COVID-19 and Risk Factors of Anxiety and Depression in South Korea

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Objective The aims of this study were to explore the prevalence of and identify predictors of anxiety and depression related to coronavirus disease of 2019 (COVID-19) in South Korea.

Methods The analysis is based on a quota survey design and a sampling frame that permitted recruitment of a national sample of 1,014 individuals between March 17–31, 2020. Several standardized measurements were used, including GAD-7, PHQ-9, COVID-19 related fear, restrictions in deaily life, as well as sociodemographic information and physical and psychosocial needs during the pandemic. Multiple logistic regression was conducted to analyze the influence of sociodemographic factors, fear, and physical/psychosocial needs on anxiety and depression.

Results Significant numbers of the respondents were identifiable anxiety (19.0%) and depression group (17.5%), respectively. This indicates that the depression and anxiety prevalence rate after the COVID-19 is substantially high compared to the depression rate of 2.6% in 2020 and 2.8% in 2018 both reported in the Korea Community Health Survey and the anxiety rate of 5.7% reported in 2016 Survey of Mental Disorders in Korea. Multiple logistic regression results showed age, COVID-19 related fear, and the level of restrictions in daily as significant factors in understanding and predicting the anxiety group. Likfewise, the COVID-19 related fear, restrictions in daily life, and need for economic support were important predictors in predicting the depression group.

Conclusion Findings on predictors for greater vulnerability to anxiety and depression has important implications for public mental health in the context of the COVID-19 pandemic.   **Psychiatry Investig 2021;18(9):801-808**

Keywords COVID-19; Risk factors; Anxiety; Depression.

INTRODUCTION

Since 2019, coronavirus disease of 2019 (COVID-19) pandemic has drastically shifted our daily lives and considerably

increased people's mental health vulnerability. As mental health specialists, we must understand stressors and mental health outcomes in the context of coronavirus pandemic situations to meet the impacted individuals' needs and to effectively deliver adequate services. It is also important to identify high risk groups in terms of some of the prominent mental health outcomes, including anxiety and depression. This part is where researchers play a key role in finding and disseminating important knowledge related to the psychological impact of COVID-19.

The World Health Organization (WHO) declared the COVID-19 a 'pandemic', the highest level of alert on March 11, 2020.[1] In South Korea, ever since the first confirmed case iden-

tified on 20 January 2020, the number of confirmed cases surged by tens and hundreds per day and reached the highest number of daily confirmed 909 cases on 29 February. The accumulated number of confirmed cases soared rapidly within a month, leading to the first wave of the epidemic in the Daegu-Gyeongbuk region,[2] which resulted in a lack of hospital beds and consequently threatening the fundamentals and reliability of the health care system.[3] The difference between COVID-19 from the New Influenza, Middle East Respiratory Syndrome, and other infectious diseases is that there are yet no known effective treatments for the COVID-19, leading to an immense fear about the infection and negative impact.[4,5] Furthermore, with the COVID-19, concerns about the possibility of transmitting the disease to others triggered even greater fear and anxiety throughout the nation.[6,7]

There are already numerous research on psychological impact of COVID-19 that covers a wide range of topics including stress and fear,[8,9] anxiety,[10-22] depression,[8,11,15-17,20,21,23,24] loneliness,[9] and suicidal ideation.[13,17,25-27] Given these global prevalence, we can conclude that, unanimously, elevated psychological mental health problems stemming from the COVID-19 pandemic is a serious worldwide concern. Even at the early stages of the epidemic, there has been a significant concern regarding the unstable mental health statuses worldwide. For example, research by Qiu et al.[28] showed that 32.1% of the participants self-reported minor to a severe level of psychological pain, 16.5% showed average to severe depression symptoms, and 28.8% reported average to a severe level of anxiety oduring the early stage of the COVID-19 epidemic. Another study by Moghanibashi-Mansourieh[29] reported that 19.1% of the Iranian sample felt a severe anxiety level at the early stage of the COVID-19 epidemic. The U.S. Centers for Disease Control and Prevention (CDC) conducted a survey on 5,470 people of 18 and older throughout 24−30 June 2020, as part of their weekly morbidity and fatality rates, and reported 40.9% of the participants to have experienced at least one time of psychological abnormality, and 30.9% of the participants who experienced the abnormality reported the symptoms of anxiety and depression.[13]

In South Korea, a study on the mental health of over 1,000 people reported 34.2% and 28.8% of participants experienced a mild or higher level of depression and a mild or higher level of anxiety, respectively, since the spread of the COVID-19.[30] Given the high prevalence, an alternative and/or in-depth analysis is needed to shed light to understanding the vulnerability of at-risk population, other than examining only the average scores of anxiety and depression or using cut-off scores.[10,12,14-16,21,23,24] Currently, few studies have looked into the factors that predict high anxiety and depression.

In this study, we examined both the prevalence of and further explored predictors of anxiety and depression related to COVID-19. The analysis is based on a quota survey design and a sampling frame that permitted recruitment of a national sample of 1,014 individuals between March 17−31, 2020. This study is meaningful in that it identifies individuals who may require clinical attentions in terms of their anxiety and depression level in the early phase of the pandemic and suggests practical as well as political measures to offering mental health support by exploring the severity of mental health issues under the CO-VID-19 epidemic and the relevant predictors.

METHODS

Data collection

An on-line survey was conducted from March 17 to 30, 2020 in South Korea. The participants were selected from over 17 metropolitan cities and provinces accounting for the population ratio per city and age. The final national sample of this study included 1,014 participants (sampling error=±3.1% at 95% confidence level).

Measures

A wide range of standardized measurements were used in this study, including anxiety (Generalized Anxiety Disorder, GAD-7) and depression level (Patient Health Questionnaire-9, PHQ-9), COVID-19 related fear, restriction levels in daily life, as well as sociodemographic information and physical and psychosocial needs during the pandemic. Using GAD-7, study participants were asked to self-report on a 7-item scale, with the level of the most recent anxious situation being scored on a scale of 4 with '0=none,' '1=several days,' '2=over a week,' and '3= nearly every day' (the range of total scores 0 to 21; cut-off score ≥10). Using PHQ-9, study participants were asked to self-report on a 9-item scale, with the most recently experienced depressive situation on a scale of 4 with '0=none,' '1=several days,' '2=over a week,' and '3=nearly every day' (the range of total scores 0 to 27; cut-off score≥10). Both GAD-7 and PHQ-9 scales with higher scores represent greater levels of anxiety and depression.

Sociodemographic information included gender, age, type of household, occupation, and region of residence. Age was categorized into five groups: 1) 19−29, 2) 30−39, 3) 40−49, 4) 50−59, and 5) 60−70. Types of the household was dichotomized into single-person households and other. The job status was comprised of three groups: 1) unemployed, 2) self-employed, and 3) other.

Region of residence was subcategorized into Daegu Metropolitan City, Gyeongbuk province and other, given that the morbidity rate in Daegu and Gyeongbuk were much more severe than other metropolitan cities and providences at the point of data collection. At that point, the accumulated number of the

confirmed cases in South Korea was 9,661; the number of confirmed cases per 100,000 population was 18.63.[31] Daegu reported 271.87 confirmed cases per 100,000 cases, while Gyeongbuk recorded 48.75 confirmed cases per 100,000 cases.[31]

Three questionnaires composed the COVID-19 related fear scale, including the fear of infection of oneself, quarantine due to the infection of oneself and family members, and the stigma due to the infection (scores each ranging from 1 to 4). As for the restrictions in daily life, the level of restrictions in three life domains, including job, social life/leisure activity, family life/role within the family, were assessed. Needs for the information on the disease, support for personal hygiene products, care-related welfare services, and economic support were also identified.

Analysis

Multiple logistic regression was conducted to analyze the impact of the general characteristics, fear, and needs on anxiety and depression. This study was reviewed and approved by Kangwon National University (IRB approval number: KWNUIRB-2020-03-004-001).

RESULTS

Sample characteristics

Sample characteristics of the participants (n=1,014) are shown

Table 1. Sample characteristics

Types	N (%)
Gender	
Male	516 (50.9)
Female	498 (49.1)
Age	
19−29	188 (18.5)
30−39	191 (18.8)
40−49	226 (22.3)
50−59	235 (23.2)
60−70	174 (17.2)
Type of household	
Single-person household	113 (11.1)
Others	901 (88.9)
Occupation	
Unemployed	100 (9.9)
Self-employed	75 (7.4)
Others	839 (82.7)
Region of residence	
Daegu	47 (4.6)
Gyeongbuk	48 (4.7)
Others	967 (90.6)
Total	1,014

in Table 1. Males and females were 50.9% (n=516) and 49.1% (n=498), respectively. A sample of 1,014 participants was divided into the following age categories: 19−29 (18.5%); 30−39 (18.8%); 40−49 (22.3%); 50−59 (23.2%); and 60-70 (17.2%) years. Single-person household composed 11.1% (n=113), 9.9% (n=100) of participants were unemployed, while 7.4% (n=75) were self-employed. As for the region of residence, Daegu and Gyeongbuk residents were 4.6% (n=47), and 4.7% (n=48), respectively.

Fear, restrictions in daily life, needs

Fear, restrictions in daily life, needs are shown in Table 2. The average score of fear of infection was 1.63 (SD=0.81), fear of quarantine due to infection 1.69 (SD=0.90), and the fear of stigmatization due to infection 1.63 (SD=0.92). The average score of each life domains of restrictions in daily life was 6.88 (SD=2.83) for the restriction in social life/leisure activities, 5.01 for the restriction in the job (SD=3.54), and 4.85 (SD=3.22) for the restriction in family life/role within the family. The average scores of the needs for the support for personal hygiene products was 2.34 (SD=0.70) and 2.10 (SD=0.77) for the information needs on the disease.

Mental health statuses

Prevalence of anxiety and depression

In Table 3, of all participants, individuals in the anxiety group (GAD-7 total score≥10) was 19.0% (n=193) and 17.5% (n=177) for those in the depression group (PHQ-9 total score≥10).

Predictors of anxiety and depression

In Table 4, multiple logistic regression results showed that age, COVID-19 related fear, and level of restrictions in daily

Table 2. Fear, restrictions in daily life, and needs

Types	Mean (standard deviation)
Fear	
Of infection	1.63 (0.81)
Of quarantine due to infection	1.69 (0.90)
Of stigma due to infection	1.63 (0.92)
Restrictions in daily life	
Job	5.01 (3.54)
Social life/leisure activity	6.88 (2.83)
Family life/role within the family	4.85 (3.22)
Needs	
Information on the disease	2.10 (0.77)
Support for personal hygiene products	2.34 (0.70)
Care related welfare service	1.44 (1.05)
Economic support	1.95 (0.89)

life were associated with the likelihood of belonging in the anxiety group (χ^2[20]=263.647, p<0.001). Age-wise, participants who are in their 20's were 2.146 (1/0.446=2.146) times more likely to be in the anxiety group, compared to the participants in their 30's (Wald=5.051, exp[B]=0.466, p=0.025), and 2.646 (1/0.378=2.646) times higher likelihood than those in their 50's (Wald=9.616, exp[B]=0.378, p=0.02). COVID-19 related fear was also a significant predictor, with one point increase of fear of being infected, the possibility of belonging in the anxiety group increased by 2.631 times (Wald=25.538, exp[B]=2.631, p<0.001), and one point increase of fear on being quarantined due to infection resulted in 1.568 times higher (Wald=6.676, exp[B]=1.568, p=0.010) possibility of belonging in the anxiety group. The level of restrictions in daily life due to COVID-19 was also a significant factor. With a one point increased in the level of restriction on the job, the possibility of belonging in the anxiety group increased by 1.112 times (Wald=98.947, exp[B]=1.112, p=0.003). One point increase in the restriction in family life/role within the family resulted in 1.145 times higher (Wald=10.142, exp[B]=1.145, p=0.001) likelihood of belonging in the anxiety group. In contrast, one point increase of restriction on social life/leisure activities reduced the possibility by 1.124 (1/0.890=1.124) times (Wald=5.128, exp[B]=0.890, p=0.024).

The multiple logistic regression on regression was significant (χ^2[20]=145.038, p<0.001) (Table 5). Fear of COVID-19, restrictions in daily life, and needs for economic support significantly explained the probability of belonging in the depression group. Of the factors relevant to the COVID-19 related fear, one point increase of fear of being infected increased the likelihood of belonging in the depression group by 1.876 times (Wald=13.829, exp[B]=1.876, p<0.001). With one point increase of restrictions in daily life in terms of family life/role within the family, the possibility of belonging in the depression group increased by 1.132 times (Wald=9.971, exp[B]=1.132, p=0.002). Every one point increase of needs for economic support resulted in a 1.346 times higher possibility of being in the depression group. (Wald=4.886 exp[B]=1.346, p=0.027).

Table 3. Prevalence rates of anxiety and depression

Classification	N (%)
Anxiety	
GAD-7 total scores (0−9)	821 (81.0)
GAD-7 total scores (10−21)	193 (19.0)
Depression	
PHQ-9 total scores (0−9)	837 (82.5)
PHQ-9 total scores (10−27)	177 (17.5)

GAD-7, Generalized Anxiety Disorder-7; PHQ-9, Patient Health Questionnaire-9

DISCUSSION

South Korea has been evaluated as a country successfully preventing the spread of COVID-19 without a total lock-down.

Table 4. Multiple logistic regression results on anxiety

Variables	B	S.E	.Wald	Exp (B)	p
Sex					
Sex (1)	-0.362	0.195	3.444	0.697	0.063
Age					
Age			11.128		0.025
Age (1)	-0.764	0.330	5.051	0.466	0.025
Age (2)	-0.404	0.304	1.769	0.668	0.183
Age (3)	-0.972	0.313	9.616	0.378	0.002
Age (4)	-0.572	0.300	3.624	0.565	0.057
Type of household					
Household (1)	-0.465	0.340	1.865	0.628	0.172
Occupation					
Occupation			1.041		0.594
Occupation (1)	-0.389	0.386	1.016	0.678	0.313
Occupation (2)	0.024	0.340	0.005	1.024	0.943
Region of residence					
Region			4.706		0.095
Region (1)	0.676	0.382	3.129	1.966	0.077
Region (2)	-0.521	0.452	1.327	0.594	0.249
Fear					
A of infection	0.967	0.188	26.538	2.631	<0.001
B of quarantine due to infection	0.450	0.174	6.676	1.568	0.010
C of stigma due to infection	0.212	0.154	1.890	1.236	0.169
Restrictions in daily life					
A Job	0.107	0.036	98.947	1.112	0.003
B Social life/leisure activity	-0.116	0.051	5.128	0.890	0.024
C Family life/role within the family	0.136	0.043	10.142	1.145	0.001
Needs					
A Information	0.296	0.175	2.840	1.344	0.092
B Hygiene products	0.054	0.200	0.074	1.056	0.786
C Care	0.056	0.110	0.254	1.057	0.615
D Economic support	0.230	0.141	2.671	1.259	0.102
Constant	-5.692	0.576	97.482	0.003	<0.001

Sex: male 0, female 1; age group: 19−29, 30−39, 40−49, 50−59, 60−70; type of household: single-person household 0, others 1; occupation: unemployed 0, self-employed 1, other 2; region of residence: Daegu 0, Gyeongbuk 1, other 1; fear: A - of being infected, B - of being isolated due to infection, C - being stigmatized due to infection; Restrictions in daily life A - job, B - social life/leisure activity, C - family life/role within the family; needs: A - information on the disease, B - support for hygiene products, C - care-related welfare service, D - economic support

However, while emotional threats such as anxiety, fright or fear, and depression were identified and responded effectively in the early stages, the path of infection and prevention and treatment

Table 5. Multiple logistic regression results on depression

	B	S.E	.Wald	Exp (B)	p
Sex					
Sex (1)	-0.300	0.187	2.580	0.741	0.108
Age					
Age			2.812		0.590
Age (1)	-0.279	0.332	0.706	0.757	0.401
Age (2)	0.215	0.298	0.523	1.240	0.470
Age (3)	-0.072	0.299	0.058	0.930	0.809
Age (4)	-0.043	0.301	0.020	0.958	0.887
Type of household					
Household (1)	0.193	0.286	0.456	1.213	0.500
Occupation					
Occupation			3.436		0.179
Occupation (1)	0.456	0.321	2.010	1.577	0.156
Occupation (2)	-0.392	0.364	1.164	0.676	0.281
Region of residence					
Region			1.068		0.586
Region (1)	0.231	0.381	0.369	1.260	0.544
Region (2)	-0.349	0.437	0.638	0.705	0.424
Fear					
A of infection	0.629	0.169	13.829	1.876	<0.001
B of quarantine due to infection	0.130	0.160	0.657	1.139	0.418
C of stigma due to infection	0.149	0.146	1.043	1.161	0.307
Restrictions in daily life					
A Job	0.045	0.033	1.894	1.046	0.169
B Social life/leisure activity	-0.007	0.049	0.020	0.993	0.888
C Family life/role within the family	0.124	0.039	9.971	1.132	0.002
Needs					
A Information	0.032	0.163	0.038	1.032	0.846
B Hygiene products	0.142	0.190	0.559	1.152	0.455
C Care	0.004	0.105	0.001	0.996	0.969
D Economic Support	0.297	0.134	4.886	1.346	0.027
Constant	-5.026	0.544	85.223	0.007	<0.001

Sex: male 0, female 1; age group: 19−29, 30−39, 40−49, 50−59, 60−70; type of household: single-person household 0, others 1; occupation: unemployed 0, self-employed 1, other 2; region of residence: Daegu 0, Gyeongbuk 1, other 1; fear: A - of being infected, B - of being isolated due to infection, C - being stigmatized due to infection; restrictions in daily life A - job, B - social life/leisure activity, C - family life/role within the family; needs: A - information on the disease, B - support for hygiene products, C - care-related welfare service, D - economic support

methods were not known, causing a high level of uncertainty to the general poulation. Moreover, identifying individuals who may be more vulnerable to experiencing mental health issues has been a critical issue in preventing their psychological issues from becoming even more severe than necessary. The aim of this study was to suggest national policies and social services for psychological support by exploring the mental health statuses among adults in South Korea within the context with COVID-19 spread and social distancing in the early stage of the pandemic so as to detect high risk anxiety and depression groups and to explore important factors affecting their mental health statuses. Summaries of our findings are as follows:

First, COVID-19 indeed has imposed a signficant psychological challenge to the mental health of the public. The anxiety group with a score of 10 and higher on GAD-7 composed 19.0% of the participants, and the depression group with a score of 10 or more on PHQ-9 being 17.5%. This indicates that the depression and anxiety prevalence rate after the COVID-19 is substantially high compared to the depression rate of 2.6% in 2020 and 2.8% in 2018 both reported in the Korea Community Health Survey (a median of the ratio of participants with a score of 10 or more on PHQ-9) and the anxiety rate of 5.7% reported in 2016 Survey of Mental Disorders in Korea.[32,33] Because there is a wide range of prevalence rates reported in the literature, it is necessary to compare this study's findings with other relevant studies that leveraged justified scale in the early stages of COVID-19. In March 2020, Jung et al.[34] used the same scale and standard as this study to investigate the impact of COVID-19 on the Cardiovascular and Metabolic Disease Etiology Research Center cohort. The study identified 12.2% of the anxiety group and 6.1% of the depression group. Jung and Hong[35] and Lee et al.[36] identified 12.5% and 18.0% of anxiety group with GAD-7 scores 10 or higher. Zhao et al.[37] reported that 22.31% of university students who participated in the online survey reported PHQ scores 10 or higher, while a study by Lee et al.[36] using Short Forms of the Korean version Center for Epidemiologic Studies Depression scale (CES-D) identified 29.7% of the participants (over 3 points out of 10) as depression group. Such differences in the anxiety and depression group per study may be related to the time at which the survey was administered within the COVID-19 context. Studies by Jung and Hong,[35] Lee et al.,[36] and Zhao et al.[37] were conducted in April 2020, but our study was performed in March when the number of confirmed cases began to soar in South Korea due to the group infection centering around a religious group located in Daegu. In April, news coverages on the unstable supply of masks, rapidly increasing number of COVID-19 confirmed cases, death from COVID-19, and lack of hospital beds repeated regularly have contributed to even higher rise of the anxiety level. Therefore, it may be difficult to make an absolute comparison between the

study results on depression across various studies, as the timing of the survey, characteristics of the respondents, and the depression scale used vary. However, given that the ratio of the depression group identified in studies in April is relatively higher than those of this study, it is reasonable to conclude that the depression risk have increased with the prolonged COVID-19 situation.

Second, important factors in understanding and predicting the anxiety group included age, COVID-19 related fear, the level of restrictions in daily life. With respect to age, a higher proportion of respondents in their 20's was an important finding. The respondents of a study by Jung et al.[34] did not include the subjects in their twenties, but respondents of the youngest age (33–39 years old) and the highest level of education group illustrated the highest level of anxiety. Although this prevalence of younger age group showing a higher level of anxiety needs to be further investigated, it is presumable that people in their twenties are in the developmental stages where more time and social experiences are required to reach psychological and emotional maturity. Because they are likely to experience uncertainties facing challenges, including employment and marriage, this developmental vulnerability may have interacted with the COVID-19 pandemic which may have resulted in a higher level of anxiety. Arnett[38] pointed out the delay in the transition from adolescence to adulthood in high-income countries and introduced the concept of "emerging adulthood," which refers to individuals aged 18–29 years, and their developmentally vulnerable issues should also be considered in understanding the higher level of anxiety regarding the COVID-19. As such, epidemiological survey findings from the United States and Japan reported a higher prevalence of psychiatric disorders among the youths in 18–29.[39] In South Korea, not limited to anxiety disorder, the subjects' socio-demographic distribution with at least one psychiatric disorder experience was the highest in the youths in 18–29 of age at 31.2%.[33] These figures may explain that the younger generations may be less equipped with a sufficient level of resilience to effectively cope with stressors such as COVID-19.

The COVID-19 related fear also played a significant role in predicting the anxiety group. Our data collection period overlapped with the first wave of a rapid infection increase, when there was an unstable supply of masks, no vaccination and treatment, rapidly increasing number of religious facility-related COVID-19 confirmed cases, and lack of hospital beds, which lead to even a higher level of fear of infection among the public. Under such circumstances, with the greater fear of infection and of quarantine due to infection, the possibility of being in the anxiety group could increase. Similarly, research by Jung et al.[34] showed that the suspected and/or the quarantined group showed the highest anxiety level, PTSD, and depression scores

among the COVID-19 confirmed, the suspected and/or the quarantined individuals, actively monitored, and healthy groups. Being isolated, unable to connect with others could be a risk factor for a person's mental health under a disaster situation.[40] The fear of being apart from family members may have also aggravated the anxiety level.

As for the level of restrictions in daily life, the greater the level of restrictions in daily life, the higher likelihood of being in the anxiety group. Respondents who felt a higher level of restrictions at the job and family life/role within the family showed a higher possibility of being in the anxiety group. An interesting result is that an increase in the level of restrictions in social life/leisure activity was associated with a decrease in the likelihood of being an anxiety group. This indicates that limiting social life/leisure activity during a social epidemic crisis can be a protective factor in lowering the anxiety level. Likewise, social distancing may reduce the possibility of the COVID-19 infection, and compliance with these quarantine guidelines may explain the lowered anxiety levels. This is comparable to an earlier study by Yonhap News Agency[41] who conducted a public survey in the first week of February 2020, where respondents with overwhelmingly high anxiety (60.2%) were outstanding after being exposed to the news about COVID-19, and anxiety (48.8%) was the most in the same survey performed after the last week of February. The investigation point in time of this study was after the pervading anxiety about COVID-19[41] subsided, but the full-fledged restrictions in daily life began with the unstable supply of masks, school lock-down, and working from home.

Third, COVID-19 related fear, restrictions in daily life, and need for economic support were significant predictors of the depression group. Particularly, COVID-19 related fear, especially of oneself being infected, was an important factor for predicting the depression group. A higher level of restrictions in family life/role within the family and a higher need for economic support (i.e., greater financial difficulty) due to the COVID-19, the likelihood of being in the depression group increased, partially coinciding with findings by Solomou and Constantinidou,[42] stating that the lower quality of life (QOL) raises the depression risk. Findings on the employment instability and income drop experienced due to the COVID-19 pandemic being major predictors of belonging in the depression group is consistent with the preceding studies (e.g., Howe et al.[43]), indicating the need for livelihood support and welfare to maintain the quality of life and manage distress.

Despite some of these important findings, this study has limitations. First, the socially disadvantaged or the elderly who are not familiar or do not have access to the Internet may have been unintentionally excluded from the on-line survey, when they can be more susceptible to pandemic situations. Second, while individuals with prexisting mental health conditions may be at

higher risk and may deteriorate or amplify[42] as COVID-19 situation prolongs, this study was not able to account for the factor in terms of collecting information on pre-mental health status and the study being cross-sectional. Future studies may incorporate these limitations by including people who are less familiar with online in parallel with online surveys, conducting a longitudinal study so as to that reflect the COVID-19 situation and the adaptation process over time.

Nonetheless, this study has important implications for public mental health in the context of the COVID-19 pandemic. While it is necessary to conduct a thorough quarantine, simultaneously providing accurate information on the disease and effective crisis communication is crucial in reducing both the unreliable information and COVID-19 related fear being spread nationwide. Given that individuals' stress responses are different and that reaction tend to vary, a psychological approach for enhancing resilience is also important in targeting the youth who are less capable of sufficiently coping upon ecountering a new stressor. With the prolonged COVID-19 situation, an economic crisis threatening individual/family livelihood and recession may become more prominent, accentuating the issue of the depression. Therefore, in addition to the government's financial support and welfare policy, mental health support is required to restore the daily life damaged by COVID-19 and improve the quality of life.

Availability of Data and Material

Data sharing not applicable to this article as no datasets were generated or analyzed during the study.

Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

Author Contributions

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