


# Korean University Students' Problematic Alcohol use, Depression, and Non-Suicidal Self-Injury During COVID-19 Lockdown

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## Abstract

**Background:** This study investigated depression, problematic alcohol use, and non-suicidal self-injury (NSSI) of university students in Korea during COVID-19 lockdown and evaluated the moderating effect of problematic alcohol use in the relationship between depression and NSSI.

**Methods:** In this descriptive cross-sectional study, 234 Korean university students' data were used to analyze the relationship between depression and NSSI and the moderating effect of problematic alcohol use. To analyze the moderating effect, Hayes PROCESS macro (model 1) was used.

**Results:** Of the participants, 69.7% were problematic alcohol drinkers and 58.1% were binge drinkers. Depression and NSSI scores were 13.948 and 0.901, respectively. Of the participants, 33.3% had experienced NSSI for 6 months. Depression was positively associated with NSSI among university students. Furthermore, problematic alcohol use had a conditional moderating effect on the relationship between depression and NSSI.

**Conclusions:** Problematic alcohol use had conditional moderating effects on the relationship between depression and NSSI. Additionally, since the COVID-19 pandemic is ongoing, to prevent NSSI, health care professionals in the university should screen students with problematic alcohol use and depressive symptoms.

## Keywords

self-injurious behavior, depression, mental health, alcohol drinking, university students

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## Introduction

The World Health Organization (WHO) declared COVID-19 a global pandemic on 11 March 2020,<sup>1</sup> and the Korean government implemented infection prevention policies, including social distancing and stay-at-home orders.<sup>2</sup> Restaurants and public facilities were ordered to shut down, and Korean universities ceased offering face-to-face lectures. Such social lockdown measures were designed to prevent the spread of infection, but they also caused social isolation and other mental health issues such as depression and non-suicidal self-injury (NSSI),<sup>3–5</sup> the “act of directly and intentionally harming one’s own body with no intent to kill one’s self.”<sup>6</sup> University students transitioning into adulthood experience increased levels of stress and depression because of greater psychosocial conflict and the pressures of academic achievement, employment, and human relationships<sup>7</sup>; sudden changes, such as campus closures during the ongoing COVID-19 pandemic, may act as a new source of

stress that increases NSSI among students.<sup>8</sup> Some studies have attempted to identify depression and NSSI during COVID-19, but most targeted adolescents<sup>3</sup>; studies on university students are also needed.

Depression is a major risk factor for NSSI. Many studies have reported that negative affect, such as depression and anxiety, is a major influencing factor of NSSI.<sup>9</sup> University students who lack cognitive maturity and psychological stability tend to use negative methods such as problematic alcohol use to moderate negative emotions, including depression.<sup>7,10,11</sup>

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Problematic alcohol use refers to impulsive excessive or binge drinking with loss of self-control.<sup>12</sup> The COVID-19 pandemic has caused changes in lifestyle<sup>13</sup> and alcohol use, which has led to changes in the drinking habits of university students.<sup>14</sup>

Research has identified changes in the level of alcohol use among university students under the stress of COVID-19. Studies since the COVID-19 lockdown have reported that the average number of drinks consumed per week among Belgian university students decreased,<sup>15</sup> whereas the frequency and quantity of alcohol use increased in the US.<sup>16</sup> However, there have been no studies on the change in alcohol use behavior of Korean university students, who live within a permissive drinking culture. Korean society tends to explain drinking as a method for relieving stress or expressing personal freedom, and Korea's permissive drinking culture allows excessive alcohol use behavior to continue despite related problems.<sup>17</sup>

Problematic alcohol use is a risk factor or comorbidity of depression,<sup>18</sup> and college students with increased depressive symptoms are more likely to consume alcohol as a way of coping<sup>19</sup>; students who drink more for social motives may develop more alcohol-related mood problems.<sup>20</sup> Problematic alcohol use may have a reinforcing effect on the relationship between depression and NSSI. Considering the permissive drinking culture in Korea and the changing alcohol use behavior of university students since the COVID-19 lockdown, there is a need to investigate whether problematic alcohol use has a moderating effect on the relationship between depression and NSSI during this difficult time. This study investigated depression, problematic alcohol use, and NSSI among university students in Korea during the COVID-19 lockdown and evaluated the moderating effect of problematic alcohol use on the relationship between depression and NSSI.

## Materials and Methods

### Study Design and Participants

A cross-sectional design was used in this study, and participants were 234 university students from seven universities located in Seoul, Daegu, Busan, Gyeongbuk, and Chungcheong. The sample size was calculated using the G\*Power 3.1.9.2 program, to evaluate the effects of the regression analysis on NSSI. A minimum of 184 participants were required to facilitate a statistical power of 0.95 at a significance level of 0.05 and a median effect size of 0.15, having a conservative effect size with the number of predictors at 12. Considering a dropout rate of 20%, we recruited 235 participants; of which, 234 valid questionnaires were used for the final analysis.

### Measures

**Problematic Alcohol Use.** To measure problematic alcohol use, the Alcohol Use Disorder Identification Test (AUDIT)

developed by the WHO<sup>21</sup> was used. A total of 10 questionnaires covered three domains: hazardous alcohol use (items 1 to 3), dependence symptoms (items 4 to 6), and harmful alcohol use (items 7 to 10). Questions 1 through 8 were scored on a 5-point Likert scale from 0 to 4, and questions 9 and 10 were scored on a 3-point Likert scale of 0, 2, and 4 points, with a score ranging from 0 to 40. In this study, the Korean version of AUDIT (AUDIT-K), which was reported to have good reliability and validity, was used.<sup>22</sup> Problematic alcohol use was defined as risky or hazardous consumption or any alcohol use disorder. In this study, 10 points indicate risky drinking for men and 6 points for women.<sup>17</sup> At the time of development of AUDIT-K, Cronbach's  $\alpha$  was 0.960<sup>22</sup>; in this study Cronbach's  $\alpha$  was 0.826.

**Depression.** Depression was assessed using the 20 items developed by Radloff in 1977.<sup>23</sup> Each item was rated on a 4-point Likert scale (0 = *not at all*; 3 = *a lot*), the total scores ranging from 0 to 60. Higher scores indicate more depressive symptoms, and a cut-off score of 16 was used for the depression group.<sup>24</sup> The Korean version of the CES-D (K-CES-D), which was developed by Chon, Choi, and Yang in 2001 and has good validity<sup>24</sup>—was used in this study. The K-CES-D's Cronbach's  $\alpha$  was 0.911 at the time of development<sup>24</sup> and 0.882 in this study.

**Non-Suicidal Self-Injury.** Participants' NSSI history during the last 6 months was measured using the Korean version<sup>25</sup> of Sansone et al.'s<sup>26</sup> self-harm inventory (SHI). SHI has been used in previous studies regarding NSSI.<sup>27–29</sup> The Korean version of SHI (K-SHI) comprises 22 items, and each item is rated on a 2-point scale (0 = *no*; 1 = *yes*). Each item addresses various broadly defined forms of non-suicidal self-injurious behaviors (e.g., scratching, cutting, burning, overdose, and interfering with wound healing).<sup>27,30</sup> In addition, this scale includes some behaviors that are not generally included in the definition of NSSI (e.g., distanced from God as a punishment or tortured myself with self-defeating thoughts). However, considering that self-defeating or self-punitive thoughts manifest as methods of NSSI within the socio-cultural context of Korea,<sup>27</sup> 21 items of the K-SHI—excluding the item related to a suicide attempt—were used; higher scores indicate a greater degree of NSSI. Furthermore, the phrase “without intending kill yourself” was added to each item to help differentiate between suicidal behaviors and NSSI. To measure the frequency of NSSI, participants were asked to select all the NSSI methods that they attempted during the last 6 months; each participant's total score was the frequency of NSSI. Participants who answered “Yes” to any of the K-SHI questions (1 point or more) were classified into the NSSI group. The KR-20 of the K-SHI was 0.760 at the time of development<sup>25</sup> and 0.761 in this study.

**Covariates.** Covariates included age, sex, year (freshman, sophomore, junior, or senior), religion, smoking, residence

type, previous semester grades, satisfaction with university life, and parents' drinking and smoking status. Smoking was assessed with the question "Do you currently smoke?" and religion with "Do you follow a religion?" (*yes* or *no*). Residence type was assessed by the question, "What is your residence type?" (*family's house* or *other*, including dormitories and boarding houses). The previous semester's grades were measured using an open question that allowed students to record their grade point averages out of 4.5. Satisfaction with university life was assessed by asking, "Are you satisfied with your current university life?" and evaluated using a five-point Likert scale (1 = *very unsatisfied*, 2 = *unsatisfied*, 3 = *average*, 4 = *satisfied*, and 5 = *very satisfied*). Parents' drinking/smoking status was assessed by asking, "Do either of your parents drink alcohol/smoke currently?" (*yes* or *no*).

### Procedures

The study was conducted after obtaining approval from the DGU University's Institutional Review Board (DGU IRB 20200023). Due to the COVID-19 pandemic, from March 2020 to December 2020 the campuses of the seven universities that the participants attended were completely closed, and classes were conducted online. Therefore, data were collected via a self-reported online survey (Google Forms) between 14 August 2020, and 22 September 2020 rather than in-person. To ensure that different regions are represented, we recruited participants by posting online advertisements on each university's website. The advertisements included details regarding the study's purpose and procedure and provided hyperlinks for the questionnaires. Information regarding the voluntary nature of the research, withdrawal from the study, and confidentiality were also included. We designed the survey such that, after reading the information regarding the study, the participants were asked to click a button to provide their consent, following which, the questionnaires were displayed. Of the 235 university students who accessed the survey website, 234 completed the questionnaire.

### Data Analysis

Data were analyzed using SPSS/WIN 25.0 (IBM Corp.) and SPSS PROCESS macro, Version 3.4. General characteristics and main variables were analyzed using descriptive statistics. Correlations with the main variables were processed using Pearson's correlation coefficient. All main variables satisfied the assumption of normality (skewness: 0.859 to 2.515, kurtosis: 0.101 to 6.132).<sup>31</sup> The PROCESS macro for SPSS (model 1) was used to examine the association between depression and NSSI and the mediating effect of problematic alcohol use.<sup>32,33</sup> To examine the moderating effect of problematic alcohol use on depression and NSSI, the Johnson-Neyman and pick-a-point methods were used.

The pick-a-point method was used to plot conditional effects for low (mean-1 × SD), medium (mean), and high (mean + 1 SD) levels of problematic alcohol use. The significance of the conditional effect of problematic alcohol use was identified as  $p < 0.05$  when the confidence interval did not include zero.

## Results

### General Characteristics

Of the 234 participants, 163 (69.7%) were female and 176 (75.2%) reported that their parents currently drank alcohol. Of the participants, 163 students (69.7%) were classified as having problematic alcohol use (Table 1); of which, 42 (59.2%) were male and 121 (74.2%) were female. As shown in Figure 1, only seven university students did not drink alcohol during the survey period; in contrast, 136 (58.1%) participants drank 7 to 10 glasses in one sitting. About one-third of participants (78; 33.3%) were placed in the NSSI group (22 [31.0%] male, 56 [34.4%] female). The most common type of NSSI was "tortured myself with self-defeating thoughts," and 80% of them reported direct and intentional behaviors such as scratching, cutting, and hitting-self were also accompanied. Furthermore, the participants also reported "starved myself to hurt myself," "abused alcohol," "banged my head," and "hurt myself on purpose," in that order of prevalence.

### Descriptive Statistics and Correlation among the Main Variables

The mean scores for problematic alcohol use, depression, and NSSI were  $10.589 \pm 6.818$ ,  $13.948 \pm 10.369$ , and  $0.876 \pm 1.707$ , respectively (Table 2). NSSI was positively correlated with problematic alcohol use ( $r = 0.247$ ,  $p < 0.001$ ) and depression ( $r = 0.632$ ,  $p < 0.001$ ). In addition, depression was significantly correlated with problematic alcohol use ( $r = 0.237$ ,  $p < 0.001$ ).

### Impact of Depression on NSSI and Moderating Effect of Problematic Alcohol use

Depression had a significantly positive effect on NSSI ( $B = 0.102$ ,  $p < 0.001$ ) after adjusting for covariates (Table 3). Problematic alcohol use moderated the relationship between depression and NSSI ( $B = 0.003$ ,  $p = 0.004$ ). As shown in Figure 2, the positive association between depression and NSSI was significant at low (effect = 0.079,  $t = 6.298$ ,  $p < 0.001$ ), medium (effect = 0.102,  $t = 11.164$ ,  $p < 0.001$ ), and high (effect = 0.125,  $t = 11.088$ ,  $p < 0.001$ ) levels of problematic alcohol use. The slope in Figure 2 reflects the conditional moderating effects of depression on NSSI of different levels of problematic alcohol use. The

**Table 1.** General characteristics and AUDIT-K of the participants ( $n = 234$ ).

Variable	$n$ (%) or mean $\pm$ SD	Range
Demographic		
Age	22.91 $\pm$ 2.162	19–30
Sex		
Male	71 (30.3)	
Female	163(69.7)	
Year		
Freshman	30 (12.8)	
Sophomore	57 (24.4)	
Junior	69 (29.5)	
Senior	78 (33.3)	
Religion		
Yes	48 (20.5)	
No	186 (79.5)	
Current smoker		
Yes	43 (18.4)	
No	191 (81.6)	
Residence type		
Living with family	113 (48.3)	
Other	121 (51.7)	
Previous semester grades	3.78 $\pm$ 0.500	2.25–4.5
Satisfaction with university life	3.34 $\pm$ 0.845	1–5
Parents' drinking status		
Yes	176 (75.2)	
No	58 (24.8)	
Parents' smoking status		
Yes	101 (43.2)	
No	133 (56.8)	
AUDIT-K		
Hazardous alcohol use	6.44 $\pm$ 3.034	0–12
Dependence symptoms	1.72 $\pm$ 2.119	0–12
Harmful alcohol use	2.42 $\pm$ 2.998	0–15
Problematic alcohol use		
Male	42 (59.2)	
Female	121 (74.2)	
Depression group	83 (35.5)	
NSSI group	78 (33.3)	

AUDIT-K: Korean version of AUDIT; SD: standard deviation; NSSI: non-suicidal self-injury.

association between depression and NSSI was stronger in those with a high level of problematic alcohol use.

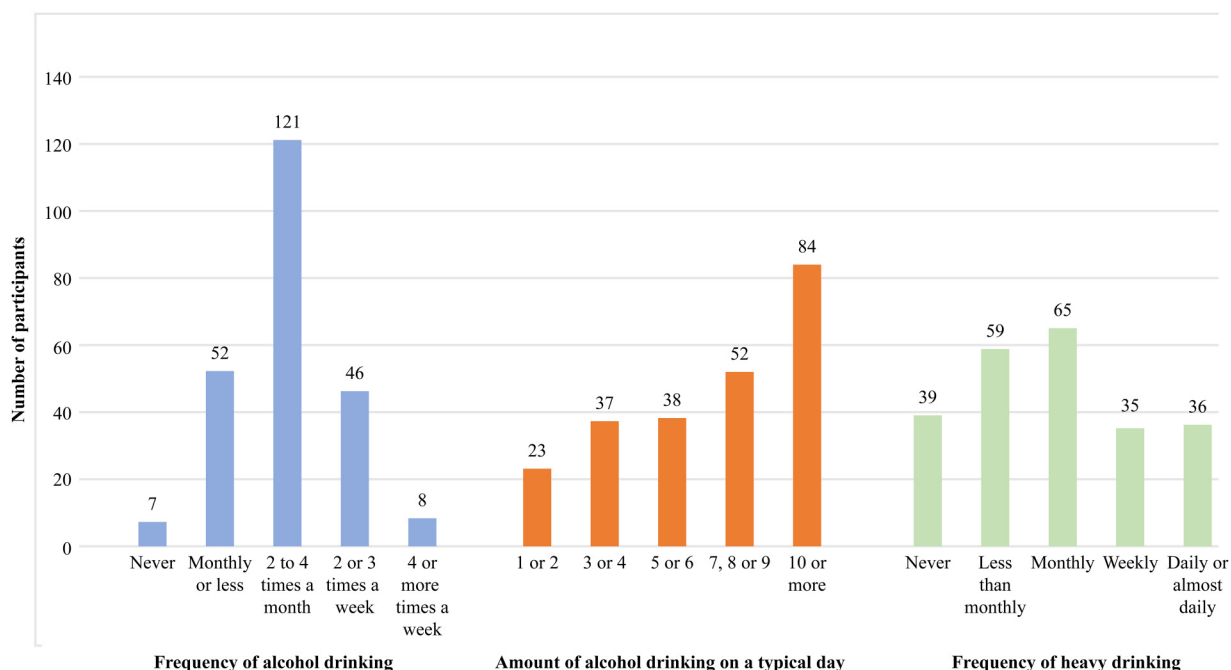
## Discussion

The findings in this study showed that more than one out of three Korean university students exhibited NSSI behavior during the COVID-19 lockdown. A study by Shin and Choi<sup>34</sup> conducted shortly after the COVID-19 pandemic was declared in March 2020 reported that 46.8% of Korean university students exhibited NSSI behavior. There is relatively less interest in NSSI among university students than among younger adolescents, and as a result, there are also few study results. A study which was conducted during the same period reported

that the prevalence of NSSI among Taiwanese adolescents—measured using a question (in the past year, have you ever engaged in the following behaviors to deliberately injure yourself but without suicidal intent?)—was 40.9%,<sup>3</sup> therefore, the prevalence of self-destructive behavior among university students cannot be considered as being significantly lower. However, university students, who are preparing for social and economic independence and employment, are a group whose mental health is most affected by the pandemic, along with women and children.<sup>35</sup> Moreover, considering that NSSI increased with younger age among adults during the COVID-19 period,<sup>36</sup> greater attention should be paid to NSSI among university students during the COVID-19 pandemic.

The mean AUDIT-K score of the participants in this study was 10.60 points, with 69.7% of the participants showing problematic alcohol use. In a 2019 study by Kim and Song that used the same tools and criteria, the mean score of Korean university students was 9.13 points,<sup>37</sup> ~1.6 times higher than the mean score of 6.93 points for foreign university students.<sup>38</sup> Previous studies reported that alcohol use habits are changing toward greater alcohol consumption<sup>38</sup> and that alcohol use disorder increased by 1.7 times during the COVID-19 pandemic.<sup>39</sup> Moreover, Korean university students also had higher mean AUDIT-K scores than foreign university students during other periods, not just during the COVID-19 pandemic.

There are 3 possible reasons for the high mean AUDIT-K score among Korean university students during the pandemic. First, such results could be linked to social isolation. A previous study reported that hazardous alcohol use increased with an increase in social isolation.<sup>40</sup> Korea maintained COVID-19 restrictions on social life from February 2020 to September 2020, when this study was conducted, causing social isolation. Another study reported that increased alcohol consumption among American college students was a way of dealing with stressful situations and was due to boredom caused by a decrease in social interaction.<sup>14</sup> Second, Korea's permissive culture toward alcohol and the country's lack of education on alcohol use could be considered. Korea takes a tolerant view of alcohol use as a method for relieving stress,<sup>17</sup> and university students are exposed to such culture without receiving proper education about alcohol use<sup>41</sup>; as a result, they tend to have hazardous alcohol habits, such as binge drinking. A lower perceived risk of harm due to a lack of education about alcohol use can be a factor that increases alcohol consumption.<sup>14</sup> Finally, parental alcohol use is a major influencing factor for alcohol use behavior among the youth.<sup>42</sup> In this study, at least one parent of 75.2% of the participants currently consumed alcohol, which could have influenced the participants' alcohol use. In this study, the frequency of drinking and binge drinking were investigated during the COVID-19 pandemic. To provide undergraduate students with education or interventions regarding better drinking habits, we recommend that future studies identify (e.g., through in-depth interviews)



**Figure 1.** Hazardous alcohol use (domain I) of the Korean version of AUDIT (AUDIT-K;  $n = 234$ ).

the cause, psychological or environmental factors, and their experiences of problematic alcohol use during the COVID-19 pandemic.

The mean depression score in this study was 13.948 points, with 35.5% of participants exhibiting depression, consistent with the results of previous studies that were conducted during the COVID-19 pandemic.<sup>43,44</sup> Moreover, depression was found to be a risk factor for NSSI, which was consistent with the results from a previous study reporting that depression was associated with self-harm and suicidality for several months after the start of the COVID-19 pandemic.<sup>45</sup> In addition, problematic alcohol use reinforced the relationship between depression and NSSI; when problematic alcohol use behavior increased in the depressed group, the level of NSSI also increased. University students suffered psychologically as they were overloaded with COVID-19-related information that indiscriminately flowed

through social network systems,<sup>46</sup> which had a negative influence on their mental health.<sup>4</sup> Furthermore, students with depression or anxiety showed an increase in problematic alcohol use, such as increased frequency of weekly alcohol use and hazardous drinking, in an attempt to escape from negative emotions or mental suffering.<sup>11</sup> However, people who currently drink alcohol face difficulties coping positively with the pandemic.<sup>38</sup> In other words, using alcohol, instead of using appropriate and positive coping strategies, to relieve the mental suffering caused by the pandemic can actually reinforce negative emotions and depression.

**Table 2.** Descriptive statistics and correlation among the main variables.

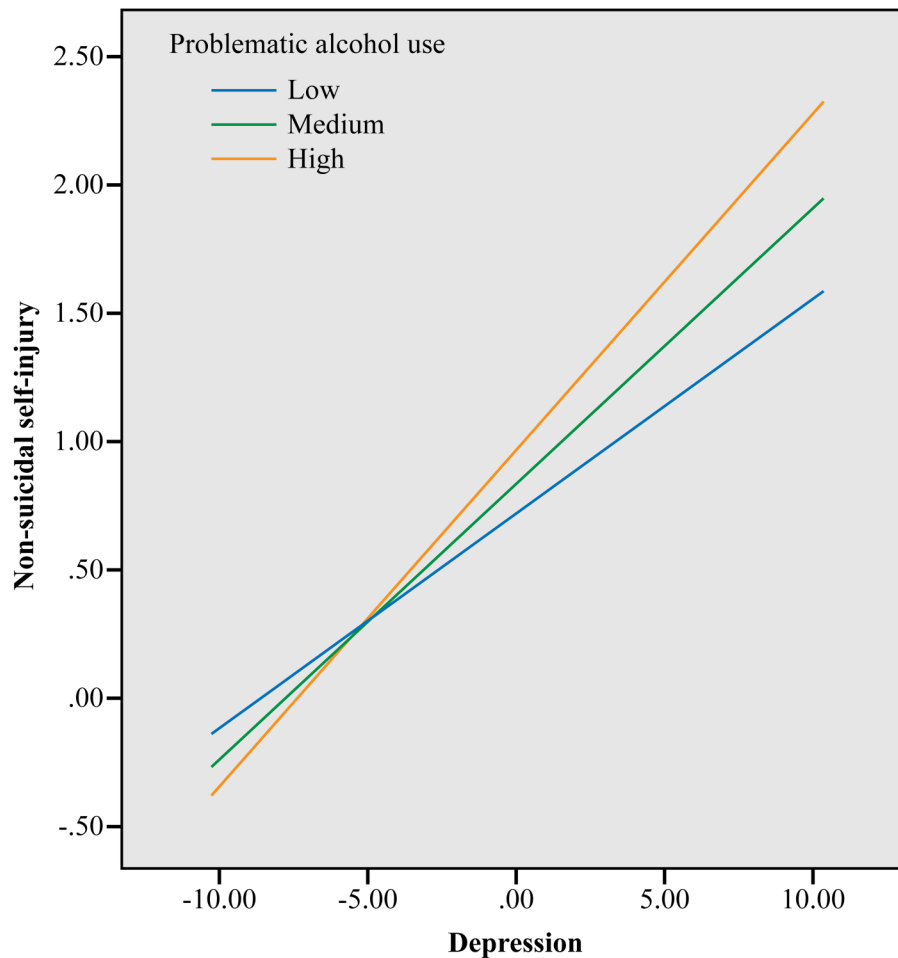
	Mean ± SD	Range	1	2	3
1. Problematic alcohol use	10.589 ± 6.818	0–37	1		
2. Depression	13.948 ± 10.369	0–50	0.237**	1	
3. NSSI	0.876 ± 1.707	0–8	0.247**	0.632**	1

SD: standard deviation; NSSI: non-suicidal self-injury. \*\* $p < 0.001$ .

**Table 3.** Impact of depression on NSSI and moderating effect of problematic alcohol use.

Variables	NSSI				
	B	SE	p	LLCI	ULCI
Constant	-2.060	1.627	0.206	-5.269	1.147
Depression	0.102	0.009	<0.001	0.084	0.120
Problematic alcohol use	0.020	0.014	0.163	-0.008	0.049
Depression × problematic alcohol use	0.003	0.001	0.004	0.001	0.005
F	13.796				
R <sup>2</sup>	0.670				
ΔR <sup>2</sup>	0.020				
				$p < 0.001$	
				$P = 0.004$	

Note: Values were controlled for covariates (all general characteristics). NSSI: non-suicidal self-injury; ΔR<sup>2</sup>: R<sup>2</sup> change due to interaction term; LLCI: low-level confidence interval; ULCI: upper-level confidence interval.



**Figure 2.** Moderating effect of problematic alcohol use on the relationship between depression and non-suicidal self-injury (NSSI).

Furthermore, such problematic alcohol use decreases anxiety about physical injury and lowers the aversion to NSSI,<sup>8</sup> ultimately increasing rates of NSSI.

This study had some limitations. First, in this study, considering the social-cultural context of South Korea, questionnaires for NSSI include both direct or intentional damage of the body and thoughts of self-defeat. Although 80% of the participants' physical damage-related behaviors were accompanied by self-defeating thoughts, caution must be exercised when interpreting this study's results, based on the general definition of NSSI. Second, participant data were collected online, and thus, detailed causes and severity of NSSI and depression could not be identified. Therefore, clinical interviews and more robust self-report measures should be used to more accurately identify the prevalence of NSSI and the severity of depression, NSSI, and other self-destructive behaviors. Third, the generalizability of this study's findings is limited since participants were recruited using the convenience sampling method. In particular, since multicultural communities are increasing in Korea, it is important to be sensitive to the psychosocial impact of trauma, chronic

stressors, isolation, and COVID-19 itself on them during the COVID-19 pandemic. Therefore, it is recommended that future studies identify their psychosocial changes, changes in problematic alcohol use, and NSSI during the COVID-19 pandemic. Fourth, alcohol use behavior during the COVID-19 pandemic was compared to results from previous studies that used the same tools; thus, caution should be taken when interpreting the results. For instance, this study found that more than half of Korean university students showed binge drinking patterns during the COVID-19 pandemic; however, previous studies did not present exact results on binge drinking, and as a result, there are limitations in comparison. Further, Jackson et al.<sup>14</sup> reported that drinking quantity and heavy drinking decreased among American college students during the same period. Therefore, longitudinal or qualitative studies are needed to identify the changes in alcohol use behavior among Korean university students during the COVID-19 pandemic from the perspective of Korea's unique drinking culture.

Despite these limitations, this study offers a useful examination of alcohol use during COVID-19 among university

students in Korea. The findings showed that at the same level of depression, an increase in the severity of problematic alcohol use resulted in increased levels of NSSI.


## Conclusion

This study suggests that depression during the COVID-19 pandemic is an influencing factor for NSSI among Korean university students and that problematic alcohol use behavior is a moderating variable. Accordingly, it is necessary to conduct continued and repeated screenings to identify university students with pandemic-related depression and problematic alcohol use and provide in-depth professional counseling to prevent NSSI. Additionally, it is necessary to connect such students to the community and be closely linked with community mental health organizations to allow these students to receive continued care and assistance. Furthermore, the inclusion of education related to proper alcohol use in regular curricula from early adolescence should be considered to help reduce and prevent problematic alcohol use among university students. Given that the COVID-19 pandemic is ongoing, these findings may have crucial mental health implications and provide evidence for the development of future intervention studies for university students.

## Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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