

# The effects of anxiety during COVID-19 on psychological exhaustion and social participation in college students

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**A** – Study Design, **B** – Data Collection, **C** – Statistical Analysis, **D** – Data Interpretation, **E** – Manuscript Preparation, **F** – Literature Search, **G** – Funds Collection

**Summary Background.** The continuous psychological decline caused by COVID-19 has become a serious social problem. Notably, a new word, “Corona Blue”, has been coined by combining “Corona” and “blue”, which symbolises depression, to describe the psychological difficulties people are facing.

**Objectives.** This study aimed to confirm the effect of anxiety experienced during the coronavirus (COVID-19) pandemic on the psychological decline and social participation levels of college students.

**Material and methods.** A questionnaire was provided to 130 university students aged 20–29 years. The questionnaire was prepared using the Coronavirus Anxiety Scale, Athens Insomnia Scale, Patient Health Questionnaire-9, Perceived Stress Scale and Maastricht Social Participation Profile to measure COVID-19 anxiety, sleep status, depression, stress and social participation levels. The survey was conducted online from June to July 2021 when the spread of COVID-19 in South Korea was continuous and social distancing was implemented as a government guideline.

**Results.** COVID-19 anxiety correlated with sleep, depression and stress. However, social participation levels were not correlated with COVID-19 anxiety. A comparison of the psychological exhaustion variables (sleep, depression and stress) between the potential risk group and the normal group confirmed a statistically significant difference for sleep, depression and stress; however, the difference in social participation variables was not statistically significant.

**Conclusions.** In addition, the public also needs to find ways to cope with psychological atrophy in preparation for a prolonged COVID-19 pandemic.

**Key words:** anxiety, students, COVID-19, psychological burnout, social participation.

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## Background

The impact of the coronavirus (COVID-19) pandemic has been prolonged. Consequently, the world has shrunk greatly socially and economically, and people are experiencing significant psychological difficulties. The World Health Organization (WHO) has described the current situation as a crisis that humanity has never experienced before, especially in terms of mental health. The continuous psychological decline caused by COVID-19 has become a serious social problem. Notably, a new word, “Corona Blue”, has been coined by combining “Corona” and “blue”, which symbolises depression, to describe the psychological difficulties people are facing [1].

Psychosocial problems caused by infectious diseases have been reported in recent studies. Infectious disease epidemics have caused psychological problems such as anxiety, fear, helplessness and post-traumatic stress symptoms. For example, severe acute respiratory syndrome (SARS), which occurred in 2002, caused depression, post-traumatic stress and anxiety in 30 to 40% of patients after discharge [2–4]. Likewise, rapid social changes caused by COVID-19 have negatively impacted mental health. Similarly, due to the high contagiousness of COVID-19, the public has experienced social isolation and disconnection following social distancing, postponement of school reopening, telecommuting and reduced leisure-sport activities, which can lead to psychological problems, such as stress, depression, insomnia, anxiety and loneliness [5, 6].

Since March 2020, universities have offered non-face-to-face classes and kept the number of people in gatherings small to prevent the spread of COVID-19 in South Korea. As a result, students are experiencing a stressful situation in which they have to adapt to drastic changes in university life. They are suffering from psychological distress due to excessive assignments, accumulation of fatigue from learning through screens and difficulties in understanding lecture content in an unfamiliar classroom environment [6, 7].

Lifestyle is a concept that distinguishes one member of the society from others. College students are physically and psychologically active with high life satisfaction. However, compared with others, the level of consciousness about changes in health-related behaviour is relatively low, and interest in preventing infectious diseases with preventive medicine is lacking [8–10]. When a negative experience or the psychological state of anxiety persists or developmental tasks are not successfully achieved, intrinsic problems, such as social withdrawal, anxiety and depression, as well as overt problems such as delinquency and aggressive characteristics, may occur. The social withdrawal of college students can adversely affect their interpersonal interactions, resulting in the maladjustment of students and hindering them from becoming well-adapted members of society [11]. In this context, this study investigated the effect of anxiety experienced during the COVID-19 pandemic on the levels of psychological exhaustion and social participation among college students. It intends to provide evidence of how to prevent this negative impact and improve the positive impact of anxiety on health.



## Material and methods

### Participants

This study was conducted through the deliberation of the institutional review board of Jeonju University, South Korea. A survey was conducted among male and female adults aged 20–29 years attending a domestic university to validate the effect of anxiety experienced during the COVID-19 pandemic on the levels of psychological exhaustion and social participation among college students. Adolescents under the age of 20, adults over the age of 30 and students who took leaves of absence or dropped out were excluded from this study. The survey was conducted online from June to July 2021 when the spread of COVID-19 in South Korea was continuous and social distancing was implemented as a government guideline.

### Instruments

The Coronavirus Anxiety Scale (CAS) was used to evaluate the levels of anxiety caused by COVID-19; the Athens Insomnia Scale (AIS) to evaluate sleep states; the South Korean version of the Patient Health Questionnaire (PHQ-9) and the South Korean version of the Perceived Stress Scale (K-PSS) to evaluate the levels of stress; and the Maastricht Social Participation Profile was used (MSPP) to evaluate the levels of social participation. The survey was conducted using a questionnaire containing 58 questions.

#### CAS (Coronavirus Anxiety Scale)

The CAS, developed by Lee (2020), was used to evaluate the COVID-19 anxiety levels of the participants. The CAS can identify levels of psychological distress, such as anxiety and depression, and COVID-19-related thoughts. Five questions from the survey were evaluated using this scale, and each item was evaluated on a Likert scale of 0 (not at all) to 4 (almost every day) based on experience over the two weeks preceding the survey. A high score of a specific item or a high total score indicates problematic symptoms and provides evidence that additional evaluation or treatment may be required [7].

#### AIS (Athens Insomnia Scale)

The AIS was used to measure the sleep quality of the participants. It included eight questions, and each item asked respondents to select the status of symptoms they might have experienced at least three times a week during the month preceding the survey. Each item was scored on a 4-point Likert scale ranging from 0 (no problem) to 3 (very serious problem). If the total score is less than 4 points, there is no concern about sleep disturbance; if the total score is between 4 and 5 points, insomnia is slightly present, and the sleep pattern needs improvement through consultation with a specialist or doctor. If the total score is 6 or more, insomnia is considered to be present, and active treatment through consultation with a doctor is recommended [4].

#### PHQ-9 (Patient Health Questionnaire-9)

The PHQ-9, a depression assessment tool translating the PHQ developed by Spitzer (1999), was used to measure the levels of depression in the participants. Participants could select their own depression score in the form of self-reports, which consists of nine questions. Items were scored on a 4-point scale based on participants' conditions in the past two weeks. The total score would be 1–4 points under normal conditions; 5–9 points under mild depression; 10–19 points under moderate depression; and 20 points or more under severe depression [12].

#### PSS (Perceived Stress Scale)

The PSS was used to measure the stress levels of the participants, and the K-PSS developed by Cohen (1983) was used in

this study. It evaluated the stress experienced during the month preceding the survey and included a total of ten questions evaluated on a 5-point scale. A score of 13 points or less was interpreted as the normal range, and a score between 14 and 18 points was interpreted as slight stress, but not serious stress. A score of 19 or higher was considered to indicate difficulties in daily life due to severe stress, requiring professional help [9].

#### MSPP (Maastricht Social Participation Profile)

The MSPP was used to measure the levels of social participation of the participants. As an evaluation tool assessing both formal social participation, such as appointment-related activities, and informal social participation, such as contact with friends, acquaintances and family, it included twenty-six questions. The higher the average score, the more diverse or more frequent the social participation. Thus, the relationship between the strength of college students' social networks and social participation was confirmed [13].

### Procedures

The purpose of the study, the content of the questionnaire and details related to personal information processing were fully explained before starting the online survey, and participants could start responding to the questionnaire only when they agreed to all the content. A total of 134 subjects agreed to participate in the study. An online Google questionnaire form was used for the survey. A total of 130 respondents were selected for the final analysis, excluding 4 who responded insincerely. Based on the survey results, the participants were divided into normal and potential risk groups regarding anxiety caused by COVID-19. Considering the content of the questionnaire, the criteria for classification were based on the CAS. If a problem was reported in even one of the five items, the participant was classified under a potential risk group and was analysed.

### Statistical analysis

This study analysed data using SPSS 26.0 to validate the effect of anxiety caused by COVID-19 on the levels of psychological exhaustion and social participation among college students. Descriptive statistics and independent *t*-Tests were used to examine general characteristics, and the Pearson correlation coefficient and simple linear regression analyses were used to evaluate the correlation and influence between each variable. The significance level was set at 0.05.

### Ethical approval

The Jeonju University institutional review board approved the protocol used in the study.

## Results

### Participants' characteristics

Table 1 shows the general characteristics, psychological decline and levels of social participation of the participants. A total of 130 participants participated in the study, with 29.2% of them being males and 70.8% being females. In terms of age, the highest proportion of the people surveyed were between 20 and 22 years of age (64 participants, 49.2%), followed by 23–25 years of age (53 participants, 40.8%) and 26 years of age or older (13 people, 10.0%). The level of psychological exhaustion of the participants was  $0.84 \pm 1.82$  points due to anxiety caused by the COVID-19 pandemic. Psychological exhaustion was measured by states of sleep, depression and stress in this study. Sleep was  $5.29 \pm 4.61$  points, depression was  $4.00 \pm 4.83$  points, and stress was  $12.45 \pm 7.61$  points. Overall, we confirmed the initial problem of psychological exhaustion. In the MSPP, the levels of so-

Characteristic		n	%
Gender	male	38	29.2
	female	92	70.8
Age	under 22yr	64	49.2
	over 23yr ~ under 25yr	53	40.8
	under 26yr	13	10.0
Variables		Score (M ± SD)	
CAS (M)		0.84 ± 1.82	
Psychological exhaustion (AIS, PHQ-9, PSS) depression stress	sleep	5.29 ± 4.61	
		4.00 ± 4.83	
		12.45 ± 7.61	
Social participation (MSPP)	acquaintance	3.14 ± 0.46	
	close friend	2.50 ± 0.60	
	family member	2.46 ± 0.77	

AIS – Athens Insomnia Scale; CAS – Coronavirus Anxiety Scale; MSPP – Maastricht Social Participation Profile; PHQ-9 – Patient Health Questionnaire-9; PSS – Perceived Stress Scale.

Variable	Psychological exhaustion			Social participation		
	Sleep	Depression	Stress	Acquaintance	Close friend	Family member
Anxiety	0.369**	0.447**	0.270**	-0.129	0.033	0.067

\*\*  $p < 0.01$ ; \*  $p < 0.05$ .

Variables	No anxiety group (n = 87)	Potential risk group (n = 43)	t	p
	M ± SD	M ± SD		
<b>Psychological exhaustion</b>				
Sleep	4.26 ± 3.57	7.37 ± 5.72	-3.265	0.002**
Depression	2.60 ± 3.39	6.84 ± 5.97	-4.323	0.000**
Stress	11.11 ± 7.04	15.16 ± 8.08	-2.934	0.004**
<b>Social participation</b>				
Acquaintance	3.16 ± 0.46	3.09 ± 0.45	0.781	0.437
Close friend	2.50 ± 0.63	2.49 ± 0.55	0.155	0.877
Family member	2.46 ± 0.80	2.47 ± 0.71	-0.007	0.994

\*\*  $p < 0.01$ ; \*  $p < 0.05$ .

cial participation were evaluated by dividing them into appointments with acquaintances, close friends and family. Promises with acquaintances totalled  $3.14 \pm 0.46$  points, meetings with close friends totalled  $2.50 \pm 0.60$  points, and meetings with family members totalled  $2.46 \pm 0.77$  points (Table 1).

### Correlation between COVID-19 anxiety and variables

COVID-19 anxiety correlated with sleep state ( $r = 0.369$ ,  $p < 0.01$ ), depression ( $r = 0.447$ ,  $p < 0.01$ ) and stress ( $r = 0.270$ ,  $p < 0.01$ ). However, social participation level variables, such as appointments with acquaintances ( $r = -0.129$ ,  $p > 0.05$ ), close friends ( $r = 0.033$ ,  $p > 0.05$ ) and meeting with family members ( $r = 0.067$ ,  $p > 0.05$ ), were not correlated with COVID-19 anxiety (Table 2).

### Impact of COVID-19 anxiety on psychological exhaustion and social participation

Comparing the sleep states of the potential risk and normal groups, a statistically significant difference was confirmed ( $p < 0.05$ ), and anxiety caused by COVID-19 also had a significant positive (+) effect on sleep ( $\beta = 0.369$ ,  $p < 0.001$ ). The regres-

sion model was statistically significant ( $F = 20.23$ ,  $p < 0.001$ ), and the explanatory power of the regression model was 13.6% ( $R_2 = 0.136$ ). The Durbin-Watson statistic was 2.160, a value close to 2, confirming that there was no problem with the assumption of independence of the residuals.

A comparison of the depressive states between the potential risk and normal groups confirmed a statistically significant difference ( $p < 0.05$ ). In addition, a simple regression analysis revealed that anxiety caused by COVID-19 had a significant positive effect on depression ( $\beta = 0.447$ ,  $p < 0.001$ ). The regression model was statistically significant ( $F = 31.99$ ,  $p < 0.001$ ), with an explanatory power of 20.0% ( $R_2 = 0.200$ ). The Durbin-Watson statistic was 2.123, which was close to 2, confirming that there was no problem with the assumption of independence of the residuals.

A comparison of the stress status between the potential risk and normal groups confirmed a statistically significant difference ( $p < 0.05$ ). In addition, a simple regression analysis revealed that anxiety caused by COVID-19 had a significant positive effect on stress status ( $\beta = 0.270$ ,  $p = 0.002$ ). The regression model was statistically significant ( $F = 10.09$ ,  $p = 0.002$ ), and the explanatory power of the regression model was 7.3% ( $R_2 = 0.073$ ). Meanwhile, the Durbin-Watson statistic was 1.999, a value close to 2, confirming that there is no problem with the assumption of independence of the residuals.

**Table 4. Regression analysis for psychological exhaustion and social participation level in COVID-19 anxiety ( $n = 130$ )**

	Beta	<i>t</i>	sig.	95% Confidence Interval for B	
				Lower	Upper
<b>Psychological exhaustion</b>					
Sleep	0.369	4.497	0.000**	0.523	1.345
Depression	0.447	5.656	0.000**	0.769	1.596
Stress	0.270	3.176	0.002**	0.425	1.830
<b>Social participation</b>					
Acquaintance	-0.129	-1.472	0.144	-0.076	0.011
Close friend	0.033	0.375	0.708	-0.047	0.069
Family member	0.067	0.761	0.448	-0.045	0.102

\*\*  $p < 0.01$ ; \*  $p < 0.05$ .

A comparison of social participation levels between the potential risk and normal groups confirmed that social participation levels with acquaintances, close friends and family were not statistically significantly different ( $p > 0.05$ ). Additionally, the results of the simple regression analysis did not confirm a linear relationship between the independent and dependent variables. (Commitment activity:  $F = 2.17$ ,  $p = 144/\beta = -0.129$ ,  $p = 0.144$ , contact with friends and acquaintances:  $F = 0.141$ ,  $p = 708/\beta = 0.033$ ,  $p = 0.708$ , family contact with:  $F = 0.579$ ,  $p = 448/\beta = 0.067$ ,  $p = 0.448$ ) (Table 3).

## Discussion

This study investigated the effects of COVID-19 anxiety on psychological exhaustion and social participation levels among college students. College students may experience psychological problems, such as depression, insomnia, stress and limited social participation due to COVID-19 anxiety. For example, concerns and fears that family members with whom they have a close relationship may be infected and restrictions on private gatherings due to prolongation of the COVID-19 pandemic may cause increased psychological exhaustion. The stress caused by social control, such as restrictions on the numbers of people in social participation, can have a negative psychological effect on students [14].

First, it was confirmed that COVID-19 anxiety had a negative effect on the psychological exhaustion of college students. This has already been confirmed in several studies. However, compared to this study, the symptoms of psychological exhaustion were not severe in the others referred to; here, the group with potential risk showed clear differences in sleep, depression and stress compared with the group without risk. The studied symptoms should be sensitively observed, and the presence of experts is necessary for early intervention and improvement in the current situation [15]. Several studies have described insomnia as a risk factor for depression, and some large-scale studies have warned that sleep disorders can greatly increase the risk of depressive symptoms [16–18]. According to studies on sleep disorders, sleep problems appear before or simultaneously with depressive symptoms. In other words, sleep disorders and depressive symptoms can be reciprocal causes of each other [19]. In this study, we confirmed that stress had a relatively small effect; however, we need to compare these results with previous studies to understand them better. One of the factors that should be considered is the stress avoidance-focused strategy, which is one of the early stress defence strategies of college students. In the case of college students with relatively weak control, frequently employed avoidance-focused strategies are increased Internet usage and gaming, which are behavioural problems that can affect the sleep disorders described above. These issues can lead to a decrease in students' quality of life [1, 20].

Second, COVID-19 anxiety did not significantly affect social participation. Appointments with acquaintances and meetings

with close friends and family were analysed in this study. Due to the current social situation, in-person interaction with people one shares meaningful relationships with is lacking, which leads to formation of monotony in social relationship and a sense of emotional and social isolation, such as falling into an isolated emotional state. In this study, although no statistically significant difference was confirmed, meeting with an acquaintance showed a difference in the levels of participation compared to other social relationships. This can be interpreted as isolation of the social network and a phenomenon that hinders the development of an expanded social network. In the past, isolation was observed to be centring on some socially underprivileged groups. However, the COVID-19 pandemic has caused major psychological problems in people of all strata of the society, and so, the range of people that can experience isolation has become wider.

Recently, social isolation has been described as a lack of social connections, contact or interaction with meaningful group members [21]. These changes mean that social isolation is not simply about being isolated from family or community but is caused by damage to social relationships, such as issues with attachment, social integration and values. Another study indicated social isolation as a feeling of isolation that occurs when separated from a reference group [22] and explained that it includes the emotional dimension of feeling subjectively isolated [23]. Previous studies have pointed out that social isolation is an underestimated public health risk [24, 25], and discussions on the negative effects of social isolation are insufficient. There are also concerns that the experience of prolonged isolation due to COVID-19 could lead to a vicious cycle of further isolation from society [26, 27]. The vicious cycle of social isolation has been discussed in several studies. As social isolation is caused by insufficient interaction with members of the reference group, individuals who experience social isolation can be placed in an environment in which they have to deal with problems that arise within the organisation on their own. Social isolation is also indicated to eventually lead to extreme inability to form social relationships [28].

This study is significant in that it provided basic data to examine the levels of sleep, depression, stress and social participation caused by COVID-19 anxiety among college students. In addition, this study investigated various kinds of psychological problems, and it is meaningful in that more specific participants were selected by excluding students on leaves of absence among college student subjects [29]. In particular, this study confirmed that 13.6% of the participants experienced insomnia, 20% experienced depression, and 7.3% experienced stress. Following the COVID-19 outbreak, social distancing implemented in South Korea (therefore, college students' COVID-19-related anxiety) caused psychological exhaustion, which may significantly influence their social participation. The impact of the special COVID-19 situation may vary from person to person, but many people are experiencing "Corona Blue" and fear of infec-



tion as a result of major changes in their daily lives. Therefore, further studies should recruit participants from other social groups and research should be conducted targeting them. For example, children who are active and have close contact with their parents, young adults who go to work and older people who have fewer opportunities to participate in society and have fewer social resources need to be studied. In addition, further research should be conducted on people who have had psychoanalytic problems, such as depression, sleep disorders or anxiety, as well as people with disabilities (who have relatively less social participation than people without), international students and foreign workers [24, 25].

### Limitations of the study

This study has some limitations. First, it was conducted using an online questionnaire; therefore, the content may not have been clearly communicated to the participants. Second, this study conducted a survey targeting university students, and the proportion of females (70.8%) in the survey was 2.4 times

higher than that of males (29.2%). As per previous studies, women are more likely to experience anxiety and depression than men during the COVID-19 pandemic; this must be carefully considered while generalising the results of depression and anxiety. Third, since the survey was conducted one year after the outbreak of COVID-19, participants may have adapted to this environment. At the time of the survey, the prolonged COVID-19 pandemic was confirmed to have reduced the awareness of infection and increased the frequencies of outdoor activities. Therefore, social changes need to be considered while interpreting the results of this study.

### Conclusions

This study indicates that the government must find and implement countermeasures against the psychological issues that people may experience. In addition, the public also needs to find ways to cope with psychological atrophy in preparation for a prolonged COVID-19 pandemic.

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