

Factors influencing stigma among college students with COVID-19 in South Korea: a descriptive study

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Purpose: This study is descriptive research aiming to identify factors influencing the stigma experienced by college students with coronavirus disease 2019 (COVID-19), focusing on COVID-19 pandemic stress, depression, and fear of negative evaluation as the main variables. **Methods:** An online survey was administered to 175 college students who had been diagnosed with COVID-19 from January to May 2022 and were enrolled in universities in Seoul, Cheongju, and Daegu, South Korea. The survey collected data on pandemic stress, depression, fear of negative evaluation, and stigma. The data were analyzed using the t-test, ANOVA, the Scheffé test, Pearson's correlation coefficients, and stepwise multiple regression in SPSS/WIN 26.0. **Results:** We analyzed differences in stigma scores based on general characteristics of the college students and found significant differences in stigma scores by age, major satisfaction, interpersonal satisfaction, date of COVID-19 confirmation, treatment modality, and recent subjective health condition. Factors influencing stigmatization were identified as COVID-19 pandemic stress, depression, date of COVID-19 confirmation, treatment modality, recent subjective health condition, and major satisfaction, with an overall explanatory power of 37.6%. **Conclusion:** This study is significant as it identifies emotional changes across various aspects of pandemic stress, depression, fear of negative evaluation, and stigma among college students who have been diagnosed with COVID-19. The findings of this study suggest the development of programs to reduce psychological distress and enhance mental health management skills among these students.

Keywords: COVID-19; Stress, psychological; Depression; Social stigma; Students

INTRODUCTION

Coronavirus disease 2019 (COVID-19), first identified in December 2019, was declared a "pandemic" in March 2020. As of a relatively recent report, there have been more than 682 million confirmed cases worldwide [1]. In South Korea, the first case of COVID-19 was reported on January 20, 2020. By January 2022, approximately two years later, the cumulative number of cases had surpassed 750,000. As of August

2023, this number had escalated to more than 34 million, affecting a significant portion of the population [2]. The pandemic has compelled people globally to adapt to numerous changes in their daily routines has been linked to adverse mental health outcomes, including increased levels of stress, depression, and anxiety compared to pre-pandemic times [3].

Stigmatization not only causes public anger, fear, and disgust towards those infected and the diseases themselves, potentially leading to social division and impeding control poli-

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cies [4], but it is also associated with prolonged stigma. This includes significant mental stress and social disadvantage for the infected individuals and their families even after recovery from the infection [5].

Transitioning into adulthood marks a significant phase between adolescence and full adulthood. During this time, individuals typically experience a noticeable expansion in the scope of their life activities. It is a crucial period for accomplishing developmental tasks such as forming a sense of identity, exploring future possibilities, and beginning to enter the workforce [6]. However, the pandemic has imposed restrictions on most social activities, leading to reports of heightened stress, anxiety, and depression among various age group, including college students [7].

COVID-19 pandemic stress encompasses the stress individuals face due to the ongoing COVID-19 pandemic situation [8]. In this study, we specifically measured COVID-19 pandemic stress, as opposed to general stress, to pinpoint the stress experienced by individuals infected with COVID-19. A report indicating that 50% of patients hospitalized with COVID-19 in South Korea had depression underscored the prevalence of mental health issues during this pandemic [9].

Fear of negative evaluation refers to the fear of being judged negatively by others. This fear frequently co-occurs with depression in people with COVID-19 [10].

The ongoing COVID-19 pandemic places people at a heightened risk of stigmatization, which includes intense anxiety and fear of contracting the virus, as well as sensitivity to judgment from others if diagnosed [11]. Moreover, depression during the COVID-19 pandemic has been linked to stigmatization [12]. Consequently, the fear of social stigmatization not only increases anxiety but also adversely affects quality of life, highlighting the importance of identifying and addressing stigma [13]. During the peak of the COVID-19 pandemic from 2020 to 2021, the fear associated with COVID-19 stigma was found to be more intense than that associated with a COVID-19 diagnosis itself [14]. This study focused on the impact of COVID-19 stigma among college students who tested positive for the virus in 2022, a time when social distancing measures were officially lifted, yet COVID-19 infections continued. Although there is extensive research on social stigma related to COVID-19 [15,16], there is a lack of studies on individuals who have actually received a COVID-19 diagnosis. Therefore, it is important to investigate the stigmatizing factors associated with COVID-19 diagnosis within the Korean cultural context.

Therefore, this study was conducted to examine the factors contributing to stigma among college students with COVID-19, with the goal of providing foundational data to assist college students in better adapting. To achieve this, the following objectives were formulated: (1) examining differences in stigma according to the general characteristics of college students; (2) identifying the levels of COVID-19 pandemic stress, depression, fear of negative evaluation, and stigma in college students; (3) calculating the correlations among major variables; and (4) determining the factors influencing stigma in college students.

METHODS

Ethical statements: This study was approved by the Institutional Review Board (IRB) of Seoul Women's College of Nursing (No SWCN-202202-HR-001-02). Informed consent was obtained from all participants.

1. Study Design

This study employed a descriptive survey design to explore the relationship between COVID-19 pandemic stress, depression, fear of negative evaluation, and stigma among college students diagnosed with COVID-19. It also is aimed to identify factors that influence stigma. The reporting of this study was based on the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guidelines [17].

2. Participants

The study population included 175 college students diagnosed with COVID-19 from January to May in 2022, from three universities in Seoul, Chungcheongbuk province, and Gyeongsangbuk province. Students diagnosed before 2022 were excluded from data collection, as the level of stigmatization may have differed across the stage of the COVID-19 outbreak.

The sample size for this study was determined using the G*power 3.1 program. With a medium effect size of .15, a significance level of .05, a power of .95 and nine predictors in a multiple linear regression analysis, it was determined that at least 166 participants would be needed.

3. Research Instruments

1) COVID-19 pandemic stress

The Korean Version of the COVID-19 Pandemic Stress Questionnaire for College Students (K-CPSQ), developed by Jeong and Yang [8], was utilized to evaluate pandemic-related stress among college students. This tool comprises 13 questions categorized into four groups: three questions address disruptions to daily life, four pertain to interpersonal relationships, three relate to economic factors, and three evaluate task performance. Responses are scored on a 6-point scale, where 5 indicates "very severe," 1 denotes "not at all severe," and 0 means "not experienced." Higher scores reflect greater levels of pandemic stress. In the original study by Jeong and Yang [8], the Cronbach's alpha was .84, a reliability measure that was replicated in this study with the same alpha value of .84.

2) Depression

The Korean version of the Center for Epidemiologic Studies Depression Scale (CES-D), which was adapted from Cho and Kim [18]. This instrument is a 20-item, 4-point scale where 3 indicates "most of the time," 2 signifies "often," 1 represents "sometimes," and 0 means "extremely rarely." Higher scores on this scale indicate more severe depression. Cronbach's alpha in the study by Cho and Kim [18] was .91 and in this study, it was .93.

3) Fear of negative evaluation

We utilized a shortened version of Leary's scale [19] that measures fear of negative evaluation by others, and which Lee and Choi [20] adapted into Korean. This scale comprises 12 items, such as "I am worried that people will notice my flaws," each rated on a 5-point Likert scale. Higher scores indicate a greater fear of negative evaluation. In the study by Lee and Choi [20], the Cronbach's alpha for college students was .90, while in our study, it was .92.

4) Stigma

To assess the degree of stigma perception, we utilized The Explanatory Model Interview Catalogue (EMIC), originally developed by Weiss [21] and subsequently adapted by Al-Zamel et al. [22] for COVID-19 patients. The stigma perception scale was translated and modified by the researchers to align with the Korean context. A bilingual professor of psychiatric nursing conducted the forward translation, while a

certified English translator, a native English speaker, performed the backward translation. The final Korean version of the EMIC was reviewed by all coauthors to ensure face and content validity. It was approved after determining that there were no significant differences between the forward- and backward-translated versions of the EMIC and the original scale. The research instrument is a 12-item, 4-point scale ranging from "yes" (3) to "not at all" (0), with higher scores indicating greater levels of stigma perception. In the study by Al-Zamel et al. [22], Cronbach's alpha was .79 and it was .81 in this study.

4. Data Collection

This study received approval from the Institutional Review Board of "S" University. Data collection occurred from May to July 2022 through a non-face-to-face mobile questionnaire survey using Google Forms. To safeguard personal information, we did not collect items containing personally identifiable information separately, instead, we assigned serial numbers to each questionnaire to maintain confidentiality. We advertised the recruitment of research participants on a social media platform accessed by all college students. The advertisement included a link to the Google Form for the online consent form and information sheet. Completing the questionnaire took approximately 15 minutes. As a token of appreciation for their participation, respondents who provided their personal contact information received mobile drink coupons. Once the coupons were issued, all personal information was promptly destroyed.

5. Data Analysis

Data collected in the study were analyzed using the IBM SPSS Statistics 26.0 program (IBM Corp). The general characteristics of the participants were analyzed using frequency/percentage and mean/standard deviation (SD). We assessed differences in stigma based on general characteristics using the independent t-test and one-way analysis of variance, with Scheffé test employed for post hoc analysis. The correlations between COVID-19 pandemic stress, depression, fear of negative evaluation, and stigma were calculated using Pearson's correlation coefficients. Additionally, stepwise multiple regression analysis was conducted to identify the factors influencing the participants' stigma.

RESULTS

1. Participants' General Characteristics

The average age of the study participants was 21.80 ± 2.57 years. The group comprised 85.1% females and 14.9% males, with seniors making up the largest subgroup at 34.3%, followed by juniors at 24.0%, freshmen at 21.1%, and sophomores at 20.6%. A majority of the students, 79.4% were enrolled in health-related major, while 20.6% pursued non-health-related majors. Geographically, 44.6% of participants resided in Gyeongsang province, 36.0% in Seoul, and 19.4% in Chungcheong province. Regarding living arrangements, 56.6% lived with their family, 24.6% lived alone, and 18.9% lived with friends. In terms of perceived economic status, 72.6% identified as "middle class," 14.3% as "poor," and 13.1% as "rich." Religiously, 73.7% of respondents had no affiliation, followed by Christians at 12.6%, Catholics at 10.9%, and Buddhists at 2.9%. Satisfaction level varied across different aspects of university life: 66.9% of students were satisfied with their major, 28.0% were neutral, and 5.1% were unsatisfied. Satisfaction with academic achievement showed 45.7% neutral, 39.4% satisfied, and 14.9% unsatisfied. Satisfaction with university life overall was reported as 53.7% satisfied, 34.9% neutral, and 11.4% unsatisfied. In terms of interpersonal relationships, 75.4% were satisfied, 18.9% neutral, and 5.7% unsatisfied. The majority (82.3%) of study participants were diagnosed with COVID-19 between January and March 2022, whereas 17.7% were diagnosed between April and May 2022. Treatment predominantly occurred at home (97.1%), with living treatment centers accounting for 1.7% and hospitalization for 1.1%. The severity of COVID-19 symptoms was classified as moderate in 49.1% of cases, mild in 30.9%, and severe in 20.0%. Before contacting COVID-19, 67.4% of participants considered themselves "healthy," 28.0% "fair," and 4.6% "unhealthy." Post-infection, these perceptions changed to 44.0% feeling "healthy," 39.4% "fair," and 16.6% "unhealthy" (Table 1).

Complications were reported by 65.1% of the cases, with the most common being cough (20.0%), sputum (7.6%), fatigue (6.4%), shortness of breath (6.0%), sore throat (4.8%), decreased or loss of smell (3.6%), weakness (2.8%), chest pain (2.4%), decreased or loss of taste (2.4%), and runny nose (2.0%) (Table 2).

2. Differences in Stigma by General Characteristics

The degree of stigmatization among the study participants varied significantly based on several characteristics, including age ($F = 3.84, p = .023$), major satisfaction ($F = 3.85, p = .023$), interpersonal satisfaction ($F = 5.03, p = .008$), date of COVID-19 confirmation ($F = 3.16, p = .002$), COVID-19 treatment modality ($F = 3.46, p = .034$), and recent subjective health status ($F = 9.99, p < .001$) (Table 1). Post-tests revealed that participants aged 25 and older experienced more stigmatization compared to those aged 19 to 21 years. Regarding satisfaction, individuals who were "unsatisfied" reported higher stigma levels than the those who were "neutral" or "satisfied" in terms of major satisfaction and higher than those who reported being "satisfied" interpersonally. Stigma scores were also higher for participants who were hospitalized than in those in living treatment centers or undergoing home treatment. Similarly, participants who rated their health as "fair" or "unhealthy" had higher stigma than who considered themselves "healthy" (Table 1).

3. COVID-19 Pandemic Stress, Depression, Fear of Negative Evaluation, and Stigma Levels

The participants' mean scores was 1.81 ± 0.89 out of 5 for COVID-19 pandemic stress, 1.16 ± 0.36 out of 3 for depression, 3.21 ± 0.82 out of 5 fear of negative evaluation, and 0.63 ± 0.51 out of 3 for mean stigma (Table 3).

4. Correlations among COVID-19 Pandemic Stress, Depression, Fear of Negative Evaluation, and Stigma

Stigma showed significant positive correlations with the COVID-19 pandemic stress ($r = .50, p < .001$) and depression ($r = .41, p < .001$). COVID-19 pandemic stress showed a significant positive correlation with the depression ($r = .32, p < .001$), and fear of negative evaluation ($r = .17, p = .023$). Depression exhibited a significant positive correlation with fear of negative evaluation ($r = .35, p < .001$) (Table 4).

5. Determinants of Stigma

Factors affecting stigma among college students were analyzed using stepwise multiple regression analysis. Variables that influenced stigma scores, including participants' general characteristics, COVID-19 pandemic stress, and depression,

Table 1. General Characteristics of the Participants Related to Stigma (N=175)

Variables	Categories	n (%)	M ± SD	t/F (p)
				Scheffé
Age (year)	19–21 ^a	93 (53.1)	0.56±0.46	3.84 (.023) a < c
	22–24 ^b	64 (36.6)	0.67±0.49	
	≤25 ^c	18 (10.3)	0.91±0.73	
	Total		21.80±2.57	
Sex	Female	149 (85.1)	0.63±0.50	-0.27 (.788)
	Male	26 (14.9)	0.66±0.58	
Grade	Freshman	37 (21.1)	0.57±0.52	0.61 (.610)
	Sophomore	36 (20.6)	0.63±0.50	
	Junior	42 (24.0)	0.60±0.44	
	Senior	60 (34.3)	0.70±0.57	
Major	Healthcare	139 (79.4)	0.62±0.49	-0.79 (.429)
	Non healthcare	36 (20.6)	0.69±0.60	
Residential area	Seoul	63 (36.0)	0.70±0.59	2.71 (.070)
	Chungcheong province	34 (19.4)	0.45±0.36	
	Gyeongsang province	78 (44.6)	0.66±0.49	
Residential form	Staying with family	99 (56.6)	0.66±0.55	0.54 (.586)
	Living alone	43 (24.6)	0.62±0.50	
	Staying with a friend	33 (18.9)	0.56±0.42	
Economic state	Rich	23 (13.1)	0.76±0.62	1.18 (.311)
	Meddle	127 (72.6)	0.60±0.47	
	Poor	25 (14.3)	0.70±0.60	
Religion	No affiliation	129 (73.7)	0.60±0.47	1.63 (.185)
	Catholic	19 (10.9)	0.85±0.70	
	Christian	22 (12.6)	0.62±0.49	
	Buddhist	5 (2.9)	0.85±0.69	
Satisfaction with major	Unsatisfied ^a	9 ^a (5.1)	1.07±0.74	3.85 (.023) a > b,c
	Neutral ^b	49 ^b (28.0)	0.57±0.51	
	Satisfied ^c	117 ^c (66.9)	0.63±0.48	
Satisfaction with academic achievement	Unsatisfied	26 (14.9)	0.69±0.47	0.22 (.800)
	Neutral	80 (45.7)	0.64±0.56	
	Satisfied	69 (39.4)	0.61±0.47	
Satisfaction with university life	Unsatisfied	20 (11.4)	0.76±0.58	1.50 (.226)
	Neutral	61 (34.9)	0.68±0.55	
	Satisfied	94 (53.7)	0.58±0.47	
Interpersonal satisfaction	Unsatisfied ^a	10 ^a (5.7)	1.04±0.34	5.03 (.008) a > c
	Neutral ^b	33 ^b (18.9)	0.75±0.57	
	Satisfied ^c	132 ^c (75.4)	0.57±0.49	
Date of COVID-19 confirmed	January to March 2022	144 (82.3)	0.69±0.53	3.16 (.002)
	April to May 2022	31 (17.7)	0.38±0.31	
Treatment modality	Hospitalization ^a	2 (1.1)	1.57±0.33	3.46 (.034) a > b,c
	Living treatment center ^b	3 (1.7)	0.56±0.62	
	Home treatment ^c	170 (97.1)	0.62±0.51	
Severity of COVID-19 symptoms	Mild	54 (30.9)	0.65±0.58	0.34 (.714)
	Moderate	86 (49.1)	0.60±0.47	
	Severe	35 (20.0)	0.68±0.51	
Presence of complications	Yes	114 (65.1)	0.66±0.55	0.97 (.334)
	No	61 (34.9)	0.58±0.45	
Pre-COVID-19 Health condition	Unhealthy	8 (4.6)	0.63±0.59	2.52 (.084)
	Fair	49 (28.0)	0.77±0.61	
	Healthy	118 (67.4)	0.58±0.45	
Recent subjective health condition	Unhealthy ^a	29 (16.6)	0.88±0.63	9.99 (<.001) a,b > c
	Fair ^b	69 (39.4)	0.73±0.54	
	Healthy ^c	77 (44.0)	0.46±0.37	

COVID-19, coronavirus disease 2019; M, mean; SD, standard deviation.

Table 2. Types of Post-COVID Conditions (N=175)^{a)}

Categories	n (%)	Categories	n (%)	Categories	n (%)
Cough	50 (20.0)	Menstrual irregularity	4 (1.6)	Palpitations	1 (0.4)
Sputum	19 (7.6)	Headache	4 (1.6)	Ear pain	1 (0.4)
Fatigue	16 (6.4)	Shivering/ chills	3 (1.2)	Feeling dazed	1 (0.4)
Shortness of breath	15 (6.0)	Rhinitis/ rhinitis exacerbation	3 (1.2)	Deepening hypotension	1 (0.4)
Sore throat	12 (4.8)	Nasal congestion	3 (1.2)	Taste change	1 (0.4)
Loss of smell	9 (3.6)	Dry throat	2 (0.8)	Muscle pain	1 (0.4)
Weakness	7 (2.8)	Hoarseness	2 (0.8)	Indigestion	1 (0.4)
Chest pain	6 (2.4)	Depression	2 (0.8)	Sickness	1 (0.4)
Loss of taste	6 (2.4)	Dizziness	2 (0.8)	Skin spots	1 (0.4)
Runny nose	5 (2.0)	Tinnitus	2 (0.8)	Enterocolitis	1 (0.4)

^{a)}Multiple responses; Missing data is not included in the values; COVID-19, coronavirus disease 2019.

Table 3. Score of COVID-19 Pandemic Stress, Depression, Fear of Negative Evaluation, and Stigma (N=175)

Variables	M±SD	Min	Max	Possible range
COVID-19 pandemic stress	1.81±0.89	0.08	4.08	0–5
Depression	1.16±0.36	0.85	2.45	0–3
Fear of negative evaluation	3.21±0.82	1.08	5.00	1–5
Stigma	0.63±0.51	0.00	2.27	0–3

COVID-19, coronavirus disease 2019; M, mean; SD, standard deviation.

Table 4. Correlations among COVID-19 Pandemic Stress, Depression, Fear of Negative Evaluation, and Stigma (N=175)

Variables	COVID-19 pandemic stress	Depression	Fear of negative evaluation	Stigma
	r (p)	r (p)	r (p)	r (p)
COVID-19 pandemic stress	1			
Depression	.32 (<.001)	1		
Fear of negative evaluation	.17 (.023)	.35 (<.001)	1	
Stigma	.50 (<.001)	.41 (<.001)	.15 (.055)	1

COVID-19, coronavirus disease 2019.

were identified and set as independent variables. Categorical variables were treated as dummy variables, with reference groups defined as “25 years old or older” for age, “satisfied” major satisfaction and interpersonal satisfaction, January to March 2022 for the time of COVID-19 diagnosis, “home treatment” as the treatment type, and “healthy” for recent subjective health status as reference variables. To identify multicollinearity among the independent variables, the tolerance before the regression analysis was conducted was .76 to .98, which was greater than 0.1 and less than 10, and the variance inflation factor ranged from 1.02 to 1.32, lower than 10, with all variables determined to have no problem with multicollinearity. Analysis of the residuals confirmed the normality of error terms, homogeneity of variances, and the linearity of the model. In the autocorrelation test, the Durbin-Watson statistic stood at 1.95, indicating the absence of autocorrelation. Consequently, the regression model was found to be statistically significant ($F = 18.46, p < .001$), with its explanato-

ry power calculated at 37.6%. The most important factor influencing stigma was COVID-19 pandemic stress ($\beta = .36, p < 0.001$), followed by depression ($\beta = .26, p < 0.001$), date of COVID-19 confirmation (January–March 2022) ($\beta = .18, p = .003$), treatment modality (hospitalization) ($\beta = .13, p = .034$), recent subjective health condition (fair) ($\beta = .13, p = .038$) and satisfaction with major (unsatisfied) ($\beta = .12, p = .042$) (Table 5).

DISCUSSION

As COVID-19 was an unprecedented global pandemic that has significantly impacted the economy, society, and psychosocial functioning of nations, it is crucial to address the stress it has caused and the subsequent mental health issues. This study investigates the levels of COVID-19 pandemic stress, depression, fear of negative evaluation, and stigmatization among college students diagnosed with the COVID-19 virus

Table 5. Factors Influencing Stigma among College Students with COVID-19 (N=175)

Variables	B	SE	β	t (p)	R ² (Adj R ²)	F (p)
(constant)	-0.45	0.13		-3.50 (.001)	.397 (.376)	18.46 (<.001)
COVID-19 pandemic stress	0.21	0.04	.36	5.69 (<.001)		
Depression	0.37	0.09	.26	4.04 (<.001)		
Date of COVID-19 to be confirmed (January to March 2022) ^{a)}	0.25	0.08	.18	3.02 (.003)		
Treatment modality (hospitalization) ^{b)}	0.63	0.29	.13	2.14 (.034)		
Recent subjective health condition (fair) ^{c)}	0.13	0.06	.13	2.09 (.038)		
Satisfaction with major (unsatisfied) ^{d)}	0.29	0.14	.12	2.05 (.042)		

^{a)}Dummy variables (ref. April to May 2022); ^{b)}Dummy variables (ref. home treatment); ^{c)}Dummy variables (ref. healthy); ^{d)}Dummy variables (ref. satisfied); COVID-19, coronavirus disease 2019; SE, standard error.

in the first half of 2022. During this period, students were still grappling with the ongoing pandemic but had more resources to manage the infection. The study also explores the key factors influencing their perceptions of stigma. Importantly, this research focuses on individuals who have personally experienced a COVID-19 diagnosis, rather than those who are merely observers of the situation. A discussion of the study's key findings is presented below.

First, when examining differences in stigma levels based on the general characteristics of the participants, it was observed that older age group perceived more stigma. Participants who were less satisfied with their major and those with lower interpersonal satisfaction also exhibited higher levels of stigmatization. Although there are no previous studies confirming the difference in stigma according to major satisfaction and interpersonal satisfaction, it is believed that major satisfaction and interpersonal relationships are related to depression, and depression is correlated with stigma. In the future, we propose a study to confirm the effect of major satisfaction and interpersonal satisfaction on stigma using depression as a parameter. Using April 2022, when social distancing measures were officially lifted, as a reference point, college students diagnosed with COVID-19 prior to this date reported higher levels of stigmatization compared to those diagnosed between April and May 2022. Additionally, those who underwent inpatient treatment experienced more stigma than those treated at living treatment centers or at home. Lastly, individuals who perceived their health as having deteriorated post-COVID-19 diagnosis reported higher stigma levels, a finding supported by Park et al. [11], who noted that an increase fear of social stigma correlates with more negative perceptions of life changes.

While most people can resume normal activities after recovering from a COVID-19 infection, some may experience symptoms that persist for weeks or even months. Symptoms

that continue for more than 12 weeks post-diagnosis and cannot be attributed to other conditions are known as post-COVID conditions (also referred to as long-term COVID, long COVID, or chronic COVID), though there is no globally accepted definition [23]. This study found that college students in early adulthood primarily reported persistent respiratory symptoms such as cough, sputum production, sore throat, and runny nose. They also experienced systemic symptoms like fatigue and weakness. Common cardiovascular symptoms included dyspnea and chest pain, along with disturbance in smell and taste.

Historically, large-scale pandemics have led to significant emotional difficulties, including severe stress, depression, and anxiety [24]. Recent research indicates a notable rise in anxiety and depression during the current pandemic [25], with a specific study from Korean highlighting that college students in early adulthood are particularly affected [7]. The term "COVID-19 Pandemic Stress" encapsulates the stress experienced due to the ongoing pandemic, impacting various aspects of life and presenting a more pervasive form of daily stress as it affects family, economic, educational, and work domains. Recent findings suggest that about 25% of the surveyed population is experiencing high stress levels due to COVID-19, leading to negative emotions such as anxiety, depression, and frustration [25]. In this study, the COVID-19 pandemic stress level among participants was 36.2%, significantly lower than the 47.8% reported in a similar study among nursing students in a different region at a comparable time [26]. The lower stress scores in this study may be attributed to the inclusion of a broader demographic of general university students, as opposed to nursing students who faced additional pressures due to their clinical responsibilities during the pandemic. Conversely, depression scores were higher among general students, with a total score of 23.2 compared to 17.2 among nursing students [26]. This dis-

crepancy suggests that general university students may be frustrated by the lack of realistic experience of college life due to the transition of all classes to face-to-face compared to nursing majors, who have mandatory provisions such as meeting practicum hours in terms of class participation [27], and may also be more susceptible to misinformation via social media and other media outlets during outbreaks of new infectious diseases like COVID-19, which may lead to feelings of helplessness. Therefore, it is crucial to provide these students with education on managing emerging infectious diseases, which is expected to enhance their sense of personal control over the disease through accurate information on quarantine and personal hygiene management.

Stigma was positively associated with COVID-19 pandemic stress and depression, with fear of negative evaluation being linked to higher levels of both COVID-19 pandemic stress and depression. Since fear of a negative evaluation can increase depression levels among individuals, enhancing psychological health to better cope with such fear is considered necessary. Higher levels of COVID-19 pandemic stress were associated with increased depression levels, consistent with findings from a study involving healthy college students [27].

Finally, stress related to the COVID-19 pandemic was identified as the strongest predictor of stigma, followed by depressive variables. A later diagnosis of COVID-19 was associated with lower levels of stigmatization. Other influential factors included hospitalization, feeling fairly healthy recently, and reduced satisfaction with one's major, collectively explaining 37.6% of the variance. In particular, in South Korea, adults have reported high levels of fear regarding social stigma [28]. This is attributed to the rapid increase in confirmed cases in specific regions and among certain religious groups, as well as widespread social condemnation. As information about individuals quarantined or infected with COVID-19 is shared on social media and their identities become public, the social stigmatization may increase not only for those infected but also for the general public observing the situation. In Korean society, there is a prevalent belief that contracting COVID-19 is due to personal failings, leading people to search for causes within individual's life or lifestyle [29]. This perception intensifies the fear of infection and psychological decline. Social stigmatization can thus worsen individual distress, complicate resolution efforts, and contribute to emotional issues such as depression.

Fear of negative evaluation was not identified as a cause of stigma in this study. Although fear of negative evaluation is

an underlying emotion that leads to mistrust, suspicion, and a sense of victimization of others [30], it may not have been a direct cause of stigma in this study. This could be because the public perceived the pandemic as a part of everyday life to which they had successfully adapted after April 2022, when COVID-19 transitioned into pandemic phase 2 [31].

Based on our findings, the limitations and suggestions for future research are as following. Firstly, the participants in this study were early adult in good health, which does not reflect the typical demographics of health, medical, and service occupations, where there is a higher fear of actual infection. Secondly, the data collection occurred after the peak of the COVID-19 outbreak, which may affect the generalizability of the results. Thirdly, mental health experts identify the three years following a pandemic as the most critical period for psychiatric sequelae. Therefore, ongoing research is essential to monitor this potentially serious social issue. Consequently, our study recommends the development of programs that proactively educate individuals about the factors influencing social stigma and aim to alleviate psychological distress while enhancing mental health management skills among college students who have encountered COVID-19.

CONCLUSION

This study is significant as it explores the emotional changes associated with pandemic stress, depression, fear of negative evaluation, and stigma among college students who have been diagnosed with COVID-19. In practical terms, it is essential to provide accurate information about the disease and to support those who are quarantined or infected without bias, especially in the context of an infectious disease like COVID-19, for which no definitive treatment has yet been established.

Consequently, the findings of this study advocate for the creation of programs designed to educate individuals about the effects of social stigma on mental health. These programs aim to alleviate psychological difficulties and enhance the mental health management skills of college students who have contracted COVID-19.

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Authors' contribution

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tion, Formal analysis: all authors; Writing-original draft: all authors; Writing-review and editing: all authors; Final approval of published version: all authors.

Conflict of interest

No existing or potential conflict of interest relevant to this article was reported.

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Data availability

Please contact the corresponding author for data availability.

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