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A Study on the Public's Crisis Management Efficacy and Anxiety in a Pandemic Situation—Focusing on the COVID-19 Pandemic in South Korea

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Abstract: Social distancing, shutdown, and lockdown policies have recently been implemented worldwide to help slow the spread of the Coronavirus disease 2019 (COVID-19), which has caused economic, social, and cultural crises on a global scale. To help create safe communities, we aimed to analyze the factors affecting the public's anxiety and efficacy to overcome crises. The results show that efficacy is associated with sex, education, central government support, the public hygiene environment, and public hygiene behaviors. Anxiety was shown to have a negative relationship with central government support, a positive relationship with civilian support, and a negative relationship with efficacy. For a country to prevent the spread of a novel infectious disease, alleviate the anxiety of the population, and construct a safe community in the midst of a global pandemic, active central government support and response, protection of vulnerable populations, publicization of policies, and crisis management communication are essential. In particular, identifying an evidence-based method to understand and address the psychological and social influences of COVID-19, such as excessive fear and discrimination, providing insight into risk factors associated with future society for policy makers, and establishing potential and sustainable public health communication strategies are of paramount importance.

Keywords: COVID-19; pandemic; crisis management; efficacy; anxiety

1. Introduction

To stop the spread of Coronavirus disease 2019 (COVID-19), which began in 2019 and was recognized as a global pandemic in 2020, various governmental policies have been introduced throughout the world. Countries have responded by closing schools and public institutions and supporting policies such as social distancing to reduce the rate of transmission in the civilian sector [1].

The Oxford COVID-19 Government Response Tracker systematically presents and compares policies between countries and companies to understand how governmental responses to COVID-19 have evolved. Research shows that governments in most countries have enforced stronger policies and countermeasures as the number of cases has rapidly increased. In addition, faster enactment of strong lockdown measures has been shown to be an important factor in more effectively inhibiting the spread of infections [2]. However, the speed and scale of responses have differed depending on each government's awareness of the threat, and higher government awareness has been associated with a lower rate of confirmed cases [2–4].

COVID-19 has had an impact on many different aspects of people's lives. It has caused isolation and a number of psychological problems, such as panic disorder, anxiety, and depression [5]. Qiu et al. [6] analyzed data from 52,370 persons in six provinces and administrative regions in Hong Kong, Macao, and Taiwan, and reported that 35% of respondents had experienced psychological distress due to COVID-19.

There have been active collaborative research efforts involving public health experts and sociologists worldwide to slow the spread of COVID-19. The subject matter of this research includes public messages, self-perceived risk due to COVID-19, fear of COVID-19, societal moral foundations, and positive behavioral changes (e.g., social distancing and improved hand hygiene) introduced through policies [7].

In their study regarding government policies to prevent the spread of COVID-19 in Vietnam, La et al. [8] highlighted the need for immediate, genuine cooperation between the government, civilian society, and individual citizens and hypothesized that trust, based on timely communication from the government and the press would help societies to overcome the crisis.

Because COVID-19 is a global pandemic, there is an urgent need for policy plans in the public health, environmental, science and technology, and social sciences sectors. In particular, we need to have in-depth discussions about the role of government based on research showing that the spread of infectious diseases can be inhibited depending on the speed with which governments implement responsive measures and strong policies [9–12].

However, the government's role and policies only become effective when they have the support and trust of the public [13–15]. There is active research regarding the role of society in the changing times of COVID-19 [16] and how the government can exert control over the people by enacting rules and policies [3,12,17]. However, it is difficult to find a study on public awareness of the effectiveness of government policy. In this study, we analyzed factors affecting the public's efficacy and anxiety in relation to crisis management, with the aim of helping to improve future crisis management policies.

1.1. Crisis Management Efficacy

Effective crisis management depends on the abilities of administrators, decision-makers, related organizations, and interested parties who contribute to the specific stages and activities of crisis management. Crises in modern society are gradually transcending the bounds of individual organizations and sectors, requiring intermittent or continuous mediation and cooperation between different fields and levels of government [18].

Research on successful crisis management has previously examined the importance of social capital-related factors (e.g., trust, shared norms, networks, administrative culture) as activating or deactivating factors in crisis management [19,20]. In the same way, researchers are now emphasizing the importance of software factors (e.g., psychological, cultural) [21–23].

Previous research shows that trust in government, public trust, and institutional trust are essential for the validity and effectiveness of institutional agreements [24,25]. Persson et al. [22] claimed that for the EU to ensure the public support, resources, and the validity needed to construct a properly functioning crisis management and disaster response institution, it is essential for citizens, who are the primary actors in this field, to have high efficacy based on trust in the EU. Christensen et al. [26] reported that a government needs to be both capable and lawful to implement a properly operating crisis management system. In particular, the validity of the ruling structure is based on trust in government.

Christensen and Lægreid [27] reported that the reason for the positive appraisal of the Norwegian government's successful crisis management response to COVID-19, compared to other countries, should be understood in terms of a high-trust society with a reliable and expert bureaucracy, strong control, a good economic situation, robust welfare, and low population density. In particular, Norway was able to execute a control strategy based on the government's cooperative and practical decision-making, successful communication with the public, ample resources, and citizens' high level of trust in the government.

Citizen participation to overcome disasters has a positive effect on improving community resilience [28–30]. According to a study by Kweit and Kweit [31], rather than disaster recovery systems based on bureaucratic guidance, recovery projects based on political

comfort and trust that promote widespread citizen participation are effective at increasing citizen satisfaction.

In particular, Frisby et al. [32] reported that efficient crisis management arises from efficacy based on learned perceptions. According to Bandura et al. [33], efficacy is a major factor in people's behaviors and beliefs. Bandura [34,35] defines self-efficacy as an individual's certainty that the behaviors and cognitive ability that they believe to be correct can be used successfully to achieve a goal or complete a task.

Zimmerman et al. [36], Abdalla [37], Ancis and Phillips [38], Garavalia and Gredler [39], and Dunlap [40] have reported that people with high self-efficacy think and act differently than those with low self-efficacy, and those with higher self-efficacy are more likely to make decisions based on their goals and the available information, and are ultimately more likely to succeed. In addition, high self-efficacy is derived from education. In other words, learning can have an effect on self-efficacy [41–43].

Self-efficacy shows strong correlations in health-related fields, which is clear in Ajzen's theory of planned behavior [44,45] and Bandura's social learning theory [34,35]. Reuter et al. [46] and Perkins et al. [47] found that self-efficacy causes changes in health-related habits, diet, and behaviors.

Mileti and Sorensen [48] as well as Mileti and Fitzpatrick [49] discussed self-efficacy in terms of crisis management communications, claiming that self-efficacy should be recognized as an outcome variable when designing messages in response to threats or crises. It is important to produce behaviors that provide protection from a threat or crises through the perception of messages [50–52]. The goal of improving self-efficacy in such a situation is to rapidly and effectively warn and direct people in potential danger to take the proper action to protect themselves.

Based on the above results, we can infer that factors affecting successful crisis management start with the validity of the governmental organization and voluntary participation by citizens, and that these are supported by the high self-efficacy of individuals. Thus, we set the following hypotheses:

Hypothesis 1 (H1). *The government's policies supporting crisis management during the COVID-19 pandemic will have a positive effect on crisis management efficacy.*

Research results from Christensen and Lægreid [27], Weible et al. [11], and Parker et al. [53] demonstrate expeditious control of infectious diseases through usage of control strategies based on the good leadership of politicians and administrative authorities, a highly trustworthy society with reliable and professional bureaucracy, resilient economy, cooperative and practical decision-making procedures in the case of welfare states, successful communication with the public, abundant resources, and a mutually trusting relationship between the society and the government.

Hypothesis 2 (H2). *Better individual practice of behaviors to overcome the spread of COVID-19 (hygienic tendencies) will have a positive effect on crisis management efficacy.*

Analysis based on results from various studies including those by Vung et al. [54], Hozak et al. [55], Loftus et al. [56], and Mbakaya et al. [57] indicate that personal hygienic tendencies and behaviors increase disease resistance and efficiency of crisis management.

Hypothesis 3 (H3). *Perceptions of the level of access to public hygiene facilities will have a positive effect on crisis management efficacy.*

Studies by Banik et al. [58], Ssemugabo et al. [59], and Dhesi et al. [60] posit that poor awareness of the accessibility of public hygiene facilities or a lack of an established system leads to proportional vulnerability in crisis management.

Hypothesis 4 (H4). *Knowledge about public hygiene information will have a positive effect on crisis management efficacy.*

Studies by Johnson and Hariharan [61], Checchi et al. [62], and Kumwenda [63] show that knowledge and the accessibility of public hygiene information increase crisis management efficacy and reduce personal fears.

Hypothesis 5 (H5). *Perceptions of hygiene facilities that are widely used by the public will have a positive effect on crisis management efficacy.*

An analysis of studies by Heuvelink et al. [64], Michael et al. [65], and Muoki et al. [66] indicates that perceptions and customs surrounding public hygiene facilities influence the efficacy of crisis management.

Hypothesis 6 (H6). *Knowledge about the population's hygiene will have a positive effect on crisis management efficacy.*

According to the studies conducted by Jefferson et al. [67], Sood et al. [68], and Dong et al. [69], poor public knowledge and awareness of hygiene influences risks associated with a disease and efficacy of crisis management.

1.2. The Public's Anxiety

Individuals struggle to make clear, logical judgments when they are wrapped up in fear and anxiety [70–72]. According to a study by Harper et al. [7], anxious, negative emotions are generally shown by individuals who will actively protect themselves. To fulfill this protective function and avoid infectious diseases, individuals are keen to implement behavioral changes in adherence to public health principles (e.g., hand washing and social distancing).

The government's fight against fear is an important aspect of crisis management policy—citizens who are faced with disasters look to the government for protection [73]. In addition, the anxiety experienced in a crisis encourages citizens to consent to national surveillance and voluntary release of their data. Hillebrand [74] investigated anxiety and its effect on the public in Germany early in the COVID-19 pandemic and found that: (1) anxiety increased consent to voluntary release of data; (2) anxiety increased the rate of consent to direct and indirect national surveillance by modulating mistrust in others; and (3) there was a voluntary, robust increase in trust in government. This shows that anxiety among the public leads to changes in behavior and trust in government.

When anxiety from a crisis accumulates, individuals show more dependence on and expectations of the government, compared to peer or personal dependence [75,76]. According to Carayannopoulos [77], there are various actors in crisis management, including the government, individuals, and civilian sectors, but the government plays the most important role in controlling crisis management because of factors such as means and processes for support in crisis management, facilitated data management and infrastructure, suitable budgeting, and a responsibility framework.

The above studies show that the public's anxiety about a threat or crisis can result in support of not only government policy and civilian support, but also community trust. Hence, we set the following hypotheses:

Hypothesis 7 (H7). *The government's crisis management support policies surrounding COVID-19 will decrease public anxiety.*

Studies by Altiparmakis et al. [78], Abate et al. [79], and Mintrom and O'Connor [80] found that diverse support policies of the government overcome national industrial crises, resolve social polarization and national conflicts, and increase trust toward the national leader and the government.

Hypothesis 8 (H8). *Civilian crisis management support policies will increase public anxiety.*

Studies by Mahmud et al. [81], Chen and Hang [82], and García-Sánchez and García-Sánchez [83] demonstrate that the introduction of diverse social responsibilities can be used for civilian support, which mollifies economic and social damage with the combined effort of local communities. Further, the positive image of public effort and cooperation can also be strengthened.

Hypothesis 9 (H9). *Efficacy of the government, medical staff, national population, and individuals will decrease public anxiety.*

Chen et al. [84], Goodwin et al. [85], Wong et al. [86], and Ao et al. [87] found that public anxiety from the spread of an infectious disease can be relieved through the combined effort of the government, medical institutions, individuals, and local communities.

2. Materials and Methods

This study utilized an online questionnaire in South Korea to measure the characteristics of self-efficacy and anxiety among the public regarding crisis situations. The questionnaire data were collected through Macomill Embrain, an online survey company, from 18 to 25 May 2020. Participants were recruited through arbitrary online sampling accounting for sex, age, and region. An email invitation to complete the survey was sent to 7320 panelists aged 20 years and older and a total of 620 requests to participate in the survey were received (response rate = 8.5%). Prior to completing the survey, those who had agreed to participate were asked if they consented to voluntarily completing the survey. Only those who agreed were allowed access to the questionnaire. Panelists who completed the survey received an incentive equivalent to approximately US $3.00. Statistical analysis was performed using the statistical program IBM SPSS Statistics 25. Frequency distributions, reliability analyses, and regression analyses were conducted.

The respondents shown in Table 1 were 51.8% male and 48.2% female. With regard to age, 18.1% of the respondents were 20–29 years old, 17.6% were 30–39 years old, 21.5% were 40–49 years old, 23.5% were 50–59 years old, and 19.4% were ≥60 years old. Regarding place of residence, 47.9% lived in the greater capital region, 25% in Gyeongsang-do, 12.9% in Jeolla-do or Jeju-do, and 14.2% in Chungcheong-do or Gangwon-do. Regarding education, 20% of respondents had a high school education or lower, 16.1% had graduated from a technical college, 55.3% had graduated from a 4-year university, and 8.5% had graduated from graduate school. Almost one-half (49.4%) of the respondents were employed full-time, 5.5% were employed part-time, 11.6% were the company owner or self-employed, 7.1% were students, 13.9% were homemakers, and 8.4% were unemployed. The monthly household income was <2 million KRW (Korean Won) for 8.2% of respondents, 2–4 million KRW for 32.4%, 4–6 million KRW for 29.4%, 6–8 million KRW for 16.5%, 8–10 million KRW for 8.7%, and ≥10 million KRW for 4.8%.

The questionnaire was converted into a web survey that was easy to respond to online and distributed via e-mail to respondents. All variables were measured using a 5-point Likert scale ranging from 1 (absolutely not) to 5 (very much) with higher scores indicating more positive responses. The reliability and validity were measured for analysis, and the questionnaire items' reliability coefficients are shown in Table 2. The reliability coefficient (Cronbach's alpha) exceeded the cutoff value (.60) for all concepts, indicating that the results were reliable.

Table 1. Descriptive statistics of survey participants (*N* = 620).

Characteristics	n (%)
Sex	
Male	321 (51.8)
Female	299 (48.2)
Age	
20–29	112 (18.1)
30–39	109 (17.6)
40–49	133 (21.5)
50–59	146 (23.5)
≥60	120 (19.4)
Place of residence	
Greater capital region	297 (47.9)
Gyeongsang-do	155 (25)
Jeolla-do or Jeju-do	80 (12.9)
Chungcheong-do or Gangwon-do	88 (14.2)
Education	
High school	124 (20)
College	100 (16.1)
Four-year university	343 (55.3)
Graduate school	53 (8.5)
Employment	
Employed full-time	306 (49.4)
Employed part-time	34 (5.5)
Company owner or self-employed	72 (11.6)
Students	44 (7.1)
Homemakers	86 (13.9)
Unemployed	52 (8.4)
Other	26 (4.2)
Monthly household income	
2 million KWR	51 (8.2)
2–4 million KRW	201 (32.4)
4–6 million KRW	182 (29.4)
6–8 million KRW	102 (16.5)
8–10 million	54 (8.7)
≥10 million KRW	30 (4.8)

Table 2. Concepts, measures, and reliability.

Concept	Questions	Reliability
Public hygiene environment	Q1 South Korea has an environment that allows citizens to wash their hands as necessary, without any particular restrictions. Q2 South Korea has an environment that allows citizens to care for their hygiene as necessary.	0.902
Public hygiene information	Q1 South Korea provides information for citizens' hygiene as necessary. Q2 South Korea enables easy access to hygiene information for citizens.	0.889
Public hygiene facilities	Q1 The overall quality of hygiene in public facilities in South Korea is excellent. Q2 The overall quality of hygiene in civilian facilities in South Korea is excellent.	0.807
Public hygiene of the population	Q1 The South Korean population has high overall awareness of public hygiene. Q2 The South Korean population has a high overall rate of performance of public hygiene.	0.917

Table 2. *Cont.*

Concept	Questions	Reliability
Public hygiene behaviors	Q1 I am practicing social distancing to overcome the COVID-19 crisis. Q2 I am restricting outdoor activities and staying at home to overcome the COVID-19 crisis. Q3 I always wear a mask during outdoor activities to overcome the COVID-19 crisis. Q4 I wash my hands regularly to overcome the COVID-19 crisis. Q5 I have purchased masks to overcome the COVID-19 crisis. Q6 I have purchased soap to overcome the COVID-19 crisis. Q7 I have purchased hand disinfectant to overcome the COVID-19 crisis. Q8 I have purchased disinfectant to overcome the COVID-19 crisis.	0.870
Central government support	Q1 The current state of the COVID-19 situation reported by the central government (information about confirmed cases, etc.) is helping to overcome COVID-19. Q2 Information provided by the central government about behaviors to overcome COVID-19 (e.g., wearing a mask, disinfecting hands, coughing etiquette, etc.) is helping to overcome COVID-19. Q3 The central government is actively providing citizens with information to overcome COVID-19. Q4 The central government is performing infection prevention activities to overcome COVID-19. Q5 The central government is actively managing infected persons to overcome COVID-19. Q6 The central government is actively managing potential infections to overcome COVID-19. Q7 The central government is making efforts to alleviate economic damages suffered by citizens due to COVID-19.	0.944
Local government support	Q1 The current state of the COVID-19 situation reported by the local government (information about confirmed cases, etc.) is helping to overcome COVID-19. Q2 Information provided by the local government about behaviors to overcome COVID-19 (e.g., wearing a mask, disinfecting hands, coughing etiquette, etc.) is helping to overcome COVID-19. Q3 The local government is actively providing citizens with information to overcome COVID-19. Q4 The local government is performing infection prevention activities to overcome COVID-19. Q5 The local government is actively managing infected persons to overcome COVID-19. Q6 The local government is actively managing potential infections to overcome COVID-19. Q7 The local government is making efforts to alleviate economic damages suffered by citizens due to COVID-19.	0.953
Civilian support	Q1 The civilian sector is actively sharing information to overcome COVID-19. Q2 The civilian sector is actively participating in infection prevention activities to overcome COVID-19. Q3 The civilian sector is actively managing infected persons (self-isolation) to overcome COVID-19. Q4 The civilian sector is actively managing potential infections (self-isolation) to overcome COVID-19. Q5 The civilian sector is making efforts to alleviate economic damages suffered by citizens due to COVID-19 (e.g., reducing rent, encouraging purchase of small business owners' or farmers' goods).	0.897
Anxiety	Q1 Since COVID-19, I am more sensitive and I do not feel at rest. Q2 Since COVID-19, I feel more anxious. Q3 Since COVID-19, I get surprised for no reason. Q4 Since COVID-19, I feel more afraid.	

Table 2. *Cont.*

Concept	Questions	Reliability
	Q5 Since COVID-19, my heart starts beating rapidly. Q6 Since COVID-19, I feel tense. Q7 Since COVID-19, I sometimes feel full of fear. Q8 Since COVID-19, I am nervous and cannot stay still. Q9 Since COVID-19, even familiar things feel new or unrealistic. Q10 Since COVID-19, I feel a sense of urgency and restlessness about everything.	0.953
Efficacy	Q1 If the government works hard, we can be safe from the threat of COVID-19. Q2 If the medical staff work hard, we can be safe from the threat of COVID-19. Q3 If the population works hard, we can be safe from the threat of COVID-19. Q4 If I work hard, I can be safe from the threat of COVID-19.	0.890

COVID-19: Coronavirus disease 2019.

3. Results

Figure 1 shows the perceptions of efficacy with regard to four different crisis management support mechanisms: self-efficacy, efficacy of the population, medical staff efficacy, and government efficacy.
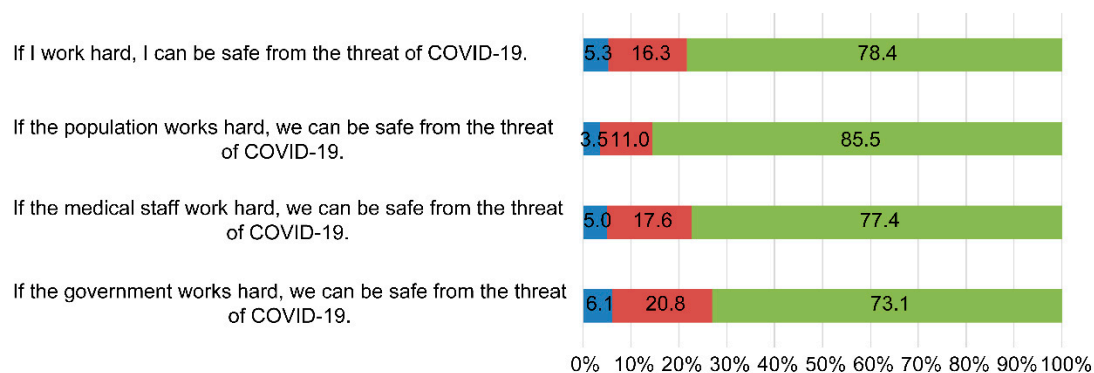

Figure 1. Attitudes toward crisis management support mechanisms.

The results of the survey showed 73.1% agreement with government efficacy (scores of 4 or 5 on the Likert scale), 77.4% agreement with medical staff efficacy, 85.5% agreement with efficacy of the population, and 78.4% agreement with self-efficacy. The fact that the efficacy of the population was highest (85.5%) demonstrates strong agreement about overcoming the crisis through social unity.

Figure 2 presents the means of the efficacy variables by demographic characteristics. Scores range from 1 to 5, with higher scores indicating higher efficacy ratings. In the demographic analysis of crisis management efficacy (Figure 2), males showed higher perceived efficacy than females [88,89]. Meanwhile, there was little difference between age groups. High school graduates had the highest perceived efficacy, while respondents with an income level of 3–6 million KRW showed higher perceived efficacy than other income groups.

To investigate the relationships between the variables, we performed a simple correlation analysis controlling for age, income, sex, education, and social status, and the results are shown in Table 3. Efficacy was correlated with public hygiene behaviors, public hygiene environment, public hygiene information, public hygiene facilities, public hygiene of the population, government support, civilian support, and anxiety. In particular, there was a strong positive correlation with government support and a negative correlation with anxiety. This indicates that government support has a positive relationship with crisis management efficacy and that efficacy is associated with lower levels of anxiety. Thus, suitable governmental support policies are needed.
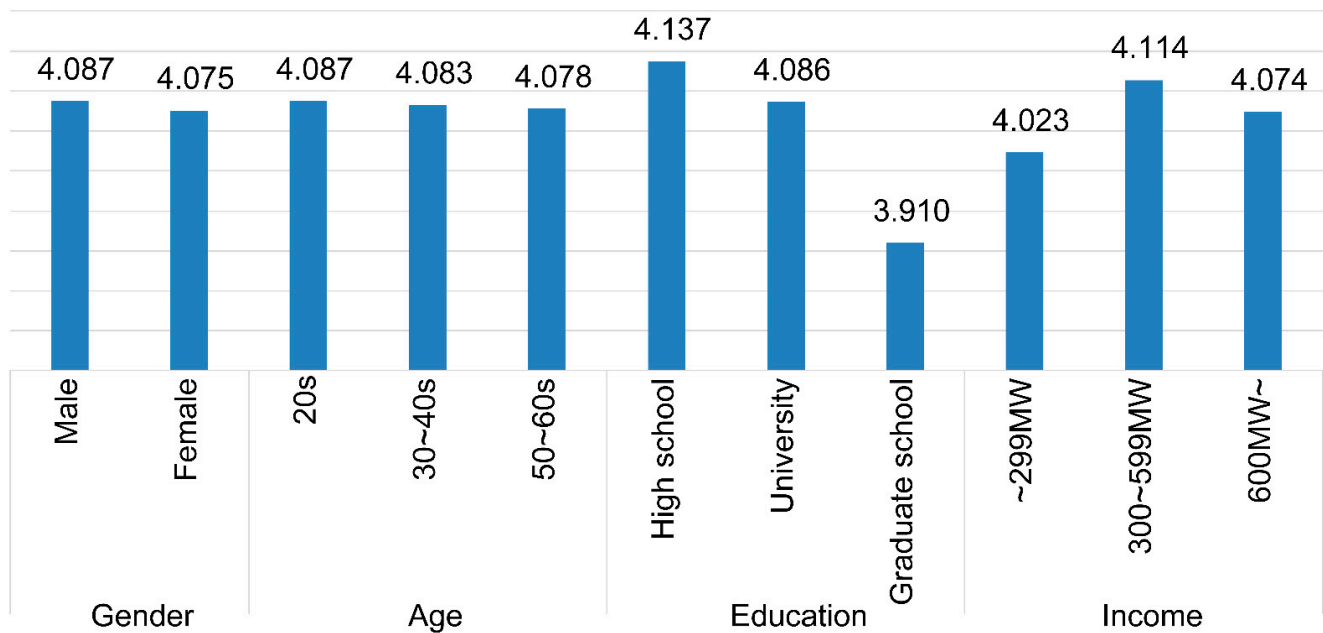
Figure 2. Mean efficacy scores by sociodemographic variables.

Table 3. Correlational analysis of crisis management effectiveness.

	Efficacy	Public Hygiene Behaviors	Public Hygiene Environment	Public Hygiene Information	Public Hygiene Facilities	Public Hygiene of the Population	Government Support	Civilian Support	Anxiety
Efficacy	-	0.128 **	0.231 **	0.220 **	0.182 **	0.213 **	0.482 **	0.327**	−0.228 **
Public hygiene behaviors	-	-	0.231 **	0.301 **	0.204 **	0.230 **	0.112 **	0.186**	0.039
Public hygiene environment	-	-	-	0.682 **	0.600 **	0.565 **	0.261 **	0.289**	−0.050
Public hygiene information	-	-	-	-	0.610 **	0.589 **	0.359 **	0.354**	−0.023
Public hygiene facilities	-	-	-	-	-	0.703 **	0.367 **	0.404**	−0.039
Public hygiene of the population	-	-	-	-	-	-	0.374 **	0.472**	−0.036
Government support	-	-	-	-	-	-	-	0.575**	−0.2400 **
Civilian support	-	-	-	-	-	-	-	-	−0.055

Note: ** $p < 0.01$.

There were positive correlations between public hygiene behaviors, public hygiene environment, public hygiene information, public hygiene facilities, and public hygiene of the population. Higher levels of behaviors related to public hygiene (e.g., hand washing, wearing masks, social distancing) were associated with the public hygiene environment, information, and facilities, which implies that it is important to construct the appropriate environment, information, and facilities, and to develop various methods of communications and publicity to promote behaviors for safe public hygiene.

We performed a regression analysis to measure the perceptions of efficacy and anxiety. The results are summarized in Tables 4 and 5.

Table 4. Multiple regression analysis for level of efficacy.

	B	*SE*	**Beta**	*t*	*p*
(Efficacy)	1.682	0.245		6.875	<0.001
Sex	−0.139 **	0.054	−0.092	−2.582	0.010
Age	−0.003	0.002	−0.049	−1.347	0.178
Income	0.000	0.000	0.039	1.096	0.274
Education level	−0.083 **	0.030	−0.100	−2.810	0.005
Central government support	0.465 ***	0.057	0.433	8.191	<0.001
Local government support	0.024	0.055	0.023	0.441	0.659
Civilian support	0.084	0.050	0.081	1.687	0.092
Public hygiene behaviors	0.086 *	0.044	0.074	1.981	0.048
Public hygiene environment	0.159 ***	0.049	0.165	3.253	0.001
Public hygiene information	−0.045	0.052	−0.046	−0.874	0.383
Public hygiene facilities	−0.084	0.052	−0.087	−1.611	0.108
Public hygiene of the population	−0.016	0.050	−0.017	−0.316	0.752

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. *B*: regression coefficient; *SE*: standard error of the mean. *F*-value 19.019 *** R^2/Adjusted R^2 0.273/0.259.

Table 5. Multiple regression analysis for level of anxiety.

	B	*SE*	**Beta**	*t*	*p*
(Anxiety)	3.018	0.321		9.406	<0.001
Sex	0.028	0.068	0.017	0.412	0.680
Age	−0.003	0.003	−0.043	−1.073	0.284
Income	0.000	0.000	−0.005	−0.128	0.898
Education level	0.008	0.038	0.008	0.204	0.838
Central government support	−0.326 ***	0.076	−0.268	−4.309	<0.001
Local government support	0.023	0.069	0.020	0.337	0.736
Civilian support	0.142 *	0.063	0.120	2.244	0.025
Public hygiene behaviors	0.073	0.055	0.055	1.312	0.190
Public hygiene environment	−0.060	0.062	−0.055	−0.955	0.340
Public hygiene information	0.075	0.066	0.068	1.143	0.253
Public hygiene facilities	0.006	0.066	0.005	0.086	0.931
Public hygiene of the population	0.011	0.063	0.011	0.180	0.857
Efficacy	−0.178 ***	0.051	−0.158	−3.475	0.001

Note: * $p < 0.05$; *** $p < 0.001$. *B*: regression coefficient; *SE*: standard error of the mean. *F*-value 4.903 *** R^2/Adjusted R^2 0.095/0.076.

When sociodemographic variables were inspected in detail, sex and education level were found to affect efficacy. O'Connor et al. [89] and Ding et al. [90] reported that females perceive the world as more dangerous than males, and this leads to more active perceptions of efficacy based on positive perceptions of response behaviors and overcoming difficult situations.

Education level also showed a correlation indicating that lower levels of education are associated with higher ratings of the efficacy of crisis management, which is consistent with a study by Calderón-Larrañaga et al. [91], in which an elderly, vulnerable population with low education was found to be at more risk both biologically and economically. In addition, Tian et al. [92] reported that COVID-19 has a negative psychosocial impact on citizens with low education and in a vulnerable working environment. Based on these findings, we can infer that vulnerable groups with high awareness of danger show higher perceived efficacy for successful crisis management. However, in our regression analysis, age and income did not show any major effect on efficacy.

With regard to support factors, central government support was found to have a significant effect on perceived crisis management efficacy. Local government support and civilian support did not have a significant effect on perceived crisis management efficacy. This may be because COVID-19 does not only affect specific regions, but has global effects. Therefore, the role of the central government and the nation are emphasized rather than the effects of support from local governments [93–95].

Finally, public hygiene behaviors to avoid contracting COVID-19 (e.g., social distancing, washing hands) and the public hygiene environment in the country had effects on crisis management efficacy, while public hygiene information, public hygiene facilities, and public hygiene of the population did not have major effects. This may be because case studies of countries implementing hygiene activities, such as social distancing [96–98], daily mask use [99–101], and a safe public hygiene environment [102–105] have already been recognized as scientific evidence for the prevention of COVID-19. These public hygiene behaviors and public hygiene environment variables had an effect on efficacy for successful crisis management [17,96–107].

Table 5 shows the results of the regression analysis for anxiety. Examining the effects of sociodemographic variables on perceived anxiety in detail revealed that neither sex, age, income, nor education level had a major effect on anxiety. As shown in studies by Roy et al. [108], Huang and Zhao [109], and Salari et al. [110], because COVID-19 is infecting large numbers of people across international borders and different communities, most survey participants have shown high levels of perceived anxiety, negating the impact of any single sociodemographic variable.

Among support-related variables, central government support and civilian support have effects on perceived anxiety. In particular, central government support reduced perceived anxiety. According to a study by Hale et al. [2], an immediate response and support from the government affect the rate of transmission of COVID-19, and the rate of transmission has a direct effect on public anxiety. Civilian support increased anxiety. This may be due to infection clusters caused by a small minority of civilian organizations failing to properly adhere to the government's quarantine guidelines [111,112]. Finally, crisis management efficacy reduced anxiety among the general public.

4. Discussion

The purpose of this study was to examine measures taken to inhibit the spread of the COVID-19 pandemic and to determine their effects on the efficacy and anxiety of the general public regarding crisis resolution. In particular, we aimed to help improve future crisis management policy by analyzing these factors.

Our findings have several important implications. First, some groups that are vulnerable to crises (e.g., females, those with lower education status) showed a need to overcome the crisis via strong efficacy. Thus, crisis management systems and policies for infectious diseases should be designed to meet the needs of the groups that are vulnerable to crises. It is a clear fact that the inequality that appears in groups vulnerable to COVID-19 pandemic also applies to developed countries. Accordingly, policy makers should react to COVID-19 while considering the measures to ease the inequality as well as the risks for the vulnerable groups [113–116].

Second, in a pandemic, the role of the central government is much more prominent than that of local governments. Since COVID-19 is not restricted to certain regions, the central government is essential in the implementation of organizations, systems, and institutions that can effectively respond to the pandemic. In particular, it is difficult to respond to the spread of new diseases due to the lack of knowledge and information and expertise, so the risk management should be implemented based on the official control of the central government and distribution of the resources [117–119].

Third, personal hygiene behaviors and the public health environment have direct effects on the efficacy of the public, meaning that active publicity and communication need to be developed for related policies.

Fourth, to alleviate the nation's anxiety, the government needs to reinforce its role in moderating, managing, and supervising civilians who refuse to comply or interfere with the government's support and policies. The prompt measures taken by the government to effectively convey crisis information to the public during crises can cause a positive influence on citizen participation [120–122].

5. Limitations

This study has several limitations. First, of the many variables in public crisis management, this study focused only on the risk perception of the public in regard to anxiety and efficacy. There is a need to explore other variables (e.g., social capital, culture, beliefs, values, etc.) that influence public crisis management in the future. Second, the participants in this study were limited to Koreans during the COVID-19 pandemic. Since research on overcoming a pandemic has a worldwide impact, there is a need to examine various countries, types of damage, victims, and private organizations, and to compare the results in the future.

Third, this study was not able to include data of individuals who were infected or cured of COVID-19 in its analysis. Research on individuals infected with or undergoing treatment for infectious diseases has hitherto focused mainly on analyzing medical connections [123–126]. Thus, additional research on public awareness of the danger of anxiety due to concerns over employment, family health (spreading the infectious disease), and financial difficulties of individuals infected with or undergoing treatment for infectious diseases is warranted.

6. Conclusions

In conclusion, the central government should implement active support and response measures to protect the vulnerable populations, promote policies, and improve crisis management communication to ensure a safe community, slow the spread of COVID-19, and alleviate the anxiety of the national population.

Further, identifying an evidence-based method to understand and address the psychological and social influences of COVID-19, such as excessive fear (or apathy or adequate attention) and discrimination, is crucial [127–129]. Analysis of public anxiety and danger awareness will provide insight regarding future risk factors for policy makers and assist in the optimization of potential and sustainable public health communication strategies [130–132].

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Abbreviations

COVID-19	Coronavirus disease 2019
SE	standard error of the mean

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