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## Research Article

## Health Behaviors and Academic Performance Among Korean Adolescents

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## SUMMARY

*Purpose:* This study aimed to examine the most prominent health-related behaviors impacting the academic performance of Korean adolescents.*Methods:* The 2012 Korea Youth Risk Behavior Web-Based Survey data were analyzed using an ordinal regression analysis after adjusting for general and other health behaviors.*Results:* Before adjustment, all health behaviors were significantly associated with academic performance. After adjustment for other health behaviors and confounding factors, only smoking [odds ratio (OR) = 2.07, 95% confidence interval (CI) (1.98, 2.16),  $p < .001$ ], alcohol consumption [OR = 1.22, 95% CI (1.18, 1.27),  $p < .001$ ], and physical activity [OR = 1.09, 95% CI (1.06, 1.13),  $p < .001$ ] were associated with lower academic performance, and engaging in a regular diet [OR = 0.65, 95% CI (0.65, 0.62),  $p < .001$ ] was associated with higher academic performance.*Conclusions:* Regular diet, reducing smoking and alcohol drinking, and physical activity should be the target when designing health interventions for improving academic performance in Korean adolescents. Copyright © 2016, Korean Society of Nursing Science. Published by Elsevier. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## Introduction

Successful academic performance is key during adolescence, and in predicting occupational and social success in one's lifetime [1]. Therefore, positive academic outcomes during adolescence have become a public concern, making the primary goal of schooling a global issue [2]. In accordance, there is a strong tradition and emphasis on education to produce positive academic performance for schoolchildren in Korea [3].

Health has long been a factor influencing academic performance among adolescents [4,5]. Health behaviors, defined as “any kind of behavior undertaken by individuals that potentially influences their health” [6], have included health-risk behaviors with immediate or later negative health consequences and health-promoting behaviors producing positive health outcomes [7]. Health behaviors among adolescents, studied in previous research, have been summarized as tobacco use, substance use, sexual behavior, violence, physical activity (exercise & sedentary activity), and nutrition (dietary behavior & nutrition) [8,9]. Much literature exploring the relationship

between health behaviors and academic performance has examined health behaviors either as a means of achieving health or as an end in itself [4,5,8]. Health behaviors themselves, independent of health, have placed emphasis on adolescence since it is an important period for forming lifelong health behaviors and habits [10]. Most related studies have found reciprocal or antecedent associations based on cross-sectional and longitudinal methods, respectively, and specifically, positive associations between unhealthy behaviors and poor academic achievement [4,5,8].

However, most previous studies exploring the relationship between health behaviors and academic performance have focused on single or small subsets of health behaviors rather than including multiple behaviors comprehensively [4,5,8]. Since many health behaviors cluster together, the effects of studies performed without multibehavioral analyses are more likely to be overestimations of true effects due to interbehavioral confounding [8]. More importantly, previous studies have rarely controlled for other confounding factors, nor have they used nationally representative data. The relationships of health behaviors and academic performance have been revealed to be mediated by psychosocial problems (e.g., stress), social structures, and demographics, and were found to be dependent on social context factors in review studies [5,8]. Exploring key health behaviors is necessary to plan public strategies to make the best use of scarce resources.

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Therefore, this study was conducted to examine the most prominent health behaviors associated with academic performance, after adjusting for other health behaviors and confounding factors including health status, stress, household socioeconomic status (SES), and sex and age using a nationally representative sample of Korean adolescents.

## Methods

### Data and study design

This study used the data of the 2012 Korea Youth Risk Behavior Web-Based Survey (KYRBS) [11], conducted by the Korean Centers for Disease Control and Prevention. The KYRBS, an online self-administered questionnaire survey, was conducted annually to monitor the prevalence of health risk behaviors in Korean adolescents. To select a nationally representative sample of middle and high school students, this survey used a stratified, three-stage cluster sampling design that considered (a) county size (large/small cities & urban areas); (b) the degree of urbanicity, the number of schools, and the population; and (c) random sampling of classrooms in each grade. The respondents' data were assigned weights to assure equal probability of being sampled and to cover missing data. Of a total of 76,980 students from these sampling frames, 74,186 students completed the survey with a response rate of 96.4%. This study analyzed 74,186 adolescents aged 12–18 years in total.

### Ethical considerations

The Korean Centers for Disease Control and Prevention provided the raw KYRBS data after reviewing our study's purpose and data analysis plans, and we were permitted to use the data on September 12, 2013. The KYRBS was officially approved by the Statistics Korea (Certificate Number: 11758). All study participants completed the survey under the condition of anonymity.

### Variable measurements

The general, health behavioral, and academic performance variables were identified from the results of the KYRBS. Academic performance, the dependent variable, was assessed with self-reported academic grades in the 12-month period by a 5-point scale (low, low-middle, middle, high-middle, & high), and was categorized into three groups: low, middle, and high.

Health behaviors [7], the independent variables, were composed of smoking, alcohol consumption, sexual activity, suicidal ideation, physical activity, Internet use, weight changes, and regular diet. All health behavioral variables were identified in two ways (yes or no) by assessing whether the adolescents had ever smoked and used alcohol in their lifetime; whether they had ever had intercourse with the same or the opposite sex; whether they had seriously considered suicide in the last 12 months; whether physical activity of any kind amounted to at least 60 minutes in the last 7 days; whether they had used the Internet during the last 30 days; whether weight control efforts for decreasing, increasing, and maintaining weight in the last 30 days were made; and whether the adolescents consumed three meals a day in the last 7 days.

General characteristics for covariates include demographics, social structures, health status, and psychosocial problems such as age/school, sex, household SES, father's and mother's education, subjective health status, and stress, respectively. Household SES was categorized into three groups by subjective household SES: low, middle, and high SES. Father's and mother's education levels were categorized into three groups: up to middle school, high school, and university. Subjective health status was categorized

into three groups: unhealthy, average, and healthy. Stress was identified in two ways (yes/no) by assessing whether more than average stress was felt.

### Data analysis

Based on the complex survey design, all data were weighted by the proportion of sex, school class, and grade in a geographic area. Descriptive statistics and chi-square tests were used to compare general and health behavioral characteristics according to academic performance. Univariate ordinal logistic regression was used to estimate the influence of each health behavior on academic performance, and multivariate ordinal logistic regression was conducted to estimate the effects of individual health behaviors after adjustment for general, stress, and other health behavioral variables, displaying only the variables that showed valid model fitting on the model. Adjustments were made for school, sex, household SES, father's education, mother's education, subjective health status, and stress. All statistical analyses were performed including the analysis of complex survey data by the use of SPSS 20.0 (IBM Corp, Armonk, NY, USA).

## Results

Data of a total of 74,186 respondents composed of 28,810 low (38.6%), 19,854 middle (26.8%), and 25,522 high (34.6%) academic performance adolescents including middle and high school students were analyzed, and the respondents' general and health behavioral characteristics according to academic performance are presented in Tables 1 and 2, respectively. Significant academic performance differences were found with regard to all the general and health behavioral characteristics. Adolescents who were high school students, female, and in a lower SES household, and those who had parents with less education, perceived health status as unhealthy, and higher stress level than average showed significantly lower academic performance. Those engaging in smoking, alcohol consumption, sexual activity, suicidal ideation, physical activity, and who had weight changes tended to show lower academic performance, and those engaging in Internet use and a regular diet tended to show higher academic performance.

The relationship between health behaviors and academic performance is presented in Table 3. Before adjustment, all health behaviors were significantly associated with academic performance: those engaging in smoking [OR = 2.14, 95%CI (2.06, 2.21),  $p < .001$ ], alcohol consumption [OR = 1.60, 95%CI (1.55, 1.65),  $p < .001$ ], sexual activity [OR = 1.59, 95%CI (1.49, 1.70),  $p < .001$ ], suicidal ideation [OR = 1.47, 95%CI (1.42, 1.53),  $p < .001$ ], physical activity [OR = 1.15, 95%CI (1.12, 1.18),  $p < .001$ ], and who experienced weight changes [OR = 1.14, 95%CI (1.11, 1.18),  $p < .001$ ] reported lower academic performance, and those engaging in Internet use [OR = 0.71, 95%CI (0.68, 0.74),  $p < .001$ ] and a regular diet [OR = 0.48, 95%CI (0.46, 0.49),  $p < .001$ ] reported higher academic performance. After adjustment of general and other health behavioral variables, only smoking, alcohol consumption, physical activity, and regular diet were significantly associated with academic performance: those engaging in smoking [OR = 2.07, 95%CI (1.98, 2.16),  $p < .001$ ], alcohol consumption [OR = 1.22, 95%CI (1.18, 1.27),  $p < .001$ ], and physical activity [OR = 1.09, 95%CI (1.06, 1.13),  $p < .001$ ] reported lower academic performance, and those engaging in a regular diet [OR = 0.65, 95%CI (0.65, 0.62),  $p < .001$ ] reported higher academic performance.

## Discussion

This study was conducted to investigate the health behaviors significantly related to academic performance among Korean

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