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The Influence of Substance Use on Sleep Duration Among South Korean Adolescents by Sex: A Secondary Analysis

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ABSTRACT

Purpose: Although insufficient sleep influences cognitive function and physical and mental health in adolescents, many still get less sleep than the recommended duration. Adolescent substance use, including alcohol and tobacco, influences sleep disturbance. However, sex differences in the relationship between substance use and sleep health have not been extensively studied. This study aimed to examine the effect of substance use on sleep duration among South Korean adolescents by sex.

Design and Methods: This secondary data analysis used the 4th Wave of the Korean Children and Youth Panel Survey 2018 and applied a multiple regression analysis. Tobacco use and alcohol consumption were assessed by asking whether the participants had ever smoked or drunk alcohol during the previous year. Sleep duration was calculated based on the participants' reports related to sleep and awake times on weekdays and weekends.

Results: For male adolescents, substance use, either tobacco use or alcohol consumption, did not significantly affect sleep duration, whereas for female adolescents, alcohol consumption was found to influence sleep duration. Age and subjective health were additional influential factors for adolescents' sleep duration, regardless of sex.

Practice Implications: Interventions for alcohol consumption should be considered to enhance sleep health in female South Korean adolescents. Further studies are needed to understand the underlying mechanisms of sleep health, particularly the effects of substance use, among male adolescents.

1 | Introduction

Sleep plays a critical role in various aspects of adolescence, including emotional, cognitive, physical, and academic functioning (Dutil et al. 2022; Liu et al. 2024), making it essential to prioritize healthy sleep in this population. In children and adolescents, good sleep health is defined by “subjective or caregiver-rated satisfaction, appropriate timing, adequate duration for age, high efficiency, sustained alertness during waking hours, and healthy sleep behaviors” (Meltzer, Williamson, and Mindell 2021). Sleep duration among adolescents has steadily decreased over the past several decades (Otsuka et al. 2021; Patte, Qian, and

Leatherdale 2017; Twenge, Krizan, and Hisler 2017), and older adolescents tend to sleep less (Sousa-Sá et al. 2021). Insufficient sleep in adolescence is associated with various health risks, including obesity (Sunwoo et al. 2020), cardiovascular disease (Sun et al. 2020), mood disturbances (Short et al. 2020), suicidal ideation (Baiden et al. 2020), and impaired neurocognitive development (Yang, Xie, and Wang 2022). Therefore, identifying the factors that influence adolescents' sleep duration is crucial for promoting sufficient sleep.

Substance use is a key factor influencing sleep duration. Studies conducted among adolescents in the United States have shown

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that tobacco (Merianos et al. 2021) and alcohol use (Kwon et al. 2021) are associated with shorter sleep durations. The use of e-cigarettes (Gentzke et al. 2020) and dual products (Merianos et al. 2021; Riehm et al. 2019), which are more prevalent among adolescents, have a detrimental impact on sleep. A study reviewing the relationship between alcohol consumption and sleep disorders, including sleep duration, found that alcohol use is associated with inadequate sleep in both adults (Hu et al. 2020) and adolescents (Short and Weber 2018). Particularly, early initiation of substance use, including alcohol, is associated with worse sleep outcomes (Mike et al. 2016), highlighting the importance for early interventions to reduce substance use to ensure sufficient sleep in adolescents.

Sex is another factor that is known to predict sleep duration and substance use in adolescents. While some studies report no differences in sleep duration by sex during pre-adolescence (Elkhatib Smidt et al. 2021), many studies have found sex-based differences in sleep patterns during adolescence (Berry et al. 2021; Keyes et al. 2015; Sousa-Sá et al. 2021). Female adolescents tend to sleep less than their male counterparts (Keyes et al. 2015) and are more likely to report impaired sleep (Elkhatib Smidt et al. 2021); however, some studies have suggested that they sleep more on weekends (Berry et al. 2021; Sousa-Sá et al. 2021). The reasons for substance use also differ by sex, with male adolescents being more likely to use substances for enjoyment; female adolescents being more likely to use them for emotional reasons (Swartz et al. 2020). Additionally, studies have suggested that the impact of marijuana use on sleep varies according to sex (Kwon et al. 2021). While it is clear that sex influences both substance use and sleep duration, few studies have specifically examined how substance use affects sleep duration across sexes.

Many adolescents experience insufficient sleep, which can have physical and psychological consequences. As substance use can exacerbate sleep problems experienced by adolescents, it is important to examine the current status of substance use among adolescents and its impact on sleep. Given that substance use patterns and sleep duration vary by sex, exploring these differences could help develop more targeted and effective interventions. In South Korea, adolescents are less likely to meet the recommended sleep duration (Garcia-Roman, Gracia, and Zerbini 2024). Although substance use has declined since the pandemic, the rate of decline has slowed (Park et al. 2023). Investigating the sex-specific relationship between substance use and sleep duration in South Korean adolescents may provide valuable insights for improving sleep health in this population. Thus, this study aimed to examine the influence of substance use on sleep duration among South Korean adolescents according to sex.

2 | Materials and Methods

2.1 | Data Sources and Study Samples

This secondary data analysis utilized data from the 4th Wave of the Korean Children and Youth Panel Survey (KCYPs) 2018, conducted by the National Youth Policy Institute of Korea. The KCYPs 2018 is a longitudinal study designed to

comprehensively assess the physical, emotional, and social development of children and adolescents (National Youth Policy Institute 2024). The target population for the KCYPs 2018 was students enrolled in fourth-grade elementary school and first-year middle school in 2018. A multistage stratified cluster sampling method was used for sample selection, and schools with at least 50 students were sampled using a probability proportional to size sampling. The entire student population of one grade from each school was surveyed (National Youth Policy Institute 2024). A total of 151 elementary schools and 131 middle schools were included, with 2607 fourth-grade elementary students and 2590 first-year middle school students (7th grade), respectively, participating in the first-year survey for a total of 5197 participants.

In the fourth-year survey conducted in 2021, the sample included 4540 students, including 2275 first-year middle school students (7th grade) and 2265 first-year high school students (10th grade). The response rate was 87.4% compared with that of the first-year survey. Data from 4497 students who completed all relevant survey questions were included in the analysis.

2.2 | Measures

2.2.1 | General Characteristics

General characteristics included sex, age, physical activity, obesity status, depression, happiness, and self-rated health (SRH). Physical activity was measured using the question, "Over the past week, how many hours did you exercise to the point of sweating?" Responses were categorized into "No physical activity" for those who reported no exercise and "Physical activity" for those who exercised for 1 h or more. Obesity status was determined based on the participants' sex, height (cm), and weight (kg), using the 2017 Korean Children and Youth Growth Chart as a reference. The participants were classified as underweight (< 5th percentile), normal weight (5th–84th percentile), overweight (85th–94th percentile), or obese ($\geq$ 95th percentile). Depression was assessed using the modified 10-item depression scale from the Symptom Checklist-90-Revised (SCL-90-R) that was used in the KCYPs. This tool was originally developed by Derogatis (1983) and was adapted for Koreans by Kim, Kim, and Won (1984). It uses a four-point Likert scale ranging from "not at all (1)" to "very much (4)," with total scores ranging from 10 to 40. Higher total scores indicated more severe depression. The reliability of the tool (Cronbach's α) was 0.89 in the study by Kim, Kim, and Won (1984) and 0.90 in this study. Happiness was measured using four items of the KCYPs Happiness Index developed by Lee (2015). All items were rated on a four-point Likert scale. Two items were rated on a scale from "very unhappy (1)" to "very happy (4)," and the other two were rated from "not at all (1)" to "very much (4)." One item was reverse coded to ensure that higher scores reflected greater happiness. The Cronbach's α was 0.89 in the study by Lee (2015) and 0.72 in this study. SRH was assessed using a single item modified from the Korean Youth Risk Behavior Web-Based Survey conducted by the Korea Disease Control and Prevention Agency (KDCA). The item asked, "Compared to your peers, how would you rate your health status?" Responses were rated on a four-point Likert scale,

ranging from “not healthy at all (1)” to “very healthy (4).” In this study, scores of 1 and 2 were defined as “poor,” and scores of 3 and 4 were defined as “good.”

2.2.2 | Sleep Health

Sleep health was assessed by calculating average sleep duration. Average sleep duration was derived from responses to questions about bedtime and wake-up time on weekdays and weekends. Weekly average sleep duration was calculated using the following formula:

$$\text{Sleep duration} = (\text{Weekday bedtime} - \text{Weekday wake-up time}) \times 5 + (\text{Weekend bedtime} - \text{Weekend wake-up time}) \times 2.$$

2.2.3 | Substance Use

Substance use was assessed based on tobacco and alcohol consumption. The frequency of tobacco and alcohol consumption was measured by modifying existing items from the KCYPS 2010, developed by Kim et al. (2010). The question used was, “Have you smoked cigarettes or drank alcohol in the past year?” Each item was rated on a six-point Likert scale: “Not at all (1),” “1–2 times a year (2),” “Once a month (3),” “2–3 times a month (4),” “Once a week (5),” and “Several times a week (6).” In this study, smoking and drinking statuses were classified as “no” (score 1) or “yes” (all other scores).

2.3 | Data Analysis

Data were analyzed using SPSS Statistics software (version 28.0; IBM Corp., Armonk, NY, United States). The participants’

general characteristics, substance use, and sleep duration were analyzed using descriptive statistics and frequencies. Differences in sleep duration according to participant characteristics were analyzed using independent-sample *t*-tests and one-way ANOVA. Pearson’s correlation analysis was conducted to assess the relationships between continuous variables. Predictors of sleep duration were identified using multiple regression by fitting variables that showed significant differences in relation to sleep duration ($p < 0.05$) and drug use-related variables.

3 | Results

3.1 | General Characteristics

The study included 2338 male (52.0%) and 2159 female (48.0%) students. The mean age was 15.0 years for the male students and 14.9 years for female students. Table 1 shows the general characteristics of the participants according to sex.

Among male adolescents, 3.4% ($n = 79$) were classified as underweight, 72.7% ($n = 1700$) as normal weight, 6.0% ($n = 141$) as overweight, and 17.9% ($n = 418$) as obese. The majority of male students (92.4%, $n = 2160$) rated their health as “good.” Regarding smoking, 96.7% ($n = 2261$) reported that they had “never smoked,” whereas 3.3% ($n = 77$) reported having smoked. Regarding alcohol consumption, 94.0% ($n = 2198$) reported that they had “never consumed alcohol,” whereas 6.0% ($n = 140$) reported having consumed alcohol. In male adolescents, the mean depression score was 17.04 ± 5.30 out of 40; the mean happiness score was 11.27 ± 1.40 out of 16.

Among female adolescents, 5.2% ($n = 112$) were classified as underweight, 82.0% ($n = 1770$) as normal weight, 6.7% ($n = 144$)

TABLE 1 | General characteristics of the participants by sex ($N = 4497$).

Characteristics	Categories	Male (2338)		Female (2159)	
		<i>n</i> (%)	<i>M</i> (SD)	<i>n</i> (%)	<i>M</i> (SD)
Age (years)			15.02 (1.52)		14.91 (1.51)
Obesity status	Underweight	79 (3.4)		112 (5.2)	
	Normal	1700 (72.7)		1770 (82.0)	
	Overweight	141 (6.0)		144 (6.7)	
	Obesity	418 (17.9)		133 (6.2)	
Self-rated health	Poor	178 (7.6)		165 (7.6)	
	Good	2160 (92.4)		1994 (92.4)	
Physical activity	Yes	1809 (77.4)		1273 (59.0)	
	No	259 (22.6)		886 (41.0)	
Drug abuse					
Tobacco use	Yes	77 (3.3)		17 (0.8)	
	No	2261 (96.7)		2142 (99.2)	
Alcohol consumption	Yes	140 (6.0)		43 (2.0)	
	No	2198 (94.0)		2116 (98.0)	
Depression			17.04 (5.30)		18.09 (5.62)
Happiness			11.27 (1.40)		11.21 (1.39)

as overweight, and 6.2% ($n = 133$) as obese. The majority of female participants (92.4%, $n = 1994$) rated their health as “good.” Regarding smoking, 99.2% ($n = 2142$) reported that they had “never smoked,” whereas 0.8% ($n = 17$) reported having smoked. Regarding alcohol consumption, 98.0% ($n = 2116$) reported that they had “never consumed alcohol,” whereas 2.0% ($n = 43$) reported having consumed alcohol. In female students, the mean depression score was 18.09 ± 5.62 out of 40, and the mean happiness score was 11.21 ± 1.39 out of 16.

3.2 | Differences in Sleep Duration According to General Characteristics

Tables 2 and 3 summarize the differences in sleep duration according to the participant characteristics.

In male students, sleep duration differed significantly according to obesity status ($F = 5.15$, $p = 0.001$), SRH ($t = 2.76$, $p = 0.006$), tobacco use ($t = 2.91$, $p = 0.004$), and alcohol use ($t = 4.54$, $p < 0.001$). Additionally, sleep duration significantly correlated with age ($r = -0.46$, $p < 0.001$) and depression ($r = -0.05$, $p = 0.016$). In female students, sleep duration differed significantly according to obesity status ($F = 3.71$, $p = 0.011$), SRH ($t = 4.25$, $p < 0.001$), tobacco use ($t = 2.73$, $p = 0.006$), and alcohol consumption ($t = 4.64$, $p < 0.001$). Furthermore, sleep duration significantly correlated with age ($r = -0.41$, $p < 0.001$) and depression ($r = -0.11$, $p < 0.001$).

3.3 | Factors Affecting Adolescents' Sleep Duration

3.3.1 | Male Adolescents

To identify the predictors of sleep duration among male students, multiple linear regression was performed using smoking

and drinking status, as well as general characteristics that significantly differed in relation to sleep duration (Table 4). The variance inflation factor (VIF) was < 10 (1.01–1.19), and the Durbin–Watson statistic was 1.753, indicating that the regression results were significant ($F = 158.82$, $p < 0.001$). The most potent predictor of sleep duration among male students was age ($\beta = -0.45$, $p < 0.001$), followed by SRH ($\beta = 0.05$, $p = 0.014$). In other words, sleep duration decreased with age and poorer SRH among male students. Tobacco use ($\beta = -0.01$, $p = 0.744$) and alcohol consumption ($\beta = -0.02$, $p = 0.305$) did not have a significant effect on sleep duration among male students. This model explained 21.3% of the variance in sleep duration in male students.

3.3.2 | Female Adolescents

A multiple linear regression analysis was performed to identify the predictors of sleep duration among female students (Table 5). The VIF was < 10 (1.01–1.20), and the Durbin–Watson statistic was 1.654 ($F = 95.79$, $p < 0.001$). The most potent predictor of sleep duration among female students was age ($\beta = -0.39$, $p < 0.001$), followed by depression ($\beta = -0.08$, $p < 0.001$), alcohol consumption ($\beta = -0.06$, $p = 0.003$), and SRH ($\beta = 0.06$, $p = 0.011$). In other words, sleep duration decreased with increasing age, feelings of depression, alcohol consumption, and poor SRH among female students. Tobacco use ($\beta = -0.01$, $p = 0.505$) did not have a significant effect on sleep duration among female students. This model explained 18.0% of the variance in sleep duration of female students.

4 | Discussion

This study confirmed that the influence of substance use on sleep duration among adolescents differed according to sex. Although tobacco and alcohol consumption did not affect sleep

TABLE 2 | Comparison of sleep duration according to the participants' characteristics ($N = 4497$).

		Sleep duration							
Characteristics	Categories	Male (2338)				Female (2159)			
		<i>n</i>	<i>M</i> (SD)	<i>t/F</i>	<i>p</i>	<i>n</i>	<i>M</i> (SD)	<i>t/F</i>	<i>p</i>
Obesity	Under-weight	79	7.63 (1.24)	5.15	0.001	112	7.51 (1.08)	3.71	0.011
	Normal	1700	7.88 (1.02)			1770	7.80 (1.06)		
	Over-weight	141	8.08 (1.01)			144	7.86 (1.05)		
	Obesity	418	7.76 (1.03)			133	7.63 (1.09)		
Self-rated health	Poor	178	7.61 (1.29)	2.76	0.006	165	7.38 (1.27)	4.25	< 0.001
	Good	2160	7.89 (1.00)			1994	7.80 (1.04)		
Physical activity	Yes	1809	7.85 (1.02)	1.27	0.206	1273	7.79 (1.05)	0.60	0.548
	No	529	7.91 (1.07)			886	7.76 (1.09)		
Drug abuse									
Tobacco use	Yes	77	7.53 (1.13)	2.91	0.004	17	7.07 (1.05)	2.73	0.006
	No	2261	7.88 (1.03)			2142	7.78 (1.07)		
Alcohol consumption	Yes	140	7.48 (1.05)	4.54	< 0.001	43	7.03 (1.03)	4.64	< 0.001
	No	2198	7.89 (1.02)			2116	7.79 (1.06)		

TABLE 3 | Correlation among age, depression, happiness, and sleep duration ($N = 4497$).

Variables	Male ($n = 2338$)				Female ($n = 2159$)			
	Age r (p)	Depression r (p)	Happiness r (p)	Sleep duration r (p)	Age r (p)	Depression r (p)	Happiness r (p)	Sleep duration r (p)
Age	1				1			
Depression	0.06 (0.002)	1			0.05 (0.030)	1		
Happiness	−0.07 (< 0.001)	−0.49 (< 0.001)	1		−0.10 (< 0.001)	−0.46 (< 0.001)	1	
Sleep duration	−0.46 (< 0.001)	−0.05 (0.016)	0.00 (0.822)	1	−0.41 (> 0.001)	−0.11 (> 0.001)	0.02 (0.326)	1

duration in male adolescents, alcohol consumption was associated with shorter sleep duration in female adolescents. Age and SRH were significant predictors of sleep duration regardless of sex. However, depression predicted shorter sleep duration only among female adolescents.

In this study, sleep duration in male adolescents was not influenced by tobacco or alcohol use. This is consistent with the findings of Kwon et al. (2021), who reported no impact of smoking (including e-cigarette use) or alcohol consumption on sleep duration in US high school students. Similarly, Bellatorre et al. (2017) found no association between smoking and sleep duration. However, another study in male adolescents reported that alcohol consumption during the transition to early adulthood can lead to late bedtimes and that this trend persists over time (Troxel et al. 2021). Some studies have reported that smoking and alcohol use are associated with other sleep problems, such as difficulty falling asleep (Bellatorre et al. 2017), and that the use of other substances, such as marijuana or cannabis, contributes to insufficient sleep (Kwon et al. 2021; Troxel et al. 2021). Therefore, continuing to investigate the broad impact of substance use on sleep duration and other sleep problems among adolescents is crucial.

Among female adolescents, alcohol use predicted sleep duration. This finding aligns with Verlinden et al. (2022), who reported that alcohol consumption deteriorates sleep quality in adult women. Given the different reasons for alcohol consumption and biological effects on male and female individuals (Swartz et al. 2020; Tapert and Eberson-Shumate 2022), it is important to identify the causes and predictors of alcohol consumption in female adolescents and devise appropriate interventions based on these findings. In this study, depression was also found to have a negative effect on sleep duration among female adolescents. From the perspective that female adolescents tend to resort to alcohol use to cope with negative mood (Sjödin et al. 2021), examining the dynamics of depression, alcohol consumption, and sleep would allow for the development of more effective interventions. White (2020) noted that the prevalence of alcohol consumption among female adolescents is similar to that among male adolescents, with female adolescents starting drinking early and being more prone to binge drinking. Early alcohol use and binge drinking are known to have detrimental effects on sleep (Hussain et al. 2020; Mike et al. 2016). Therefore, it could be helpful to educate female adolescents about the risks of alcohol use from early adolescence and monitor the timing and frequency of drinking as well as any sleep problems to promote adequate sleep duration among female adolescents.

Age was the most significant predictor of sleep duration among both male and female adolescents. This supports previous findings that sleep duration decreases with age among adolescents (Alves et al. 2020; Gariepy et al. 2020; Raniti et al. 2017; Yoo 2020). This pattern is observed globally; older adolescents tend to go to bed later during school days than on non-school days or weekends (Gariepy et al. 2020). In South Korea, the percentage of adolescents with inadequate sleep duration is markedly higher than in other countries (Garcia-Roman, Gracia, and Zerbini 2024). A longitudinal study in South Korea found that longer hours spent in after-school classes and

TABLE 4 | Factors influencing sleep duration among male adolescents.

Variables	<i>B</i>	SE	β	<i>t</i>	<i>p</i>	95% Confidence interval		VIF
						Lower	Upper	
(Constant)	12.32	0.20		60.66	0.000	11.92	12.72	
Age	−0.31	0.01	−0.45	−24.40	0.000	−0.33	−0.28	1.03
Self-rated health ^a	0.18	0.7	0.05	2.46	0.014	0.04	0.32	1.01
Drug use								
Tobacco use ^a	−0.04	0.12	−0.01	−0.33	0.744	−0.26	0.19	1.17
Alcohol consumption ^a	−0.09	0.09	−0.02	−1.03	0.305	−0.26	0.08	1.19
<i>F</i> (<i>p</i>)					158.82 (< 0.001)			
<i>R</i> ²					0.214			
Adj. <i>R</i> ²					0.213			
Durbin-Watson					1.753			

^aDummy variable (reference): Self-rated health (poor), tobacco use (no), alcohol consumption (no).

TABLE 5 | Factors influencing sleep duration among female adolescents.

Variables	<i>B</i>	SE	β	<i>t</i>	<i>p</i>	95% Confidence interval		VIF
						Lower	Upper	
(constant)	11.96	0.24		50.31	< 0.001	11.48	12.43	
Age	−0.28	0.01	−0.39	−20.11	< 0.001	−0.30	−0.25	1.08
Depression	−0.01	0.00	−0.08	−3.74	< 0.001	−0.02	−0.01	1.08
Self-rated health ^a	0.25	0.08	0.06	3.05	0.011	0.09	0.41	1.20
Drug use								
Tobacco use ^a	0.17	0.26	−0.01	−0.67	0.505	−0.68	0.33	1.19
Alcohol consumption ^a	0.48	0.16	−0.06	−2.93	0.003	−0.80	−0.16	1.01
<i>F</i> (<i>p</i>)					95.79 (< 0.001)			
<i>R</i> ²					0.182			
Adj. <i>R</i> ²					0.180			
Durbin-Watson					1.654			

^aDummy variable (reference): Self-rated health (poor), tobacco use (no), alcohol consumption (no).

homework were linked to shorter sleep duration (Yoo 2020). Although sleep duration naturally decreases as children grow (Iglowstein et al. 2003) and bioregulatory sleep delays are common in older school-aged children and adolescents (Jenni and Carskadon 2005), it is important to ensure that adolescents maintain adequate sleep, given the detrimental physical (Sunwoo et al. 2020; Sun et al. 2020) and psychological impacts of inadequate sleep duration among adolescents (Baiden et al. 2020; Short et al. 2020). Therefore, there is a need for continued research on factors that promote sufficient sleep as well as studies validating the effectiveness of interventions to improve sleep duration to ensure that adolescents achieve healthy sleep patterns.

This study has several limitations. This study analyzed secondary data using a cross-sectional approach, although the original data set was one of the waves of a longitudinal study. Therefore, cause–effect relationships, which require studies with longitudinal and experimental designs, cannot be determined based on the findings from this study. Second, the

selected variables were limited as this study was a secondary data analysis. In other words, not all potentially influential factors could be included. For example, only tobacco and alcohol use were included as substance use. In addition, data were collected based on self-reported questionnaires; thus, there could be bias (i.e., social desirability bias). Finally, the proportion of the groups with tobacco or alcohol consumption was smaller than that of those without. Although this reflects that the prevalence of tobacco or alcohol consumption among Korean adolescents is not high, studies with snowball sampling or focus groups could enhance our understanding of the effects of adolescents' substance use and sleep duration.

5 | Conclusion

This study analyzed data from 4497 South Korean adolescents from the 4th Wave of the KCYPs 2018 survey to examine the sex-specific impact of substance use on sleep duration. Although the number of adolescents with tobacco use or

alcohol consumption was small, compared with those without their use, regardless of sex, the influence of substance use on sleep duration differed between male and female adolescents. In male adolescents, neither tobacco use nor alcohol consumption significantly affected sleep duration. However, alcohol consumption was associated with shorter sleep duration in female adolescents. To improve sleep duration among adolescents, it is essential to assess substance use according to sex and develop appropriate interventions tailored to specific types of substance use. While the prevalence of substance use among South Korean adolescents is not particularly high, the declining trend in substance use has slowed, and early initiation of substance use is becoming more common. Therefore, continuous monitoring of substance use is crucial for promoting adequate sleep duration among adolescents.

6 | How Might This Information Affect Nursing Practice?

This study highlights the importance of sex differences in the association between substance use and sleep duration among adolescents. Devising interventions for alcohol consumption among female adolescents could be helpful for managing their insufficient sleep. In addition, monitoring the initiation and frequency of drinking consumption could also help promote sleep duration in female adolescents. Although no significant influence of substance use on male adolescents' sleep duration has been found, previous studies have reported ongoing impacts of substance use on sleep in adulthood. Thus, investigating the longitudinal impact of substance use on sleep problems, including sleep duration, could ultimately help promote better sleep among male adolescents. In addition, the proportion of South Korean adolescents with substance use was small; considering the numbers of adolescents using substance have slowly declined compared with these before, continuously monitoring tobacco use and alcohol consumption is necessary.

Author Contributions

Sophia Jihey Chung: conceptualization, formal analysis, funding acquisition, methodology, supervision, writing—original draft, and writing—review and editing. **Jiwon Choi:** formal analysis, methodology, writing—original draft, and writing—review.

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Ethics Statement

The study was performed after the secondary data analysis was approved by the Institutional Review Board of Chung-Ang University (No. 1041078-20230831-HR-247) on September 14, 2023.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are openly available in the National Youth Policy Institute of Korea at <https://www.nypi.re.kr/archive/eps>.

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