

Relationship between Quality of Sleep Duration and Drinking Behavior in Korean Adolescents

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Abstract

This study identified the relationship between drinking behavior and sleep hours in Korean adolescents. It used the Eighth (2012) Youth Health Behavior Online Survey that was conducted by the Centers for Disease Control (CDC). Analytical methods involved a chi-square test, Pearson correlation, and present factors related to sleep hours and quality of sleep. The sleep hours and sleep quality of adolescents are associated with the general characteristics of adolescents as well as drinking behaviors. Therefore, society's belief of alcohol as a preference item or the positive attitude toward alcohol needs to be changed to increase the success of alcohol-related prevention education for adolescents in South Korea.

Keywords: *Drinking behavior, Sleep duration, Quality of sleep*

1. Introduction

Sufficient high-quality sleep is necessary to lead a healthy physical and emotional lifestyle; it regenerates the body and brain and helps strengthen academic performance at school. There is a higher chance that students with sufficient sleep would have a greater interest in their studies, and this would improve their grades.

However, Korean adolescents have a lack of sleep because of an education system that focuses on college admission, exam competitions, and afterschool education programs. It causes mental and psychological pressures that they could not adequately handle. Furthermore, it develops drinking behavior, a source of behavioral problems. The level of drinking among Korean adolescents is 24.5% in 2008. It remains at a high level because Koreans think of alcohol as a personal preference item and are more tolerant of it. People tend to make light of the psychological and physical problems associated with drinking behavior. Korean adolescents who are prohibited by law to purchase alcohol are more likely to be in contact with alcohol.

Since the physical body of an adolescent is not fully developed, the psychosocial consequences of drinking are very harmful compared with adults. This behavior can lead to damage of the nerves and body tissues, and it will cause mental disorders such as hallucinations and delusions, delayed physical development, or disruption of body functions. In addition, excessive or long-term drinking abuse could cause brain cell death, and damaged brain cells are not regenerated; it leads to memory deterioration and will have an adverse impact on academic performance. Although drinking helps them fall asleep faster, they would not have enough sleep because of the disruption of sleep quality.

Research on the relationship between sleeping and drinking of adolescents has been conducted in South Korea; however, a relevant study on the relationship between sleeping and drinking behavior was not previously conducted. This study found a relationship between the quality of sleeping hours and alcohol behavior of adolescents; it was conducted to help develop a future educational plan that informs adolescents of the relationship between sleeping and drinking behavior.

2. Methodology

2.1. Study Subjects & Data Collection

This study used the Eighth (2012) Youth Health Behavior Online Survey that was conducted by the Centers for Disease Control (CDC). The population consisted of enrolled students in middle school and high school from 16 different cities and states in April 2011; they were distributed over five selected schools, and the sample schools were distributed by the proportional allocation method according to matching between population composition of satisfied elements and ratio of component samples. Stratified sampling was used with cluster sampling to extract one sample class randomly by grade. The study investigated all students; however, students with absences, special educational needs, and disabilities were excluded from the sample. The survey was conducted on 76,980 students from a total of 800 schools; 74,186 students and 797 schools participated, which showed a 96.4% participation rate. In this study, selected raw data from the Eighth (2012) Youth Health Behavior Online Survey were used and modified for this study.

2.2. Research Tool

2.2.1. General Characteristics and Health Behavior

The assessed sociodemographic variables were gender, school year, family income level, city size, school classification, school type, and academic performance. School year was divided into middle school and high school students. Family income level was divided into high, medium, and low. Cities were categorized as large cities, small and medium-sized cities, and counties. Schools were classified as middle schools, general high schools, and specialized high schools. School type was divided into boy's school, girl's school, and coed school. Finally, academic performance for the last 12 months was ranked as high, medium, and low.

The assessed health behavior variables were body mass index (BMI), smoking, sexual experience, drug taking, stress awareness, and subjective health awareness. BMI was calculated by a survey of height and weight, students who were less than 18.5 kg/m^2 were underweight, $18.5 \text{ kg/m}^2 \sim 23.0 \text{ kg/m}^2$ were average, and more than 23.0 kg/m^2 were overweight. Smoking was separated into two categories: a student who smoked in the last 30 days was classified as a smoker, and a student who had no smoking experience was classified as a non-smoker. Sexual experience was recorded as with experience and without experience. Drug taking was classified into two groups: students who took drugs for psychoactive experience or losing weight and students with no experience. Stress awareness was divided into high stress, moderate stress, and no stress. Finally, subjective health awareness was classified as healthy, average healthy, and unhealthy, which indicated a student's health status.

2.2.2. Drinking Behavior

Drinking behavior was classified as non-drinker, non-hazardous drinker, and hazardous drinker. If a student did not consume alcohol thus far, that student was classified as "non-drinker." If students drank in the last 30 days, they were categorized depending on the amount of alcohol consumed; when males drank more than 5 cups of Soju and females drank more than 3 cups of Soju, those behaviors were classified as "hazardous drinker"; those that drank less than that were classified as "non-hazardous drinker."

2.2.3. Sleep Hours and Quality of Sleep

The number of sleep hours was based on an average of weekday sleep hours, and the subjective satisfaction of sleep quality was rated. Average weekday sleep hours were

classified into two categories: more than eight hours and less than eight hours. These were calculated from bedtime and wake time; the recommended hours of sleep by the US National Sleep Foundation is eight hours (Ministry of Gender Equality and Family, 2010). The subjective satisfaction rating of sleep quality was classified as sufficient, normal, and insufficient depending on the satisfaction of students in last 7 days.

2.3. Data Analysis

Data analysis was performed using the SPSS version 18.0 statistical program. Analysis results were presented as frequency and percentage according to the sociodemographic characteristics, health behavior, and drinking behavior of subjects, in relation to sleep hours and quality of sleep. The study also did a cross analysis; the correlation analysis of the relationship between drinking behavior, sleep hours, and quality of sleep was performed. Statistical significance was set at $p < 0.05$.

3. Results

3.1. General Characteristics of Subjects

The population consisted of 50.8% males and 49.2% females; 48.9% were middle school students, and 51.1% were high school students. In terms of family income level, 30.0% were high level, 47.4% were middle level, and 22.6% were lower level. For city size, 52.0% were from major cities, 40.6% were from small and medium-sized cities, and 7.4% were from counties. Of the subjects, 48.9% were middle school, 39.9% were general high school, and 11.2% were specialized high school students. School type was made up of 16.7% boy's school, 17.1% girl's school, and 66.2% coed school. The ranks in academic performance were 35.6% high, 27.1% middle, and 32.3% low. For BMI calculations, 32.3% were underweight, 47.6% were average weight, and 20.1% were overweight. Non-smokers were 89.4%, and smokers were 10.6%. The percentage of students who had no sexual experience was 83.4% and was 16.6% for those who had sexual experience. The percentage of students who had no experience of drugs was 99.1% and was 0.9% for those who had experience. For stress awareness, 42.1% felt high stress, 41.3% felt moderate stress, and 16.6% felt no stress. For health awareness, 67.9% felt healthy, 25.2% felt average healthy, and 7.0% felt unhealthy. For drinking behavior classification, 81.1% were non-drinkers, 10.1% were non-hazardous drinkers, and 8.8% were hazardous drinkers [Table 1].

Table 1. General Characteristics of the Subjects

Characteristics	Category	% (N)
Gender	Male	50.8 (31574)
	Female	49.2 (30629)
School year	Middle school	48.9 (30402)
	High school	51.1 (31801)
Family income level	High	30.0 (18662)
	Middle	47.4 (29484)
	Low	22.6 (14057)
City size	Big city	52.0 (32369)
	Small and medium-sized cities	40.6 (25258)
	County area	7.4 (4576)
School classification	Middle school	48.9 (30402)

	General high school	39.9 (24804)
	Specialized high school	11.2 (6997)
Type of school	Boys	16.7 (10360)
	Girls	17.1 (10636)
	Coed	66.2 (41207)
Academic performance	High	35.6 (22118)
	Middle	27.1 (16869)
	Low	37.3 (23216)
BMI*	Underweight	32.3 (20107)
	Average weight	47.6 (29601)
	Overweight	20.1 (12495)
Smoking	No	89.4 (55606)
	Yes	10.6 (6597)
Sexual experience	No	83.4 (51875)
	Yes	16.6 (10328)
Drug taking	No	99.1 (61665)
	Yes	0.9 (538)
Stress awareness	High	42.1 (26175)
	Moderate	41.3 (25711)
	No	16.6 (10317)
Subjective health awareness	Healthy	67.9 (42230)
	Average healthy	25.2 (15647)
	Unhealthy	7.0 (4326)
Drinking behavior	Non-drinking	81.1 (50474)
	Non-hazardous	10.1 (6262)
	Hazardous	8.8 (5467)
* Body mass index		

3.2. Relationship between Sleep Hours and Sleep Quality according to the General Characteristics of the Subjects

Subjects who had less than 8 hours of average sleep consisted of 43.7% males and 45.5% females; 39.2% were middle school students, and 50.0% were high school students. In terms of family income level, 26.3% were high level, 42.4% were middle level, and 20.5% were lower level. For city size, 47.0% were from major cities, 36.1% were from small and medium-sized cities, and 6.2% were from counties. Of the subjects, 39.2% were middle school, 39.4% were general high school, and 10.6% were specialized high school students. School type was made up of 14.9% boy's school, 16.1% girl's school, and 58.2% coed school. The ranks in academic performance were 32.1% high, 24.4% middle, and 32.8% low. For BMI calculations, 27.6% were underweight, 43.4% were average weight, and 18.2% were overweight. Non-smokers were 73.5%, and smokers were 9.9%. The percentage of students who had no sexual experience was 73.5% and was 15.7% for those who had sexual experience. The percentage of students who had no experience of drugs was 88.4% and was 0.8% for those who had experience. For stress awareness, 38.8% felt high stress, 36.8% felt moderate stress, and 13.6% felt no stress. For health awareness, 59.9% felt healthy, 22.9% felt normal healthy, and 6.5% felt unhealthy. For drinking behavior classification, 71.3% were non-drinkers, 9.4% were non-hazardous drinkers, and 8.5% were hazardous drinkers.

As a result, the relationship between sleep hours and general characteristics of the subjects, such as gender, school year, family income level, city size, school classification, school type, academic performance, BMI, smoking, sexual experience, stress awareness, subjective health awareness, and drinking behavior, revealed a significant difference in sleep hours ($p < 0.001$); drug taking did not significantly affect sleep hours.

In the comparisons between subjective sleep quality and general characteristics of the subjects, students who had enough sleep hours were 16.7% males and 11.1% females; 17.1% were middle school students, and 10.8% were high school students. In terms of family income level, 10.2% were high level, 12.7% were middle level, and 5.0% were lower level. For city size, 14.6% were from major cities, 11.3% were from small and medium-sized cities, and 2.1% were from counties. Of the subjects, 17.1% were middle school, 8.2% were general high school, and 2.6% were specialized high school students. School type was made up of 5.1% boy's school, 3.6% girl's school, and 19.2% coed school. The ranks in academic performance were 10.9% high, 7.7% middle, and 9.3% low. For BMI calculations, 9.7% were underweight, 12.5% were average weight, and 57% were overweight. Non-smokers were 25.8%, and smokers were 2.1%. The percentage of students who had no sexual experience was 24.5% and was 3.4% for those who had sexual experience. The percentage of students who had no experience of drugs was 27.7% and was 0.2% for those who had experience. For stress awareness, 7.2% felt high stress, 12.5% felt moderate stress, and 8.2% felt no stress. For health awareness, 21.9% felt healthier, 5.0% felt normal healthy, and 1.0% felt unhealthy. For drinking behavior classification, 24.1% were non-drinkers, 2.3% were non-hazardous drinkers, and 1.5% were hazardous drinkers.

As a result, the relationship between sleep quality and general characteristics of the subjects, such as gender, school year, family income level, school classification, school type, academic performance, BMI, drug taking, stress awareness, subjective health awareness, and drinking behavior, revealed a significant difference in sleep hours ($p < 0.001$); city size did not significantly affect quality of sleep [Table 2, 3].

Table 2. Relationship between Sleep Hours and the General Characteristics of the Subjects

Characteristics	Category	Sleep hours (%)		
		≤ 8 h	> 8 h	p^\dagger
Gender	Male	43.7	7.1	< 0.001
	Female	45.5	3.7	
School year	Middle school	39.2	9.7	< 0.001
	High school	50.0	1.1	
Family income level	High	26.3	3.7	< 0.001
	Middle	42.4	5.0	
	Low	20.5	2.1	
City size	Big city	47.0	5.1	< 0.001
	Small and medium-sized cities	36.1	4.5	
	County area	6.2	1.2	
School classification	Middle school	39.2	9.7	< 0.001
	General high school	39.4	0.4	
	Specialized high school	10.6	0.7	
Type of	Boys	14.9	1.7	< 0.001

school	Girls	16.1	1.0	
	Coed	58.2	8.0	
Academic performance	High	32.1	3.5	<0.001
	Middle	24.4	2.7	
	Low	32.8	4.6	
BMI*	Underweight	27.6	4.7	<0.001
	Average weight	43.4	4.2	
	Overweight	18.2	1.9	
Smoking	No	79.4	10.0	<0.001
	Yes	9.9	0.7	
Sexual experience	No	73.5	9.9	<0.001
	Yes	15.7	0.9	
Drug taking	No	88.4	10.7	0.026
	Yes	0.8	0.1	
Stress awareness	High	38.8	3.3	<0.001
	Moderate	36.8	4.6	
	No	13.6	3.0	
Subjective health awareness	Healthy	59.9	8.0	<0.001
	Average healthy	22.9	2.3	
	Unhealthy	6.5	0.5	
Drinking behavior	Non-drinking	71.3	9.8	<0.001
	Non-hazardous	9.4	0.6	
	Hazardous	8.5	0.3	
* Body mass index				
† Tested by chi-square test				

Table 3. Relationship between Sleep Quality and the General Characteristics of the Subjects

Characteristics	Category	Subjective rating of sleep quality (%)			
		Sufficient	Normal	Shortage	p [†]
Gender	Male	16.7	16.9	17.1	<0.001
	Female				
School year	Middle school	11.1	16.3	21.7	<0.001
	High school				
Family income level	High	17.1	16.5	15.3	<0.001
	Middle				
	Low				
City size	Big city	10.8	16.8	23.6	0.400
	Small and				

	medium-sized cities				
	County area				
School classification	Middle school	10.2	9.5	10.3	<0.001
	General high school				
	Specialized high school				
Type of school	Boys	12.7	16.5	18.2	<0.001
	Girls				
	Coed				
Academic performance	High	5.0	7.3	10.3	<0.001
	Middle				
	Low				
BMI*	Underweight	14.6	17.2	20.3	<0.001
	Average weight				
	Overweight				
Smoking	No	11.3	13.6	15.8	<0.001
	Yes				
Sexual experience	No	2.1	2.5	2.8	<0.001
	Yes				
Drug taking	No	17.1	16.5	15.3	<0.001
	Yes				
Stress awareness	High	8.2	12.8	18.9	<0.001
	Moderate				
	No				
Subjective health awareness	Healthy	2.6	3.9	4.7	<0.001
	Average healthy				
	Unhealthy				
Drinking behavior	Non-drinking	5.1	5.4	6.1	<0.001
	Non-hazardous				
	Hazardous				
* Body mass index					
† Tested by chi-square test					

3.3. Relationship of Sleep Hours and Subjective Sleep Quality with Drinking Behavior

Drinking behavior and sleep hours, correlation analysis was performed to evaluate the quality and relevance of sleep results; there was a significant negative correlation between drinking behavior and sleep hours ($r = -0.089$, $p < 0.001$), and there was a significant positive correlation between drinking behavior and subjective quality of sleep ($r = 0.112$, $p < 0.001$) [Table 4].

Table 4. Relationship of Sleep Hours and Subjective Sleep Quality with Drinking Behavior

	Sleep hours		Subjective rating of sleep quality	
	r	p	r	p
Drinking behavior	-0.089	<0.001	0.112	<0.001

4. Conclusions

Korean adolescents are frequently exposed to drinking. This study was performed to determine the effects of drinking behavior on sleep hours and quality of sleep in adolescents.

First, the drinking behavior of Korean adolescents demonstrated an effect on sleep hours and quality of sleep in this study; these were a significant correlation.

Although the law prohibits liquor sale to adolescents [11], people in society think of alcohol as a personal preference item and are tolerant toward alcohol drinking [5,6]. Hence, the number of adolescents who drink alcohol is increasing. Since people have easy access to alcohol, they choose to drink to relieve stress and negative emotions; an excessive and frequent drinking behavior could lead to alcohol-related problems [12]. People have experienced fear, body trembling, and visual or auditory hallucinations after drinking; they also have a lack of family or friends [13]. These continuous behaviors will not only change someone into a potential problematic drinker but also will lead to physical and mental health problems or legal problems.

Second, the general characteristics of adolescents affected the sleep hours and subjective quality of sleep.

Adolescents experience various stresses such as relationship problems with family or classmates and self-reflection problems [11]. Korean adolescents in particular face serious academic stress because of the academic pressure associated with college admission [14]. Daily stress increases the possibility of drinking and motivation of drinking.

Many adolescents consume alcohol because of academic pressures, and it negatively affects the quality of sleep and sleep hours. As a result, the vicious cycle repeats and would have adverse effects on the mental and physical health of adolescents.

One limitation of the study was that it did not identify the strain factor that affects the quality of sleep and sleep hours in adolescents. This study also used a self-administered questionnaire survey to collect data; thus, it has limited control of the secondary material. Nevertheless, this research revealed the factors related to drinking behavior in adolescents; these factors have effects on their sleep hours and quality of sleep. This study provides meaningful information to educate adolescents on drinking behavior in the future.

Overall, the sleep hours of Korean adolescents were influenced by their drinking behavior as well as general characteristics. Society's belief of alcohol as a preference item or positive attitude toward alcohol needs to be changed to increase the success of alcohol-related prevention education for adolescents in South Korea.

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