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ORIGINAL RESEARCH

Impact of COVID-19 on suicidal attempts identified by face-to-face interviews

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Abstract

Epidemics of infectious diseases, such as the coronavirus disease 2019 (COVID-19) pandemic, have various psychiatric effects. These psychiatric problems are affected not only by the fear of infectious diseases, but also by economic and social changes following the epidemic. The aim of this study was to investigate the effect of COVID-19 pandemic on their suicide attempts through face-to-face interview records of suicide attempt patients who came to the emergency department (ED). This single-center, retrospective observational study was conducted with suicide attempt patients who visited ED from February 2020 to January 2021, who underwent a face-to-face interview with a psychiatrist. The patients were classified as a COVID-19 related group if they clearly mentioned a causal relationship between the COVID-19 pandemic and suicide attempts in the interview record, and a non-related group if they did not. A total of 502 patients were included, of which 90 were classified as a COVID-19 related group. As a result of comparing the demographic characteristics between the two groups, there were more patients who were employers by occupation and patients without a psychiatric history in the COVID-19 related group compared to the non-related group. There were various differences in motives for suicide attempt between the two groups, and unemployment, financial difficulty, and loneliness were statistically significantly higher in the COVID-19 related group than in the non-related group. The number of COVID-19 related groups increased toward the late period, but there was no statistically significant difference in suicide attempt motives. In conclusion, the COVID-19 pandemic has had a variety of effects on suicide attempt patients and also affects suicide attempts in patients with no psychiatric history. As motives for suicide attempts by the COVID-19 related group, unemployment, financial difficulty, and loneliness showed statistically significant results.

Keywords

COVID-19 pandemic; Suicide attempt; Motives for suicide attempt; Face-to-face interview

1. Introduction

Coronavirus disease 2019 (COVID-19) is a disease caused by infection of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), which first appeared in Wuhan, China in 2019 and is caused global pandemic [1]. This is a pandemic that is unprecedented in history, and has a huge economic impact as well as a health problem internationally [2]. Historically, these disasters and infectious disease epidemics have had various effects on suicide rates. Previously, in addition to study on the association between World War II and suicide rates, studies have also been published that the epidemic of Spanish flu and Severe Acute Respiratory Syndrome (SARS) is also associated with suicide rates [3–6].

The COVID-19, which has been a pandemic since 2020, has also had a significant impact on mental health such as suicide, anxiety, and depression [7, 8]. This is not only the fear of infection, but also various emotional stresses such as economic problems, social isolation, deprivation, and loneliness [9]. The uncertainty of the COVID-19 pandemic, social distancing, and economic breakdown can exacerbate mental health problems. In particular, it can have an adverse impact on people with pre-existing mental health disorders, and may present difficulties with continuity of treatment [10]. In general, these effects have more long-term effects toward the later stages of the outbreak than the immediate effects at the beginning of the pandemic [8, 9, 11].

Suicide attempt are one of the main symptoms that require visiting emergency department (ED) and psychiatric treatment [12]. These are closely related to the suicide rate due to the high risk of subsequent suicides [13, 14]. Therefore, it is very important to evaluate the suicide attempt patients who

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come to the ED and take appropriate measures. The effects of COVID-19 on depression, suicide, and suicide attempts have been extensively studied, and previous studies using online surveys reported that stress associated with COVID-19 increases the risk of depressive episodes and suicidal ideations [15, 16]. However, studies examining how COVID-19 affects their motives for suicide are lacking, and there is no study using face-to-face interview records with suicide attempt patients. We thought that this study would help to establish effective suicide prevention measures in the event of a prolonged COVID-19 pandemic or an epidemic of new infectious disease. Therefore, we studied the impact of the pandemic on motives for suicide attempt using face-to-face interview records with suicide attempts patients who visited ED during the COVID-19 pandemic.

2. Materials and methods

2.1 Study population and setting

This study was a retrospective observational study through medical record analysis, and was conducted at Inha University Hospital in Incheon Metropolitan City. This hospital is located in a metropolitan city with a population of about 2,900,000, and about 55,000 people visit the ED annually. The first confirmed case of COVID-19 in the Republic of Korea was on 20 January 2020, and COVID-19 vaccination started on 26 February 2021 [17, 18]. Accordingly, we targeted patients with suicide attempts who visited our ED from February 2020 to January 2021, during the COVID-19 pandemic period. All patients prioritized treatment for injuries, and were treated by specialists from each clinical department, including emergency medicine specialists, depending on the type of injury. Then, when communication was possible, a face-to-face interview was conducted by a psychiatrist in the ED or ward.

We reviewed psychiatric interview records to classify patients who attempted suicide as affected by the COVID-19 pandemic and those who did not. Accordingly, cases in which the patient clearly mentioned a causal relationship between the COVID-19 pandemic and suicide attempts in the interview record were defined as "COVID-19 related". In addition, cases which there was no mention of COVID-19 in the records or which the causal relationship between the COVID-19 pandemic and suicide attempts were denied were defined as "Non-related". Patients who did not consult with a psychiatrist or who refused a psychiatric interview were excluded because interview records could not be found.

2.2 Data collection

The demographic and clinical data of the target patients were extracted and collected through the electronic medical record of the hospital. The demographic data collected included age, gender, education level, marital status, religion, occupation, and psychiatric history. The psychiatric history was checked using the patient's statement and prescription medications, and the diagnosis, treatment, and psychiatric follow-up were checked. Patients who had maintained psychiatric treatment were classified as major depressive disorder, bipolar disorder, panic disorder, anxiety disorder, schizophrenia, and substance use disorder.

Clinical data included motives for suicide attempt, history of previous suicide attempts, time of ED visits, methods of suicide attempts, and outcomes. Motives for suicide attempts were identified through interview records, which were classified into unemployed, financial difficulty, family trouble, interpersonal problems, bereavement, loneliness, work stress, academic stress, health problem, and psychosis. When there was more than one motive, multiple selections were allowed.

To compare the differences according to the period, based on the ED visit time of the patients, it was classified into early period (February to May 2020), middle period (June to September 2020), and late period (October 2020 to January 2021). Then, the number of patients visited during each period was compared, and the motive for suicide attempt was investigated whether there was a difference according to the period.

Methods of suicide attempt were classified into analgesic poisoning, sedative poisoning, non-sedative poisoning, pesticide and herbicide poisoning, carbon monoxide poisoning, other poisoning, hanging, stabbing, and others. Others included drowning, fall down, traffic accidents, and suicidal ideation alone. As with the motives for suicide attempt, multiple selections were allowed when more than one method were used. Outcomes were classified as discharge, discharge against medical advice, transfer to another hospital, general ward admission, psychiatric ward admission, intensive care unit (ICU) admission, and death. This hospital has been operating the ED-based suicide crisis prevention center since 2017 and has been evaluating and managing suicide attempts patients who came to the ED. The missing data in the electronic medical record was supplemented and collected through the data of this center.

2.3 Statistical analysis

Nominal variables consisting of two categories were analyzed using the Pearson chi-square test or Fisher's exact test, nominal variables consisting of three or more categories were analyzed using Fisher's exact test with permutation resampling method for multiple testing adjustment, and the results were expressed as frequencies and percentages. For continuous variables, the Shapiro-Wilk normality test was performed. Variables with normal distribution were analyzed using Student's *t*-test and expressed as the means and standard deviations; those without normal distribution were analyzed with the Mann-Whitney U test and expressed as medians and interquartile ranges (IQRs). Trends were assessed with the use of the Cochran-Armitage test. Data analysis was conducted using SAS 9.4 (SAS Institute, Inc, Cary, NC, USA).

3. Results

3.1 Study population

A total of 610 suicide attempts patients visited the ED during the study period. Among them, 108 without interview records were excluded. There were 87 who did not consult a psychiatrist, 18 who refused a psychiatric interview, and 3 who arrived dead. Finally, a total of 502 people were included in the

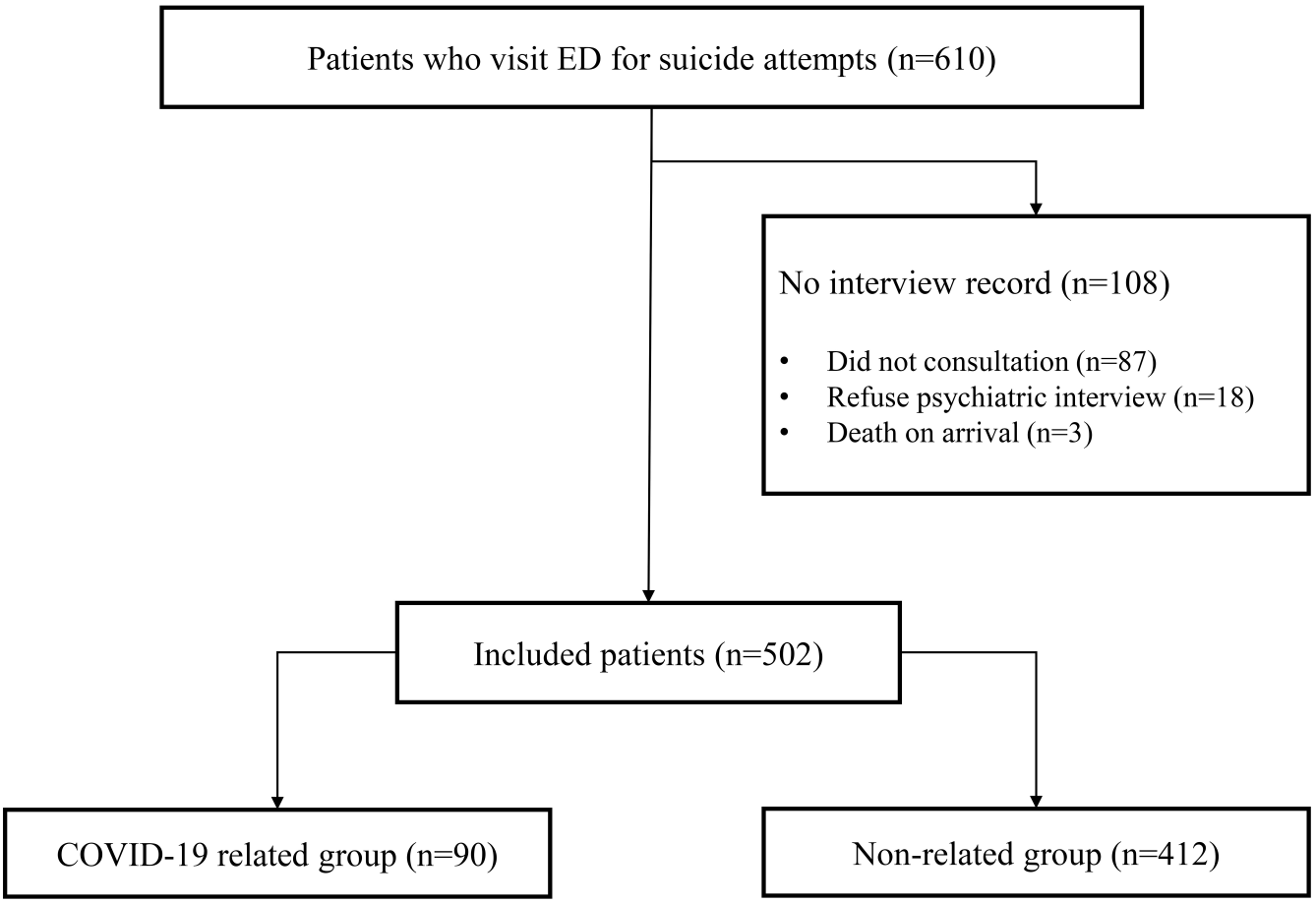

FIGURE 1. Flowchart of study. ED: Emergency department, COVID-19: Coronavirus disease 2019.

study (Fig. 1). 90 people who mentioned a causal relationship between COVID-19 and suicide attempt in their interview records were classified as a COVID-19 related group, and 412 people who did not were classified as a non-related group.

3.2 Baseline characteristics

The demographic characteristics of the two groups are described in Table 1. Age, gender, education level, marital status, and religion did not show a statistically significant difference between the two groups. As for occupation, the employer showed a high proportion in the COVID-19 related group (26.67%, n = 24), and there was a statistically significant difference compared with the non-related group (8.01%, n = 33) ($p < 0.001$). Patients without a psychiatric history were 60.0% (n = 54) in the COVID-19 related group and 42.48% (n = 175) in the non-related group, and there were more cases without a psychiatric history in the COVID-19 related group ($p = 0.013$).

3.3 Clinical finding

The clinical characteristics of the two groups are presented in Table 2. There were various differences between the two groups in the motives for suicide attempt. In the COVID-19 related group, unemployment, financial difficulty, and loneliness were statistically significantly higher, and in the non-related group, interpersonal problems, health problems, and psychosis were observed as more motives for suicide attempt. There were no differences between the two groups in terms of family trouble, bereavement, work stress, and academic stress. In addition, past history of suicide attempts were observed more in the non-related group than in the COVID-19 related group.

As for the ED visit time, the number of the COVID-19 related group gradually increased toward the late period, and there were more COVID-19 related groups than the non-related group in the late period (50%, n = 45 and 33.25%, n = 135, respectively, $p = 0.009$). In the methods of suicide attempt, analgesics poisoning showed higher in the COVID-19 related group (8.9%, n = 8 and 3.4%, n = 14, respectively, $p = 0.021$), and there was no significant difference in other methods. There was no difference between the two groups in the patient outcomes.

3.4 Differences in motives for suicide according to the time of ED visit

We observed and compared the motives for suicide attempt according to the ED visit time. There was no statistically significant difference in motives for suicide attempt between the two groups according to the ED visit time. However, in the COVID-19 related group, the interpersonal problems were showed a tendency to increase in the late period ($p = 0.064$) (**Supplementary Table 1**).

TABLE 1. Comparison of baseline characteristics between two groups.

Variables	COVID-19 related (n = 90)	Non-related (n = 412)	*p*-value
Age	38 (25~53)	35 (24~49.5)	0.428
Gender, n (%)			0.203
Male	39 (43.3)	149 (36.2)	
Female	51 (56.7)	263 (63.8)	
Education level, n (%)			
Elementary school	11 (12.2)	42 (10.2)	0.927
Middle school	8 (8.9)	45 (10.9)	0.974
High school	45 (50.0)	235 (57.0)	0.538
University	26 (28.9)	90 (21.8)	0.411
Marital status, n (%)			
Single	43 (47.8)	213 (51.7)	0.919
Married	26 (28.9)	120 (29.1)	1.000
Divorced	18 (20.0)	61 (14.8)	0.617
Bereaved	3 (3.3)	18 (4.4)	1.000
Religion, n (%)			
None	78 (86.7)	340 (82.5)	0.784
Christian	8 (8.9)	41 (10.0)	0.990
Catholic	3 (3.3)	18 (4.4)	1.000
Buddhism	1 (1.1)	13 (3.2)	0.834
Occupation, n (%)			
Employer	24 (26.7)	33 (8.0)	<0.001*
Employed worker	21 (23.3)	128 (31.1)	0.497
Housewife	4 (4.4)	21 (5.1)	1.000
Inoccupation	30 (33.3)	177 (43.0)	0.334
Student	11 (12.2)	53 (12.9)	1.000
Psychiatric history, n (%)			0.001*
None	54 (60.0)	175 (42.5)	0.013*
Major depressive disorder	30 (33.3)	159 (38.6)	0.939
Bipolar disorder	1 (1.1)	17 (4.1)	0.716
Panic disorder	5 (5.6)	12 (2.9)	0.640
Anxiety disorder	0	10 (2.4)	0.755
Schizophrenia	0	21 (5.1)	0.100
Substance use disorder	0	18 (4.4)	0.249

*Data are presented as median (interquartile range) or number (%). COVID-19: coronavirus disease 19. *p value < 0.05.*

TABLE 2. Comparison of clinical characteristics between two groups.

Variables	COVID-19 related (n = 90)	Non-related (n = 412)	*p*-value
Motives for suicide attempt, n (%)			
Unemployed	21 (23.3)	11 (2.7)	<0.001*
Financial difficulty	40 (44.4)	68 (16.5)	<0.001*
Family trouble	26 (28.9)	151 (36.7)	0.163
Interpersonal problem	11 (12.2)	106 (25.7)	0.006*
Bereavement	1 (1.1)	20 (4.9)	0.108
Loneliness	19 (21.1)	39 (9.5)	0.002*
Work stress	2 (2.2)	17 (4.1)	0.391
Academic stress	3 (3.3)	9 (2.2)	0.518
Health problem	3 (3.3)	51 (12.4)	0.012*
Psychosis	2 (2.2)	55 (13.3)	0.003*
Past history of suicide attempt	24 (26.7)	185 (44.9)	0.001*
ED visit time			
Early-period	15 (16.7)	135 (32.8)	0.005*
Mid-period	30 (33.3)	140 (34.0)	1.000
Late-period	45 (50.0)	137 (33.3)	0.009*
Methods of suicide attempt, n (%)			
Analgesics poisoning	8 (8.9)	14 (3.4)	0.021*
Sedative poisoning	16 (17.8)	64 (15.5)	0.598
Non-sedative poisoning	17 (19.0)	75 (18.2)	0.879
Pesticide and herbicide poisoning	4 (4.4)	10 (2.4)	0.292
Carbon monoxide poisoning	14 (15.6)	73 (17.7)	0.623
Other poisoning	8 (8.9)	39 (9.5)	0.865
Hanging	4 (4.4)	17 (4.1)	0.891
Stabbing	14 (15.6)	90 (21.8)	0.182
Others[a]	10 (11.1)	60 (14.6)	0.392
Patient outcomes, n (%)			
Discharge	30 (33.3)	122 (29.6)	0.980
Discharge against medical advice	14 (15.6)	62 (15.1)	1.000
Transfer to another hospital	0	11 (2.7)	0.742
General ward admission	30 (33.3)	134 (32.5)	1.000
Psychiatric ward admission	2 (2.2)	8 (1.9)	0.998
ICU admission	13 (14.4)	73 (17.7)	0.986
Death	1 (1.1)	2 (0.5)	0.972

*Data are presented as number (%). COVID-19: coronavirus disease 19; ED: emergency department; ICU: intensive care unit. [a]Drowning, fall down, traffic accidents, suicidal ideation alone. *p value < 0.05.*

4. Discussion

We tried to investigate the effects of the COVID-19 pandemic on suicide attempts and the motives for suicide attempts by reviewing the psychiatric interview records of suicide attempt patients who visited the ED. From February 2020 to January 2021 included in this study period, it can be said that the whole world was dominated by COVID-19 pandemic. Previous studies have shown that the epidemic of these infectious diseases has a greater number of psychiatric affected patients than those infected with the disease [7]. This is thought to be due to various factors including social isolation, financial difficulties, economic uncertainty, and unemployment. These factors may affect differently depending on the patient's mental disorder, psychiatric history, and personality. Accordingly, we compared the differences in psychiatric history between the COVID-19 related and non-related groups. As a result, more cases with no psychiatric history were observed in the COVID-19 related group than in the non-related group, and there was no difference in the history of major depressive disorder, bipolar disorder, panic disorder, anxiety disorder, schizophrenia and substance use disorder between the two groups. This suggests that COVID-19 pandemic can have a negative impact even on patients who were psychically healthy. Not only the anxiety and stress caused by the COVID-19 pandemic, but also the problems caused by social distancing may have had an impact on this result. Due to the COVID-19 pandemic, the Korea Centers for Disease Control and Prevention (KCDC) has been promoting social distancing policies since 29 February 2020. From then, several workplaces and public institutions have ceased operations, and kindergartens and schools have not been able to operate normally. This is a measure to prevent the spread of COVID-19, and it is a policy to prevent the spread of disease through outside activities and gatherings. However, problems caused by this have often been reported. Emotions such as loneliness, anxiety, depression, and anger due to social distancing also increased problems such as domestic violence and self-harm [19]. In 2003, Toronto, the largest city in Canada, suffered a severe social and economic impact due to the severe acute respiratory syndrome (SARS) epidemic. Hawryluck *et al.* [20] reported that more than 15,000 people epidemiologically exposed to SARS were ordered to self-isolate, and they experienced significant psychological stress. As a result, various types of psychiatric disorders were shown, especially post-traumatic stress disorder (PTSD) and depression. Although our study was not conducted on self-isolated people, we think that people may have experienced similar stress because outside activities were restricted due to social distancing policies.

In a previous study by Dsouza *et al.* [21], reported suicide reason was investigated using press media reported COVID-19 related suicide cases in India, and a total of 72 suicide cases were included. Interestingly, fear of COVID-19 infection was reported as the most common causative factor. There were 21 cases of suicide due to fear of COVID-19 infection, and most victims were diagnosed negative for COVID-19 at autopsy. However, in our study, only 3 cases (classified as a health problem) were affected by fear of COVID-19 infection as motives for suicide attempt. It is thought that the difference in the target population has influenced such different results. In India, where their study was conducted, most of the population in the country reside in rural areas. As they mentioned in the discussion, populations living in rural areas have less knowledge about COVID-19 than people living in urban areas, and the resulting fear can make them vulnerable to mental health. However, since the hospital where our study was conducted was located in a metropolitan city and most of the patients were residents of the city, this difference may have been seen. Following fear of COVID-19 infection, financial crisis, loneliness, and pressure to be quarantine were observed as suicide reasons, and similar variables were observed as motives for suicide attempts in our study. Their study investigated the reasons for suicide using press media reported COVID-19 related suicide cases. It differs from our study in that we conducted face-to-face interviews with patients who attempted suicide.

The COVID-19 pandemic has had a huge impact not only on health care, but also on the economy [2, 22]. This impact has also been extended to countries, companies, employers and employed workers. Due to the COVID-19 pandemic, many people have experienced economic instability, and many have lost their jobs [23]. Unemployment more than doubles the risk of suicide for both men and women [24]. This is not simply due to financial stress, but a combination of factors such as deprivation due to unemployment and increased vulnerability to stress. In addition, according to the social distancing policy, normal operation of the company becomes difficult and financial problems may arise for entrepreneurs and small business owners. As a result, many entrepreneurs and employed workers are exposed to severe stress, which can dramatically change their way of life. These stresses and changes can lead to mental health problems, such as substance use disorders and suicide attempts [25]. In our study results, unemployment and financial difficulties were more common among the motives for suicide attempts in the COVID-19 related group, which can be interpreted in the same context. The longer the COVID-19 pandemic continues, the greater the negative economic impact will be, which could cause serious health problems as well as social problems, especially psychiatric problems.

In general, psychiatric problems following an epidemic of an infectious disease such as the COVID-19 pandemic often have long-term effects rather than immediate effects [8, 9, 11]. Some previous studies reported that the suicide rate at the beginning of the epidemic onset rather decreases [26]. In addition, in the Republic of Korea, the suicide rate from January to August 2020, during the early stages of the COVID-19 pandemic, actually decreased [27]. In our study, the proportion of patients in the COVID-19 related group was higher in the late period than in the early period, which can be seen in the same context. In our study, we observed whether the motives for suicide attempts differed according to the period of disease epidemic. Considering that the accumulation of negative emotions and economic difficulties according to the COVID-19 pandemic will be aggravated toward the late period, we expected that it would show a difference according to the epidemic period. Contrary to our expectations, the motives for suicide attempt did not show a statistically significant

difference according to the epidemic period. However, in the COVID-19 related group, suicide attempts due to interpersonal problems tended to increase toward the late period. Because of the pandemic prolongs, it is thought that negative emotions including loneliness, anxiety and depression may accumulate and cause more serious interpersonal problems.

In this study, we observed that the COVID-19 pandemic has various effects on motives for suicide attempts. As a result of this study, in the COVID-19 related group, there were more patients who were employers by occupation compared to the non-related group. In addition, unemployment, financial difficulties, and loneliness were more observed as motives for suicide attempts. There have been previous studies that analyzed the psychiatric effects of COVID-19 through online surveys [15, 16, 28]. The strength of this study is that it analyzed the impact of the COVID-19 pandemic on patients who came to the ED for suicide attempts using face-to-face interview records. This is more meaningful in that it was based on direct statements of patients, unlike questionnaires or online surveys targeting the public.

This study has several limitations. First, as this is a retrospective study through review of electronic medical records, there may be errors in patient information or some medical records necessary for the study. However, such errors were minimized by excluding cases where there was no psychiatric interview record. Second, there are limitations in generalizing the results of the study because regional and demographic variables may have effects because the study was conducted on a group of patients who visited a single emergency medical center. Third, the period included in this study was before COVID-19 vaccination began. Therefore, changes after vaccination could not be included. Further research on this will be needed in the future.

5. Conclusions

The COVID-19 pandemic has had various impacts on suicide attempt patients. In the COVID-19 related group, unemployment, financial difficulty, and loneliness were observed as motives for suicide attempts, and it had a great effect on patients with no psychiatric history. In addition, interpersonal problem tended to increase as the motive for suicide attempts toward the late period. If another infectious disease such as COVID-19 spreads in the future, it will be necessary to prepare for suicide attempt patients based on these studies.

AVAILABILITY OF DATA AND MATERIALS

The data are contained within this article (and supplementary material).

AUTHOR CONTRIBUTIONS

TKA—designed the study, data collection, wrote original draft. SK—designed the study, analyzed the data, wrote original draft. YHS—analyzed the data, reviewed and edited. JHP—designed the study, supervised, reviewed and edited. SLS—designed the study, supervised, reviewed and edited. All authors read and approved the final manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study protocol was reviewed and approved by the Institutional Review Board of Inha University College of Medicine (IRB No.: 2021-09-037-000). Informed consent was waived owing to the retrospective nature of the study, and the study was conducted in compliance with the principles of the Declaration of Helsinki.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

SUPPLEMENTARY MATERIAL

Supplementary material associated with this article can be found, in the online version, at https://oss.signavitae.com/mre-signavitae/article/1699978116168859648/attachment/Supplementary%20material.doc.

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