girls), 3.0% lifetime smokers only (4.7% among boys and 1.1% among girls) and 58.3% never smoked and never used alcohol (52.2% among boys and 47.8% among girls). All measures of more intensive smoking pattern and smoking exposure and more intensive drinking pattern and drinking exposures, respectively, were associated with consistently increased risk of lifetime alcohol use and lifetime smoking, respectively, compared to lifetime never smokers and abstainers. In multinomial logistic regression, compared to students who neither had used alcohol nor tobacco, concurrent lifetime smokers and drinkers were more likely to be male, mixed or boys school, higher school grade, lower paternal and maternal educational level, perceived lower socio-economic status, ever drug user, perceived stress above average, depressive mood, experience of violence victimization, and living in a rural area or medium sized city.

Conclusion: Prevention and treatment strategies should better incorporate the comorbidity of cigarette smoking and alcohol use in their intervention programmes.

1. Introduction

Alcohol and tobacco use contribute to significant morbidity and mortality but less is known of their concurrent use reducing possible more appropriate prevention strategies (Jackson, Sher, Cooper, & Wood, 2002). Persons of all ages that use tobacco products are more likely than non-users to use alcohol and other drugs (Richter, Pugh, Smith, & Ball, 2017). Individuals with a substance use problem are much more likely to smoke than individuals in the general population (Schroeder, 2017). Grucza and Bierut (2006) found among American adolescents a higher prevalence of alcohol use disorders among smokers, compared to non-smokers. Co-occurrence risks between tobacco use and alcohol use seem to be the largest with greater consumption rates of each substance (Schmid et al., 2007).

Alcohol and tobacco use seem to strongly correlate in emerging adulthood (Cance, Talley, Morgan-Lopez, & Fromme, 2017; Chung & Chun, 2010). In a national adult population sample in USA, the prevalence rates of co-use of tobacco and alcohol and comorbidity between dependent smoking and alcohol use disorders peaked among adolescents (Falk, Yi, & Hiller-Sturmhöfel, 2006). Among six Europen countries, Wetzels, Kremers, Vitória, and de Vries (2003) found that concurrent lifetime use of alcohol and tobacco was 24.6% at time 1 and 43.7% at time 2 of the study, and among American adolescents concurrent past year alcohol and tobacco use was 20% (Anthony & Echeagaray-Wagner, 2000). Among Korean adolescents, the past year prevalence of concurrent alcohol and tobacco use was 9.4% among males and 8.6% among females in a panel study conducted in 2003–2008 (Chun & Chung, 2013). There is a dearth of recent studies of concurrent alcohol and cigarette use among adolescents in Korea.

Previous studies in high-income countries found the following risk

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factors for concurrent tobacco and alcohol use, including male gender (Cance et al., 2017), higher family income (Cance et al., 2017), lower socioeconomic status (Twyman et al., 2016), and lack of attachment to parents (Chun & Chung, 2013). Additional risk factors include, having mental distress (Horn et al., 2000), illicit drug use (Hoffman, Welte, & Barnes, 2001), aggression (Chun & Chung, 2013; Matuszka, Bácskai, Czobor, & Gerevich, 2017), and delinquency (Hoffman et al., 2001). In line with the above cited studies, we hypothesized that socioeconomic factors, mental distress and aggressive behaviour would be associated with concurrent alcohol and cigarette use and that its co-occurrence risks would be the largest with greater consumption rates of each substance.

The goal of this study was to investigate concurrent alcohol and cigarette use and the co-occurrence risks of each substance among a nationally representative school sample of adolescents in Korea.

2. Methods

2.1. Data sources

The data utilized for this study come from the 2016 12th "Korea Youth Risk Behavior Web-based Survey (KYRBS)." (Korea Centers for Disease Control and Prevention, 2017) The KYRBS is an annual anonymous online self-reported cross-sectional survey on various health behaviours that uses a stratified cluster sampling procedure to source middle and high school students that are representative of the adolescent school population in Korea (Korea Centers for Disease Control and Prevention, 2017), more details are described elsewhere (Korea Centers for Disease Control and Prevention, 2017). The online survey was administered during class after survey instructions had been given and written informed consent had been obtained (Korea Centers for Disease Control and Prevention, 2017). In 2016, the survey included a total of 798 schools, and a total of 65,528 respondents participated, resulting in a response rate of 96.4% (Korea Centers for Disease Control and Prevention, 2017). The KYRBS was approved by the "institutional review board of Korea Centers for Disease Control and Prevention (2014-06EXP-02-P-A)".

2.2. Measures

2.2.1. Alcohol use

Alcohol use was assessed with the following three questions: 1) "Have you ever used alcohol more than 1 glass?" (Response option, "Yes"or "No"), 2) "In the last 1 month, how often did you drink more than 1 glass?" (Responses ranged from 1 = no drink during the last 1 month to 6 = 20–29 days per month and daily). (Responses were categorized into 1 = never, 2 = no for 30 days, 2 = 1–9 days/month, 3 = 10 + days/month.), and 3) "In the last 1 month, on average, how much alcohol did you consume per drinking episode?" (Response options: 1 = < 1 bottle of beer or 1–2 glass(es) of Soju (Korean distilled spirits) to 5 = 8 or more bottles of beer or 3 or more bottles of Soju). Males who drank > 5 glasses of Soju and females who drank > 3 glasses of Soju were classified as hazardous drinker (Korea Centers for Disease Control and Prevention, 2017).

2.2.1.1. Age of first use of alcohol. "When was the first time you drank at least a glass of alcohol?" (Response option, 1 = before primary school, 2 = first year of primary school to 13 = 3rd year of high school). Responses were categorized into 1 = never drink, 2 = primary school or less, 3 = secondary school, and 4 = high school (Korea Centers for Disease Control and Prevention, 2017).

2.2.1.2. Perceived accessibility of alcohol. "In the last 1 month, how did you feel when you want to buy an alcoholic drink in shops?" (Response options: 1 = I did not want to buy during the last 1 month, 2 = it was impossible, 3 = it was possible if you make a lot of efforts, 4 = it was possible if you make some efforts, and 5 = it was possible without efforts). Responses were categorized into 1 = did not try during the 1 month, 2 = not easy (impossible or require lots of efforts), 3 = easy accessibility (require no or some efforts) (Korea Centers for Disease Control and Prevention, 2017).

2.2.1.3. Received education on alcohol in the past 12 months. "In the last 12 months, have you ever received education on alcohol in your school (class, media, any education)?" (Responses were "yes" or "no") (Korea Centers for Disease Control and Prevention, 2017).

2.2.2. Cigarette use

Conventional cigarette use was assessed with three questions, 1) "Have you ever tried a cigarette, even one puff, in your life?" (Response option "Yes" or "No.) (Lifetime smokers were defined as those who responded "yes" to this question); 2) "During the past 30 days, how many days did you smoke cigarettes, even one cigarette?" (Response options: did not for 30 days, 1 and 2 days, 3–5 days/month, 6–9 days/month, 10–19 days/month, 20–29 days/month, to every day); and 3) "How many cigarettes did you smoke a day on average in the past 30 days?" (Response options: "fewer than 1 per day," "1 per day," "2 to 5 per day," "6 to 9 per day," "10 to 19 per day," and "20 or more per day.") (Korea Centers for Disease Control and Prevention, 2017).

2.2.2.1. Age of first smoking. "When was the first time you smoked at least one or two puff of cigarette smoking?" (Response option, 1 = before primary school, 2 = first year of primary school to 13 = 3rd year of high school). Responses were categorized into 1 = never smoke, 2 = primary school or less, 3 = secondary school, and 4 = high school (Korea Centers for Disease Control and Prevention, 2017).

2.2.2.2. Age of becoming daily smokers. "Since when did you smoke every day?" (Response option, 1 = before primary school, 2 = first year of primary school to 13 = 3rd year of high school). Responses were categorized into 1 = never smoke or did not smoke for the past month or smoked less than daily, 2 = primary school or less, 3 = secondary school, and 4 = high school (Korea Centers for Disease Control and Prevention, 2017).

2.2.2.3. Perceived accessibility of cigarettes. "In the last 1 month, how did you feel when you want to buy a cigarette in shops?"(Response options: 1 = I did not want to buy during the last 1 month to 5 = it was possible without efforts). Responses were categorized into 1 = did not try during the 1 month, 2 = not easy (impossible or require lots of efforts), 3 = easy accessibility (require no or some efforts) (Korea Centers for Disease Control and Prevention, 2017).

2.2.2.4. Ever smoking cessation. "Have you ever tried to quit smoking?" (Responses were "Yes" or "No"). *Second hand smoke exposure in household.* "In the last week, have you ever been together when family members or guests and so on smoked in the household?" (Response options: 1 = "not last week", 2 = once/week, to 8 = daily. They were categorized into 1 = "no last week", 2 = "1–2 days", 3 = "3-5 days", and 4 = "6–7 days"). *Family members currently smoking.* "Who in your family smokes currently?" (Response options: "no one", "father", "mother", "brothers or sisters", "grandparents", "others", and "do not know"). *Number of current smokers in close friends.* "Is there a close friend of yours who smokes?" (Response options: "no one", "some smoke", "almost smoke", and "all smoke") (Korea Centers for Disease Control and Prevention, 2017).

2.2.2.5. Education on smoking prevention or cessation last year. "In the last 12 months, have you ever received education on smoking prevention or cessation in your school (class, media, any education)?"(Response option: "Yes" or "No") (Korea Centers for