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Research Article

The Relationship between the Emotions caused by COVID-19 and the Attitude to Use Face Mask among Nursing Students

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Abstract

Background/Objectives: This study aims to examine whether emotions provoked by COVID-19 are associated with their attitude about using a face mask.

Methods/Statistical analysis: Data were collected from November 17 to November 22, 2020, for 261 nursing students from two universities in D Metro City. Differences in emotions provoked by COVID-19 and attitude about face masks according to general characteristics were analyzed with independent t-test and one-way ANOVA. The relationship between emotions provoked by COVID-19 and attitude about face masks was analyzed using Pearson's correlation coefficients and multiple regression analysis.

Findings: There were statistically significant differences in emotions caused by COVID-19 according to sex (F=-4.34, p=.000), face mask-related expense (F=2.49, p=.044), determination to protect oneself (F=8.79, p=.000), and determination to protect others (F=3.94, p=.021). There were also statistically significant differences in attitudes about face masks according to a determination to protect oneself (F=28.98, p=.000) and determination to protect others (F=29.68, p=.000). Attitudes about face masks were significantly positively correlated with emotions caused by COVID-19, knowledge about face masks (particularly, correct usage of face masks) (p<.05), determination to protect oneself, and determination to protect others (p<.001). It was also significantly positively correlated with perceived susceptibility, perceived severity, perceived benefits, cues to action, and self-efficacy (p<.001). The regression model explained for 20.4% of the variance of attitudes about face masks (F=17.62, p<.001), and determination to protect oneself and determination to protect others were identified as the significant predictors (p<.05).

Improvements/Applications: The results of this study suggest that it is important to change the thinking to protect themselves or others in order to improve the attitude of face mask.

Keywords: Nursing Students, Face Mask, Attitudes, COVID-19, Emotion

1. Introduction

Coronavirus disease 2019 (COVID-19) was declared a pandemic by the World Health Organization on March 11, 2020. As of May 2021, there have been more than 150 million confirmed cases and 3.2 million deaths worldwide [1]. In Korea, the cumulative total number of cases reached 122,000 as of April 30, 2021, and the daily number of new cases remain above 500. COVID-19 also has a high fatality rate of 3–4% compared to 1% for influenza [2].

Amid the rising number of severely ill patients and deaths from COVID-19 worldwide, there has been strenuous effort to develop vaccines and treatment agents, some countries have successfully developed a COVID-19 vaccine and began to vaccinate their citizens since late 2020. Korea also began COVID-19 vaccinations in early 2021, but the vaccination rate is still low (5–6%) compared to the rates in other countries [2], so strategies to prevent and halt the spread of COVID-19 remain important. To prevent COVID-19 infection and transmission, the Korea Disease Control and Prevention Agency (KDCA) stresses prevention practices, such as disinfection, handwashing, social distancing, and use of a face mask [3]. The use of a face mask is recommended as the most useful practice to prevent infection and transmission amid the COVID-19 pandemic [4]. Past studies have also reported the importance of wearing face masks in preventing infectious diseases [5-7]. Thus, it is important to impart the correct use of face masks to prevent highly transmissible infections such as COVID-19.

Among several COVID-19 prevention practices emphasized by the KDCA, tips for correct use of face masks are promoted nationwide, nurses' attitude about face masks, including accurate knowledge about face masks, is crucial for patient education, as nurses are in close contact with patients in clinical settings. Moreover, establishing correct values and attitudes about face masks—the best means to prevent infection and transmission currently known—is an important task for nursing students as well, as they are prospective frontline health care providers.

While a pandemic such as COVID-19 may strengthen nursing students' vocational calling, it may also instill fear of having to work as a frontline health care provider even amid an infectious outbreak with high transmissibility and fatality rates. Previous studies also reported that a negative attitude toward COVID-19 may affect nursing students' attitude toward infection prevention practices, such as the use of a face mask [8,9]. However, past studies have generally been focused on knowledge and behaviors, prevention methods, stress, fear, and effectiveness of using a face mask in relation to COVID-19 in the general public and older adult population. On

the other hand, there have been relatively fewer studies on the knowledge, behaviors, and attitudes about face masks, emotions related to COVID-19, and nursing students amid the COVID-19 pandemic, highlighting the need for such research. Thus, this study aims to identify the predictors of the attitude toward the use of a face mask among nursing students and examine whether emotions provoked by COVID-19 are associated with their attitude about using a face mask, ultimately to present foundational data for developing effective face mask-related education programs for nursing students amid outbreaks such as COVID-19.

2. Study Methods

2.1. Study Design

This study is a descriptive survey aiming to investigate the predictors of attitude about using a face mask and the relationship between this attitude and emotions provoked by COVID-19 in nursing students.

2.2. Participants

Two hundred and sixty-one nursing students of two colleges in D who provided informed consent to participate in the study were enrolled in this study. The sample size was determined using the G*Power ver. 3.1.9.2. software. For a multiple regression with a moderate effect size of .15, the significance of .05, power of .95, and five predictor variables, the minimum required sample size was 138. In consideration of potential dropouts, we enrolled 261 students, and the effective sample was 261 questionnaires (100%).

2.3. Study Variables

2.3.1. General and Use of Face Mask Related Characteristics

Participants' general and face mask-related characteristics included sex, age, school year, monthly allowance, a pre-existing condition currently under treatment, perceived health, type of face mask used, the timing of face mask replacement, monthly expenses related to face mask, financial burden related to face masks, and overall perception of face masks (determination to protect oneself, determination to protect others).

2.3.2. Emotion caused by COVID-19

Emotions aroused by COVID-19 were measured using the scale developed by Choi [10] to examine the negative psychological related to the social risks caused by COVID-19. This tool was developed based on the notion that infectious disease disasters such as COVID-19 are related to Maslow's human needs theory and the operational definition that the negative elements of social risk caused by COVID-19 manifest as psychological anxiety and fear. This 9-item tool is rated on a five-point Likert scale, and a higher score indicates more negative emotions caused by COVID-19. The Cronbach's alpha was .82 in this study.

2.3.3. Attitudes to Use Face Masks

Attitudes about face masks were measured using the Face mask use scale developed by Ho [8]. This tool consisted of knowledge assessment, attitude, and performance at the time of development, and it was developed for influenza-like illnesses based on the health belief model. In this study, the tool was adapted for use on COVID-19 and modified to an 18-item tool, including 4 items for perceived susceptibility, 3 items for perceived severity, 2 items for perceived benefits, 5 items for perceived barriers, 3 items for cues to action, and 1 item for self-efficacy. Each item was rated on a three-point Likert scale, with agree (1), uncertain (0), and disagree (–1). Negatively worded items were reverse scored, and a higher score indicates a more positive attitude about using a face mask. Ho [8] confirmed that the tool has good face validity, and the internal consistency, stability, content validity, and construct validity of the tool were established in the study by Lam et al. [11]. The Cronbach's alpha was .73 in this study.

2.4. Data Collection

Data were collected from November 17 to November 22, 2020, and the participants were informed about the purpose, process, anonymity, and confidentiality related to the study. They were also informed that the collected data will only be used for research purposes and that they can withdraw the collected data at any time without any disadvantages.

2.5. Data Analysis

The collected data were analyzed using the IBM SPSS 22.0 software, and the data were analyzed as follows:

1) Participants' general and face mask-related characteristics were analyzed with frequency, percentage, mean, and standard deviation.

2) Participants' emotions provoked by COVID-19 and attitude about face masks were analyzed mean and standard deviation.

3) Differences in emotions provoked by COVID-19 and attitude about face masks according to general characteristics were analyzed with independent t-test and one-way ANOVA, with Scheffe test for post-hoc comparison.

4) The relationship between emotions provoked by COVID-19 and attitude about face masks was analyzed using Pearson's correlation coefficients.

5) The predictors of attitudes about face masks were analyzed with multiple regression analysis.

3. Results

3.1. General and Use of Face Mask Related Characteristics in Participants

As shown in Table1, the majority of the participants were female (85.4%), and the mean age was 23.54 years. Many students were fourth-year students (45.6%), and the most common monthly

allowance was 210,000–300,000 KRW (26.1%). Most of the participants claimed to have no pre-existing condition (89.3%), and many participants perceived themselves to be in moderate health (45.6%). The most common type of face mask used was dental masks (60.9%), and participants generally used a single face mask for 1–2 days (73.2%). The average face mask-related expense was 14,055 KRW.

Table 1: General and Use of Face Mask Related Characteristics of Nursing Students

N = 261)

Characteristics	Categories	N(%)	Mean(SD)
Gender	Male	38(14.6)	
	Female	223(85.4)	
Age (/year)	≤20	47(18.0)	23.54(4.92)
	21-22	79(30.3)	
	23-24	86(33.0)	
	≥25	49(18.8)	
Grade	1st	46(17.6)	
	2nd	35(13.4)	
	3rd	61(23.4)	
	4th	119(45.6)	
Pocket money (KRW/month)	≤200,000	47(18.0)	
	21-300,000	68(26.1)	
	31-400,000	50(19.2)	
	41-500,000	44(16.9)	
	≥500,000	52(19.9)	
Disease	Yes	28(10.7)	
	No	233(89.3)	
Subjective health	Very good	28(10.7)	
	Good	94(36.0)	
	Moderate	119(45.6)	
	Bad	19(7.3)	
	Very bad	1(0.4)	

Type of face mask	K-94 mask	93(35.6)	
	Dental mask	159(60.9)	
	Cloth mask	5(1.9)	
	other	4(1.5)	
Mask usage period	1-2 days	191(73.2)	
	3-4 days	57(21.8)	
	5-6 days	7(2.7)	
	more than a week	6(2.3)	
Mask purchase cost(KRW/month)	≤9,999	130(49.8)	14055.56(20357.66)
	10,000-19,999	51(19.5)	
	20,000-29,999	27(10.3)	
	30,000-39,999	25(9.6)	
	≥40,000	28(10.7)	
Self-protection will	Agree	245(93.9)	
	I don’t know	15(5.7)	
	Disagree	1(0.4)	
Will to protect others	Agree	245(93.9)	
	I don’t know	13(5.0)	
	Disagree	3(1.1)	

3.2. Descriptive Statistics for Emotion caused by COVID-19 and Attitude to Use Face Masks

As shown in Table 2, the mean total score for emotions caused by COVID-19 was 32.03±5.74 out of 45, and the mean score by item was 3.56±0.64 out of 5. The mean total score for attitude about face masks was 8.02±4.27 from a possible score range of –18 to 18, and the mean item score was 0.45±0.24 from a possible range of –1 to 1.

Table 2: Descriptive Statistics for Emotion caused by COVID-19 and Attitude to Use Face Masks

N = 261)

Variables	Range	M±SD	Item M±SD
Emotion caused by COVID-19	9~45	32.03±5.74	3.56±0.64
Attitude to use face mask	-18~18	8.02±4.27	0.45±0.24
Perceived susceptibility	-4~4	-0.12±2.19	0.16±0.52
Perceived severity	-3~3	2.47±1.03	0.82±0.34
Perceived benefits	-2~2	0.65±0.83	0.32±0.41
Perceived barriers	-5~5	-0.84±2.03	0.41±0.38
Cues to action	-3~3	1.33±2.30	0.44±0.77
Self-efficacy	-1~1	0.89±0.38	0.89±0.37

3.3. Difference of Emotion caused by COVID-19 and Attitude to Use Face Masks according to General and Use of Face Mask Related Characteristics

As shown in Table 3, there were statistically significant differences in emotions caused by COVID-19 according to sex (F=-4.34, p=.000), face mask-related expense (F=2.49, p=.044), determination to protect oneself (F=8.79, p=.000), and determination to protect others (F=3.94, p=.021). There were also statistically significant differences in attitudes about face masks according to a determination to protect oneself (F=28.98, p=.000) and determination to protect others (F=29.68, p=.000).

Table 3: Difference of Emotion caused by COVID-19 and Attitude to Use Face Masks according to General and Use of Face Mask Related Characteristics

N = 261)

Characteristics	Categories	Emotion caused by COVID-19		Attitude to Use Face Mask	
		M(SD)	t/F (p) post-hoc	M(SD)	t/F (p) post-hoc
Gender	Male	28.42(6.84)	-4.34(.000)	8.13(4.76)	0.17(.869)
	Female	32.65(5.31)		8.00(4.20)	

Age (/year)	≤20	31.60(5.80)	1.04(.377)	8.02(4.20)	0.88(.450)
	21-22	32.57(5.33)		8.00(4.12)	
	23-24	32.41(5.45)		7.57(4.46)	
	≥25	30.94(6.72)		8.82(4.27)	
Grade	1st	31.80(5.70)	0.16(.925)	8.00(4.12)	1.38(.250)
	2nd	32.40(6.05)		9.31(3.42)	
	3rd	32.33(4.89)		8.00(4.25)	
	4th	31.87(6.11)		7.65(4.54)	
Pocket money (/month)	≤200,000 won	32.13(6.24)	1.35(.252)	7.71(4.36)	0.95(.433)
	21-300,000 won	33.09(5.02)		8.88(4.42)	
	31-400,000 won	31.12(5.52)		7.33(3.41)	
	41-500,000 won	32.50(5.42)		8.04(4.68)	
	≥500,000 won	31.06(6.51)		8.50(3.99)	
Disease	Yes	33.29(4.65)	1.22(.223)	9.32(3.28)	1.72(.087)
	No	31.88(5.85)		7.86(4.36)	
Subjective health	Very good	30.57(7.73)	2.02(.092)	8.50(4.87)	0.39(.818)
	Good	31.27(6.04)		7.98(4.01)	
	Moderate	32.74(4.67)		8.07(4.43)	
	Bad	33.84(6.35)		7.05(3.87)	
	Very bad	27.00(0.00)		10.00(0.00)	
Type of face mask	K94 mask	32.53(5.53)	0.52(.671)	8.16(3.96)	0.31(.820)
	Dental mask	31.82(5.84)		7.90(4.47)	
	Cloth mask	30.00(8.34)		7.60(5.13)	
	other	31.50(2.89)		9.75(3.40)	
Mask usage period	1-2 days	32.12(5.64)	0.16(.923)	8.09(4.13)	0.69(.559)
	3-4 days	31.61(6.25)		7.93(4.81)	
	5-6 days	32.71(6.02)		8.71(2.50)	
	more than a week	32.50(4.64)		5.67(5.16)	
	≤9,999 won	31.02(5.76)	2.49(.044)	7.71(4.36)	0.95(.433)

Mask purchase cost	10,000-19,999 won	32.61(4.84)		8.88(4.42)	
	20,000-29,999 won	32.81(5.92)		7.33(3.41)	
	30,000-39,999 won	34.32(6.37)		8.04(4.68)	
	≥40,000 won	32.93(5.80)		8.50(3.99)	
Self-protection will	Agree	32.18(5.48)	8.79(.000)	8.46(3.87)	28.98(.000)
	I don't know	31.20(7.01)		1.87(4.09)	
	Disagree	9.00(0.00)		-8.00(0.00)	
Will to protect others	Agree[a]	32.18(5.48)	3.94(.021) a>c	8.47(3.86)	29.68(.000)
	I don't know[b]	31.46(7.43)		1.85(4.00)	
	Disagree[c]	23.00(12.49)		-2.67(5.03)	

3.4. Correlation between Emotion caused by COVID-19 and Attitude to Use Face Masks

As shown in Table 4, attitudes about face masks were significantly positively correlated with emotions caused by COVID-19, knowledge about face masks (particularly, correct usage of face masks) ($p<.05$), determination to protect oneself, and determination to protect others ($p<.001$). It was also significantly positively correlated with perceived susceptibility, perceived severity, perceived benefits, cues to action, and self-efficacy ($p<.001$).

Table 4: Correlation between Emotion caused by COVID-19 and Attitude to Use Face Masks

N = 261)

	r (p)										
	1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)
Emotion caused by COVID-19[1)]	1										
Knowledge of the procedure	.03 (.593)	1									

for using the mask[2)]											
Self-protection will[3)]	.15 (.016)	.16 (.009)	1								
Will to protect others[4)]	.14 (.027)	.13 (.033)	.82 (<.001)	1							
Attitudes to Use Face Mask[5)]	.16 (.009)	.14 (.028)	.43 (<.001)	.43 (<.001)	1						
Perceived susceptibility[6)]	.12 (.054)	.02 (.719)	.06 (.336)	.08 (.199)	.43 (<.001)	1					
Perceived severity[7)]	.25 (<.001)	.10 (.100)	.49 (<.001)	.43 (<.001)	.50 (<.001)	.19 (.002)	1				
Perceived benefits[8)]	.21 (.001)	-.00 (.967)	.23 (<.001)	.19 (.002)	.33 (<.001)	.22 (<.001)	.32 (<.001)	1			
Perceived barriers[9)]	.22 (<.001)	-.08 (.189)	-.06 (.333)	-.06 (.311)	.03 (.652)	.32 (<.001)	.08 (.182)	.26 (<.001)	1		
Cues to action[10)]	.03 (.662)	.04 (.491)	.17 (.006)	.19 (.002)	.66 (<.001)	.11 (.066)	.07 (.277)	.08 (.195)	.28 (<.001)	1	
Self-efficacy[11)]	.07 (.238)	.411 (<.001)	.63 (<.001)	.61 (<.001)	.38 (<.001)	.06 (.352)	.38 (<.001)	.117 (.059)	-.05 (.451)	.16 (.009)	1

3.5. Factors Affecting on Attitude to Use Face Masks

To identify the predictors of nursing students' attitude about face masks, multiple regression was performed with attitudes about face masks as the dependent variable and emotions caused by

COVID-19, knowledge about the correct usage of face masks, determination to protect oneself, and determination to protect others as the independent variables.

Durbin-Watson statistic was close to 2, at 1.967, confirming the absence of autocorrelation. Tolerance was greater than 0.1, at 0.34–0.98, and variance inflation factor (VIF) was smaller than 10, at 1.02–3.02, confirming the absence of multicollinearity.

As shown in Table 5, the regression model explained for 20.4% of the variance of attitudes about face masks (F=17.62, p<.001), and determination to protect oneself and determination to protect others were identified as the significant predictors (p<.05)

Table 5: Factors Affecting on Attitude to Use Face Masks

N = 261)

Variables	B	SE	β	t	p
(Constant)	-1.414	1.597		-0.886	0.377
Emotion caused by COVID-19	0.071	0.042	0.095	1.7	0.09
Knowledge of the procedure for using the mask	0.97	0.799	0.068	1.214	0.226
Self-protection will	3.291	1.568	0.202	2.099	0.037
Will to protect others	3.461	1.356	0.244	2.552	0.011
Adj.R^2=20.4, F=17.616, p<.001					

4. Discussion

We will discuss the correlations between nursing students' emotions caused by COVID-19 and their attitude about face masks as well as the predictors of their attitudes. The mean score for emotions caused by COVID-19, that is, negative emotions, was 3.56 (out of 5), and such a high score is in line with previous results that nursing students and healthcare professionals experienced more stress, anxiety, and depression [12]. Medina et al. [13] reported that more than 50% of nursing students and recent graduates experience fear and stress, supporting our results. These results suggest that nursing students were subject to a quite high level of pressure for having to work in the frontlines during an infectious outbreak such as COVID-19. The results of this study, which showed higher negative emotions for COVID-19 in women than in men, were consistent with the results of higher perceived sensitivity and severity in women than men in Kim [14]. The results of this study, in which women feel more serious and negative about infectious disease pandemic situations such as COVID-19, are due to empathy or cognitive abilities according to gender, and if women with children are due to maternal instinct, it is necessary to conduct a follow-up study on this.

In our study, the negative emotions provoked by COVID-19 were significantly positively correlated with nursing students' attitudes about face masks, but the correlation was not strong. On the other hand, nursing students' attitude about face masks was strongly correlated with their determination to protect themselves and others. This shows that determination to protect oneself and others, as opposed to negative emotions from COVID-19 or knowledge about face masks, is a property of nursing students' attitude about face masks. In addition, determination to protect oneself and others were identified as significant predictors of nursing students' attitude about face masks, and these two factors explained for 20.4% of the variance. These results can be explained by past findings that Americans or Europeans wore face masks less frequently than Asians but exhibited a higher level of anxiety, depression, and stress [15]. This may also be attributed to the gap between the emphasis on personal freedom among some people in the West who refuse to wear a face mask and the value placed on a sense of solidarity among Asians who strictly comply with face mask practices [16]. In other words, Asians' determination to protect themselves or others based on the sense of solidarity and group harmony valued in Eastern countries has affected their attitudes about using a face mask more so than did the negative emotions provoked by COVID-19. In contrast, Chung et al. [17] reported that horizontal individualism, characterized by belief in one's uniqueness, independent choice, and honest attitude, affected individuals' use of face masks. Hence, subsequent studies should examine the use of face masks from various perspectives.

Based on our findings, face mask-related education programs for nursing students should include contents to increase students' knowledge as well as contents that strengthen their determination to protect themselves and others. This study is significant in that it identified the predictors of nursing students' attitude about face masks and thus presented foundational data for devising strategies for education programs about the use of face masks.

5. Conclusion

The results of this study suggest that it is important to change the thinking to protect themselves or others in order to improve the attitude of face masks. Therefore, future research suggests researching the attitude of wearing a mask for subjects with various mindsets.

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