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The Psychological Burden of COVID-19 Stigma: Evaluation of the Mental Health of Isolated Mild Condition COVID-19 Patients

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ABSTRACT

Background: The objective of this article is to assess the mental health issues of the mild condition coronavirus disease 2019 (COVID-19) patients admitted to a community treatment center (CTC) in Korea.

Methods: A total of 107 patients admitted to a CTC were included as the study population, and their mental health problems including depression (patient health questionnaire-9), anxiety (generalized anxiety disorder scale-7), post-traumatic stress disorder (PTSD) (PTSD checklist-5) and somatic symptoms (by patient health questionnaire-15) were evaluated every week during their stay. The stigma related to COVID-19 infection was evaluated with an adjusted version of the Middle East respiratory syndrome (MERS) stigma scale.

Results: During the first week of isolation, the prevalence of more-than-moderate depression was 24.3%, more-than-moderate anxiety was 14.9%, more-than-moderate somatic symptoms was 36.5% and possible PTSD was 5.6% of total population. For depression and anxiety, previous psychiatric history and stigma of COVID-19 infection were significant risk factors. For PTSD, previous psychiatric history and stigma of COVID-19 infection as well as total duration of isolation were found to be significant risk factors. Prevalence of depression, anxiety and possible PTSD remained similar across the four weeks of observations, though the prevalence of severe depression, increased after four weeks of stay. Somatic symptoms seemed to decrease during their stay.

Conclusion: The results suggest that social mitigation of COVID-19 related stigma, as well as care of patients with pre-existing mental health problems are important mental health measures during this crisis period. It is also important that clinical guidelines and public health policies be well balanced over the protection of the public and those quarantined to minimize the negative psychosocial consequences from isolation of the patients.

Keywords: COVID-19; Isolation; Depression; Anxiety; Stigma

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The authors have no potential conflicts of interest to disclose.

Author Contributions

Conceptualization: Sohn JH, Park HW, Lee YJ, Cho B. Data curation: Sohn JH, Kang E. Formal analysis: Kang E, Lee SY. Investigation: Kang E, Lee SY, Kim MS, Jung H, Kim KH, Kim KN. Methodology: Sohn JH, Park HW, Lee YJ, Cho B. Writing - original draft: Kang E, Lee SY, Sohn JH. Writing - review & editing: Kang E, Lee SY, Kim MS, Jung H, Kim KH, Kim KN, Cho B, Sohn JH.

INTRODUCTION

In 2020, the worldwide severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) infection 2019 (COVID-19) epidemic resulted in large numbers of patients and shortages of medical facilities.^{1,2} Community treatment centers (CTCs) are innovative responses to the COVID-19 outbreak in Korea.³ The Korean government converted existing accommodation facilities into patient facilities to cope with the lack of hospital beds. COVID-19 patients with no symptoms or mild symptoms did not need intensive medical treatment, but they still needed to be quarantined until they were clear of the virus to prevent the spread of the disease.⁴ Further, medical monitoring is also needed to detect acute deterioration and to deal with it. The CTC is an intermediate model between hospitals and self-isolation at home.³ COVID-19 patients with minimal symptoms stayed in separate rooms in CTCs, and the medical staff of the CTCs consisted of doctors and nurses that monitored patients periodically, including using various telemedicine methods including smartphones.

The mass outbreak of a viral disease is going to cause public anxiety and subsequently lead to various mental health issues, both for the infected individuals and the general population.^{5,6} Despite the efforts of public health authorities and hospitals to make the quarantine more acceptable to patients, and it is legally and scientifically justified from both the individual and public health viewpoints to quarantine those patients, the quarantine itself is essentially an involuntary process that involves the restriction of basic human rights, so there is always the possibility that the quarantine becomes a traumatic experience for those involved. Indeed, one psychiatrist consulting the CTC in which the authors of this article were involved reported that patients worried about their family, especially the children that were left out; felt guilty that they might have infected their loved ones; had anxiety about uncertainty of this novel disease; worried about their own jobs and workplaces; felt frustrated about the postponement of important personal or occupational events; and experienced boredom during their isolation. Those negative psychosocial factors can combine and might lead to the deterioration of the patient's mental health. Quarantines were indeed reported to be associated with suicide, anger and other unpleasant psychological consequences in several other literatures and reviews from previous and current infectious disease outbreaks.^{7,8} These possible negative psychological costs should be mitigated as far as possible if the quarantine is to be successful against the viral outbreak.⁹ Therefore, the CTC that we have operated screened patients' mental health vigorously and tried to provide the patients with various mental health promoting programmes and activities.

The objective of this article is to assess and understand the mental health issues we observed during the operation of a CTC during the first months of the COVID-19 crisis in Korea and provide insights on the principles of operating quarantine facilities during this crisis period.

METHODS**Study setting-CTCs**

By the end of February 2020, the Korean government decided to operate CTCs that isolate and monitor mild COVID-19 patients to cope with the shortage of hospital beds.¹⁰ The target population of CTCs were COVID-19 patients who were asymptomatic or had mild symptoms according to the criteria of the Korea Centers for Disease Control and Prevention (KCDC).¹¹ Patients admitted to CTCs were those who were waiting to be admitted to the hospital after

a COVID-19 diagnosis and those who were simply waiting for viral clearance in the hospitals. CTCs could provide symptomatic treatment for mild respiratory symptoms such as coughs, fevers, etc. However, if there was evidence of pneumonia in chest X-rays or symptomatic deterioration, patients were to be transferred to the hospital immediately. According to the guidelines of the KCDC, patients were discharged when two consequent RT-PCR tests at least 24 hours apart both failed to detect the virus.¹¹

This study was conducted in one CTC operated by Seoul National University Hospital (SNUH). In March 5, 2020, SNUH, a teaching hospital in Korea, transformed the existing human resource development centre with 100 rooms into a CTC. The SNUH-CTC consisted of a patient center and a remote monitoring center. The patient center was where the patients were staying. They stayed in separate one- or two-bed rooms equipped with a private toilet and shower. Each room also had a small balcony or window for outside viewing. Meals and snacks were served in the room using disposable lunchbox style trays, and patients were provided with basic necessities including toiletries and other personal hygiene items, phone and Internet connections and cable TV channels. Patients were also provided with automatic blood pressure monitors, thermometers and finger-oxygenometers for self-monitoring vital signs. Patients were given instructions to measure their vital signs twice a day with those self-measured devices. They were also given chest X-ray examinations and COVID-19 tests at regular intervals. In the patient center, a minimal number of medical staff (1–2 doctors, 2 nurses and a radiographer) stayed with the patients for viral testing, X-ray screening, unavoidable in-person examinations, and emergency responses. In the remote monitoring center, doctors and nurses monitored patients at least twice a day using the telemedicine method and a smartphone. The detailed operations of SNUH-CTC were reported previously.¹²

Study design and data collection

As a retrospective observational study, data were obtained through reviewing medical records. All variables were collected from the electronic medical recording system of SNUH. Two of the researchers reviewed the data and cross-checked them. The medical records were composed of the following data: age, sex, date of diagnosis, date of admission, underlying disease (diabetes, hypertension, and respiratory disease), COVID-19 related symptoms (cough, sputum, fever or chill, rhinorrhoea, sore throat, dyspnea, chest pain, headache and myalgia), and the results of a weekly psychiatric evaluation.

At admission, the psychiatric history and initial psychiatric assessment were evaluated. The psychiatric history included the diagnosis of psychiatric disorders and the use of psychotropic medications. The psychiatric assessment includes the PHQ-2 (patient health questionnaire-2) and the GAD-2 (generalized anxiety disorder 2-item).^{13,14} During their stay at the CTC, patients reported their self-checked vital signs and symptoms to the medical staffs twice a day using the smartphone application. The doctors and nurses checked it and provided medical consultations using a video-call system. Every week after admission, the patients completed and submitted detailed psychiatric assessments that consisted of the Korean versions of the PHQ-9 (patient health questionnaire-9), GAD-7 (Generalized Anxiety Disorder Scale), P4 (suicidality screener), PCL-5 (PTSD checklist for DSM-5), PHQ-15 (patient health questionnaire-15), and COVID-19 stigma (**Appendix 1**).^{13–22} If at-risk mental status was detected from these questionnaires or at the request of the patients themselves or the monitoring staff, a psychiatric consult using a video-call interview was arranged to conduct a psychiatric assessment and supportive psychotherapy. The consulting psychiatrist offered brief psychotherapy sessions for anyone with mental health difficulties during their stay

at the CTC, and prescribed antidepressants and anxiolytic medications for clinical mental health disorders.

Study population

Between 5 March and 8 April 2020, 113 COVID-19 patients who were admitted to the SNUH-CTC were included. Three pediatric patients under 18 years old and three patients who were discharged within one week of admission were excluded. A total of 107 patients were included as the study population.

Measurements

To evaluate patients' psychiatric conditions, multiple assessment tools were used. Depression was assessed with the PHQ-9, which is a 9-item scale to assess the symptoms of major depressive disorder.¹⁸ Significant depression is defined to be when the total score is ≥ 5 . Anxiety was assessed with the GAD-7 scale.¹⁹ The GAD-7 consists of seven items and a total score ≥ 5 is considered to be significant anxiety. Suicidal ideas were evaluated with the P4 suicidality screener, which evaluates the suicidal attempt history and plans. Post-traumatic stress disorder (PTSD) was evaluated with the PCL-5.²⁰ It is a 20-item scale that assesses the symptoms of stress, and PTSD is defined to be when the total score is ≥ 31 . The PHQ-15 evaluated the severity of 15 somatic symptoms.²² The COVID-19 stigma was evaluated with an adjusted version of the MERS stigma scale. It is an 8-item scale assessing the four domains of stigma with a four-point Likert-type scale (from "strongly disagree" to "strongly agree"): personalized stigma, disclosure concerns, negative self-image, and public attitude concerns.^{21,23} Concurrent validity was assessed by examining the relationship of stigma index with other validated questionnaires. COVID-19 stigma index has a statistically significant positive correlation with PHQ-9, GAD-7, PHQ-15 and PCL-5 (Appendix 2).

Statistical analysis

The PHQ-9, GAD-7, P4 suicidality screener, PCL-5 and COVID-19 stigma scale were scored according to each questionnaire's scoring manual. The descriptive statistics are described for the sociodemographic variables, the changes in the proportion of patients with psychiatric distress during the isolation period in the CTC and the intensity of the somatic symptoms of the mild COVID-19 patients in the CTC. We analysed the relationships between sociodemographic factors with the COVID-19 stigma with the χ^2 test or ANOVA; we assessed the associations between depression, anxiety, PTSD and clinical characteristics using odds ratios (ORs), which were calculated using multiple logistic regression analyses; and the 95% confidence intervals (CIs) were calculated using maximum likelihood methods. All tests were two-tailed, and $P < 0.05$ was considered statistically significant. All analyses were performed using the Stata software, version 14.1 (Stata Corp., College Station, TX, USA).

Ethics statement

The study was approved by the Institutional Review Board (IRB) of Seoul National University Hospital (IRB No. H-2003-163-1112). Informed consent was exempted as this study was a retrospective medical record review study and did not obtain patient personal information.

Table 1. Characteristics of the mild COVID-19 patients admitted to a CTC in Korea, according to the level of perceived COVID-19 stigma

Characteristics	Total	Perceived stigma		P value ^a
		Upper 25%	25%–100%	
Sex				0.302
Male	51 (47.7)	11 (21.6)	40 (78.4)	
Female	56 (52.3)	17 (30.4)	39 (69.6)	
Age, yr				0.720
< 30	73 (68.2)	19 (26.0)	54 (74.0)	
30–49	19 (17.8)	4 (21.0)	15 (79.0)	
≥ 50	15 (14.0)	5 (33.3)	10 (66.7)	
Previous psychiatric history				0.417
Yes	11 (10.3)	24 (25.0)	72 (75.0)	
No	96 (89.7)	4 (36.4)	7 (63.6)	
Underlying disease ^b				0.748
Yes	5 (4.7)	1 (20.0)	4 (80.0)	
No	102 (95.3)	27 (26.5)	75 (73.5)	
COVID-related symptoms				0.997
Yes	65 (60.7)	17 (26.2)	48 (73.8)	
No	42 (39.3)	11 (26.2)	31 (73.8)	
Total duration of isolation, day				0.061
0–10	49 (45.8)	13 (26.5)	36 (73.5)	
> 10	58 (54.2)	15 (25.9)	43 (74.1)	

Values are presented as number (%).

COVID-19 = coronavirus disease 2019, CTC = community treatment center.

^aP value by χ^2 test; ^bUnderlying disease includes: hypertension, diabetes and asthma.

RESULTS

Demographic characteristics of COVID-19 patients and the relationship with COVID-19 stigma

The basic characteristics in this study population are shown in **Table 1**. Of the 107 residents, 52.3% were female and 68.2% of them were no more than 30 years old. Approximately 10.3% of the patients had a previous psychiatric history and 4.7% of them had an underlying disease. 39.3% did not have COVID-19 symptoms, and the mean isolation period at the time of the evaluation was 11.58 ± 0.81 days. There were no significant differences between the subjects with high levels and low levels of COVID-19 stigma regarding their sociodemographic characteristics, COVID-19 symptoms, and total duration of isolation.

The relationships between depression, anxiety, PTSD and clinical characteristics

To identify the relationships between depression, anxiety, PTSD and clinical characteristics among the participants, sex- and age-adjusted logistic regression models were applied for analysis (**Table 2**). Previous psychiatric history was significantly associated with a depressed mood in the PHQ-9 scale (adjusted OR [aOR], 11.76; 95% CI, 2.67–51.92). COVID-19 stigma was also related to a depressed mood (aOR, 7.66; 95% CI, 2.76–21.29). Similar results were observed for the relationship between anxiety and clinical characteristics. A previous psychiatric history and COVID-19 stigma were significantly associated with the anxiety of patients (aOR, 10.15; 95% CI, 2.43–42.40, and aOR, 10.43; 95% CI, 3.04–35.75, respectively). In the case of PTSD, the participants with a previous psychiatric history were more likely to have PTSD (aOR, 11.88; 95% CI, 1.83–77.20). COVID-19 stigma and the total duration of isolation were significantly associated with PTSD (aOR, 8.77; 95% CI, 1.40–55.01, and aOR, 8.94; 95% CI, 1.41–56.60, respectively).

Table 2. Multivariate logistic regression analysis on relationship between depression, anxiety, PTSD and clinical characteristics among the patients in the CTC

Variables	Total	Depression (PHQ-9)		Anxiety (GAD-7)		PTSD (PCL-5)	
		OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value
Sex			0.425		0.539		0.100
Male	51 (47.7)	1 (Ref)		1 (Ref)		1 (Ref)	
Female	56 (52.3)	1.46 (0.58–3.67)		1.42 (0.46–4.35)		0.16 (0.02–1.43)	
Age, yr			0.103		0.125		0.675
< 30	73 (68.2)	1 (Ref)		1 (Ref)		1 (Ref)	
≥ 30	34 (31.8)	2.16 (0.85–5.46)		2.36 (0.79–7.05)		1.47 (0.24–8.94)	
Previous psychiatric history			0.001		0.001		0.010
No	96 (89.7)	1 (Ref)		1 (Ref)		1 (Ref)	
Yes	11 (10.3)	11.76 (2.67–51.92)		10.15 (2.43–42.40)		11.88 (1.83–77.20)	
COVID-related symptoms			0.732		0.952		0.278
No	42 (39.3)	1 (Ref)		1 (Ref)		1 (Ref)	
Yes	65 (60.7)	1.18 (0.46–3.04)		0.97 (0.31–2.98)		3.42 (0.37–31.45)	
Perceived stigma			< 0.001		< 0.001		0.020
25%–100%	79 (73.8)	1 (Ref)		1 (Ref)		1 (Ref)	
Upper 25%	28 (26.2)	7.66 (2.76–21.29)		10.43 (3.04–35.75)		8.77 (1.40–55.01)	
Total duration of isolation, day			0.139		0.206		0.020
0–10	49 (45.8)	1 (Ref)		1 (Ref)		1 (Ref)	
> 10	58 (54.2)	2.48 (0.75–8.28)		2.39 (0.62–9.21)		8.94 (1.41–56.60)	

PTSD = post-traumatic stress disorder, CTC = community treatment center, PHQ-9 = patient health questionnaire-9, GAD-7 = generalized anxiety disorder-7, PCL-5 = PTSD checklist for DSM-5, OR = odds ratio, CI = confidence interval, COVID = coronavirus disease.

Trends in the psychiatric distress during the isolation period in the CTC

The psychiatric distress in the residents showed no significant trend change except for depression and somatic symptoms (Fig. 1). In the case of depression, the proportion of people with severe depression (PHQ-9 ≥ 10) was 15.6% at week 4, which increased significantly ($P = 0.018$) (Fig. 2). There was no significant difference over time in anxiety, and the proportion of patients with moderate suicide risk was the highest at week 4, but it also did not show a significant difference over time. In the case of somatic symptoms, rather, it tended to decrease with time ($P = 0.014$), and there was no significant difference in PTSD over time.

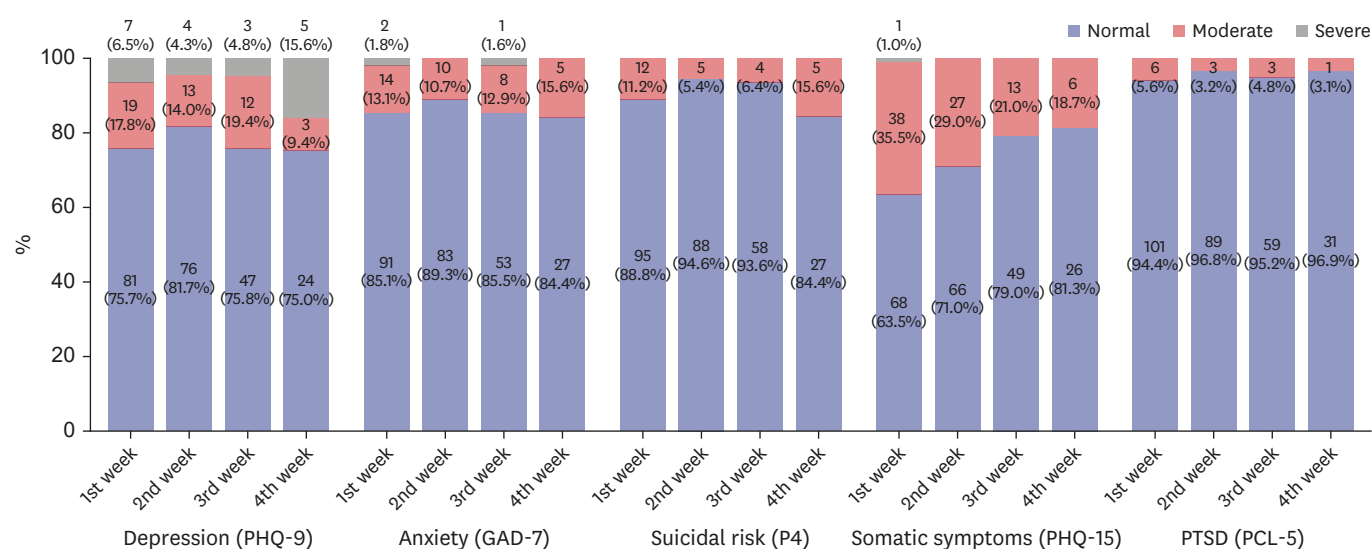


Fig. 1. Changes in the proportion of patients with psychiatric distress during the isolation period in the community treatment center. PHQ-9 = patient health questionnaire-9, GAD-7 = generalized anxiety disorder-7, P4 = suicidality screener, PHQ-15 = patient health questionnaire-15, PTSD = post-traumatic stress disorder, PCL-5 = PTSD checklist for DSM-5.

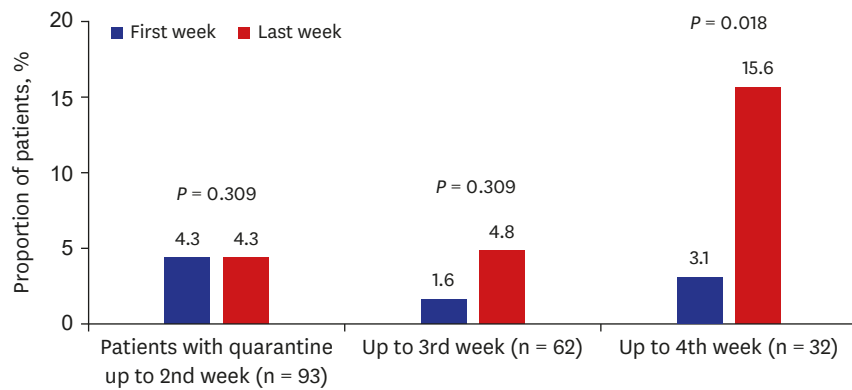


Fig. 2. Changes in the proportion of patients with depressive mood according to the isolation period in the community treatment center.

Intensity of somatic symptoms of the mild COVID-19 patients in the CTC

As shown in Fig. 1, the psychiatric distress most frequently reported by residents in the first week of admission was somatic symptoms. For each somatic symptom, the most frequent complaint was a headache (Fig. 3), followed by constipation or diarrhoea. The somatic symptoms most rarely reported by residents were sexual problems or pain.

Psychiatric intervention during the isolation period in the CTC

At the time of admission, all patients completed the PHQ-2 and GAD-2, and psychiatric intervention was offered if each scale was 3 or higher. During patients' stays in the CTC, psychiatric consultation was offered for patients who showed symptoms on their weekly mental health assessments or who complained of emotional distress to the monitoring medical staff of the CTC. A total of 29 patients were provided with 30-minute sessions of general supportive psychotherapy via video-calls with the counselling psychiatrist, with an average of 2.8 counselling sessions for each patient (Appendix 3). In addition, 7 of those

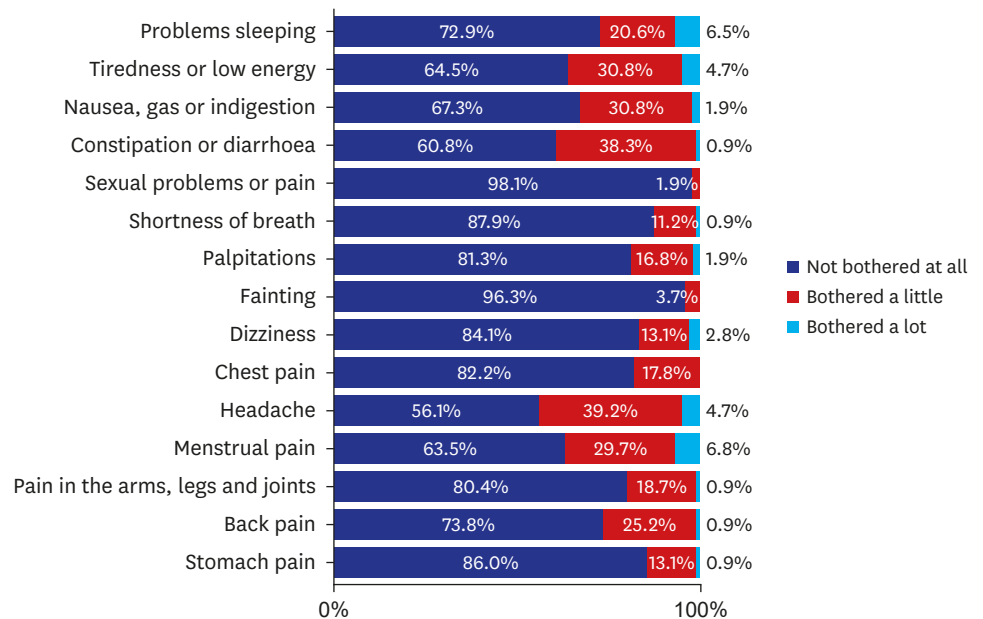


Fig. 3. Intensity of somatic symptoms of the mild coronavirus disease 2019 patients in the community treatment center. Symptoms are measured by patient health questionnaire 15.

patients were also prescribed psychotropic medications. The average number days of the psychotropic prescription was 8.14 ± 6.69 days.

DISCUSSION

During the patients' first week of stay in the CTC, depression did not seem to be more prevalent than that of the general population in Korea. The prevalence of depression with PHQ-9 ≥ 10 was 6.5% among the study subjects for first week stay in the CTC, while in the general Korean population, the prevalence of PHQ-9 ≥ 10 depression was 6.7% (Shin, 2017). For the GAD-7, there are no population level data in Korea, but PTSD is possibly more prevalent among the patients in the CTC than the estimates from general population, though the data are not directly comparable due to different measures (Cho 2015, Jeon 2007). One literature from China reporting the mental health status among those quarantined as having close contacts with COVID-19 and frontline medical personnel showed a 22.1% prevalence of depression with PHQ-9 ≥ 5 and a 22.2% prevalence of anxiety with the GAD-7 ≥ 5 .²⁴ Our study sample showed more depression and less anxiety (24.3% PHQ-9 ≥ 5 depression and 14.9% GAD-7 ≥ 5 anxiety) since our subjects are not close contacts or medical personnel under surveillance, but rather are confirmed mild cases; therefore, these results are not comparable. The prevalence of more-than-moderate depression (PHQ-9 ≥ 5), anxiety (GAD-7 ≥ 5) and possible PTSD remained similar across the four weeks of observations, though the prevalence of severe depression (PHQ-9 ≥ 10), which can be regarded as clinical depressive disorder, increased after four weeks of stay. In contrast, somatic symptoms measured by the PHQ-15 seemed to decrease during their stay.

The stigma of the COVID-19 infection and previous psychiatric history were two important risk factors for depression and anxiety, as well as possible PTSD during the first week of stay in the CTC. It is of note that the total duration of isolation until the first mental health assessment (that is, the sixth day of stay in the CTC), which would include the self-isolation period at home and 6 or 7 days in the CTC, was not a significant risk factor for possible depression and anxiety, while it was a significant risk factor for possible PTSD.

The stigma of the COVID-19 infection is indeed an important societal concern. The current COVID-19 outbreak has provoked the social stigma of those infected, as well as discriminatory behaviors towards foreigners, certain ethnic groups or other minority populations including LGBTQs worldwide, almost to the level of xenophobia in some countries.²⁵⁻²⁸ Even the necessary public health measures would have created tensions leading to social stigma if they were not carefully prepared and conducted.²⁹ As UNICEF clarified in their guide for social stigma associated with COVID-19, the situation itself - the newness of the disease, the fear of the unknown, and the ease of associating that fear with "others" in this COVID-19 situation³⁰ - looks very volatile. There is a plethora of hatred responses from the media and SNS that can be observed every day. However, stigmatizing and labelling others potentially lead to deviant behaviours, which might include the concealment of the infection, the delay of immediate treatment, or the refusal of healthy behaviors, and might ultimately undermine the much needed social cohesion and solidarity during the crisis. Of course, on an individual level, stigma and labelling will lead to unnecessary suffering and possible mental health problems for COVID-19 patients and their families. In these regards, the public health system should also concern itself with mitigating the stigma of the COVID-19 infection if COVID-19 containment efforts are to truly be successful. Stigma mitigation programmes such as anti-

stigma education, advocacy for patients and their families and media monitoring will be important in this regard, but more importantly, careful, balanced attention to human rights should be given by government and public health authorities, as well as medical institutions providing treatment and quarantining.

On the individual level, the important risk of mental health issues such as depression, anxiety and PTSD can be found in one's previous psychiatric history. It can be expected that personal vulnerability poses as an important risk factor for mental health problems during any social crisis, and several studies involving disaster and refugee settings^{31,32} indicated that one's previous psychiatric history was a major mental health risk. In addition to the fact that quarantine and isolation inevitably place infected persons in a closed space, the stress of a sudden life change, be it as short as a month, and the degree of uncertainty regarding the prognosis or when they are going to be clear of the virus would contribute to the aggravation or recurrence of existing mental disorders among the patients placed in quarantine. Additionally, in these prolonged disaster equivalent situations, many patients with chronic illnesses including mental disorders will find it difficult to obtain the necessary medications or psychosocial supports both because of their own isolation and the shut-down of healthcare facilities such as clinics and pharmacies, and this would make the already dire situation much worse. Therefore, special care should be given to existing mental disorders for those admitted with mild COVID-19 symptoms. Vigorous screening for mental health symptoms and assessment of patients' past psychiatric history should be mandatory during admission, and possibly at regular intervals during their stay; and counselling psychiatrists or psychologists should be on hand for further assessment and intervention. Additionally, the isolation duration before first mental health assessment (during the first week of admission) did not affect the risk of depression or anxiety, though it did affect the risk of PTSD symptoms. Most of the patients admitted to the CTC were self-isolated in their own houses before coming to the CTC. The fear and anxiety of the unknown viral disease, the feeling of containment, adequate medical care not being readily available while all the media warned about the seriousness of the disease, and the self-isolation period might be traumatic, even if patients had minimal symptoms from the virus.

However, the consulting psychiatrist of the center reported that many of the people who requested counselling on admission but did not have a past psychiatric history expressed quick relief of their worries and anxiety after a few days of stay in the CTC because they felt that now they were placed in professional and adequate care. The gradual decrement of patients with significant somatic symptoms according to the PHQ-15 might also be explained by this factor since stress and emotional distress would cause vague physical symptoms, even without the presence of the formal somatoform disorder.

Another result of note regarding the isolation period was that although the majority of the people admitted to this CTC were discharged in less than 4 weeks, the prevalence of a possible depressive disorder (that is, severe depressive symptoms according to the PHQ-9) was seen to increase after 4 weeks of stay. The consulting psychiatrist reported that the sense of isolation, deprivation and uncertainty started to take over the sense of security among those individuals whose stay extended beyond four weeks. One study from China during the H1N1 pandemic of 2009 reported that a short quarantine of 7 days did not have a negative psychological effect on those quarantined.³³ Therefore, care should be taken for not to prolong the isolation without the appropriate clinical necessity, and the viral test scheduling and discharge guidelines should be well balanced over the protection of the general public and those quarantined.

A recent review emphasizes that information & communication, the provision of supplies, minimal duration of isolation and voluntary quarantine rather than required quarantine are key factors for psychological mitigation during the COVID-19 crisis.⁹ Various international organizations also emphasize that the first step in mental health promotion during the disaster would be providing basic services (food, shelter, water, basic health care, and the control of communicable diseases), security, the restoring of communication (telephone lines, etc.) and providing relevant information for those affected.^{34,35} This means that providing a sense of safety with the fulfilment of basic needs, communication with their important ones, and a sense of what happened and what will happen in the future are important disaster management principles, especially for the promotion of mental health and psychosocial well-being. From this perspective, the stay in the CTC was likely seen as humane, caring, and secure by the individuals admitted here and not as a traumatic isolation forced by this unprecedented and unexpected disaster. The authors believe that sufficient human and medical resources deployed for medical surveillance and caring, individual and spacious spaces, the basic sense of privacy, and maintained connectivity to the outside with various IT technologies would be the important factors in the successful operation of containment facilities during a viral outbreak crisis, both for the containment of the virus and the protection of the psychosocial well-being and mental health of patients.

We found that the CTC model would be one effective innovation to counter a mass outbreak such as the current COVID-19 crisis. The CTC can take care of the patients with minimal viral symptoms and enable the hospitals to focus on more serious cases; furthermore, the CTC is able to provide much needed psychosocial support for the victims of COVID-19. The CTC seems to change the possible traumatic experience of quarantine into a more humane and cared-for experience. The authors expect that establishing well-provided CTCs for an infectious outbreak such as the current COVID-19 crisis possibly decreases the total social cost of the situation. This decrease occurs not only by making the whole containment system more efficient but also by making the quarantine experience more acceptable to the public than simple isolation facilities.

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Appendix 1. COVID-19 stigma scale

Items of COVID-19 stigma scale	Strongly disagree	Disagree	Agree	Strongly agree
1 After knowing that I have COVID-19, I feel set apart, isolated from the rest of the world.				
2 Telling someone I have COVID-19 is risky.				
3 I worry about people discriminating against me when they learn about my COVID-19 status.				
4 Most people with COVID-19 are rejected when others learn about their status.				
5 I work hard to keep my COVID-19 status a secret.				
6 Most people are uncomfortable around someone with COVID-19.				
7 I am hurt by how people react when they learn I have COVID-19.				
8 I feel ashamed of having COVID-19.				

The COVID-19 stigma is an adjusted version of the Middle East respiratory syndrome stigma scale,²¹ which is derived by the modification of short version of the human immunodeficiency virus stigma scale.²³ Responses to each statement are rated on a four-point Likert scale from “strongly disagree” to “strongly agree,” where higher scores indicate higher level of stigma.

COVID-19 = coronavirus disease 2019.

Appendix 2. Pearson correlations of stigma index with other validated questionnaires

Variables	Pearson correlations	P value
PHQ-9	0.347	< 0.001
GAD-7	0.418	< 0.001
P4	0.130	0.183
PHQ-15	0.324	< 0.001
PCL-5	0.390	< 0.001

Cronbach’s $\alpha = 0.935$.

PHQ-9 = patient health questionnaire-9, GAD-7 = generalized anxiety disorder-7, P4 = suicidality screener, PHQ-15 = patient health questionnaire-15, PCL-5 = PTSD checklist for DSM-5.

Appendix 3. Pre and post admission PHQ-2, GAD-2 scores according to psychiatric intervention

Intervention	Total	PHQ-2		GAD-2	
		Pre-admission	Post-admission	Pre-admission	Post-admission
Yes	27 (25.2)	2.04 ± 0.56	2.15 ± 0.58	2.85 ± 0.73	3.11 ± 0.76
No	80 (74.8)	0.65 ± 0.18	0.68 ± 0.20	0.91 ± 0.20	0.92 ± 0.22

Values are presented as number (%) or mean ± standard deviation.

PHQ-2 = patient health questionnaire-2, GAD-2 = generalized anxiety disorder-2.