Psychopathology in Elderly COVID-19 Survivors and Controls

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Abstract

Background: The highly infectious and pathogenic coronavirus-19 (COVID-19) has emerged to cause a global pandemic. In this cross-sectional comparative study, our objective is to compare the depression and anxiety symptoms in elderly COVID-19 survivors with a control group.

Method: 69 elderly COVID-19 survivors (age 65 or older) within 2 weeks post-discharge were assessed for anxiety and depression symptoms by a package of self-rating scales (Geriatric Anxiety Scale-10 (GAS-10), Geriatric Depression Scale-15 (GDS-15) and General Health Questionar-28 (GHQ-28)). Their scores were compared with a group of aged-matched residents without COVID-19 in their community.

Results: The mean scores on GAS-10, GDS-15 and GHQ-28 in the COVID-19 survivors group and control group were 12.06 vs. 6.53 (p < .001), 12.48 vs. 5.73 (p < .001), 52.7 vs. 29.8 (p < .001), respectively. All of the COVID-19 survivors and 60% of the controls had scores in the pathological range of GHQ-28 scale. A total of 93.2% of COVID-19 survivors revealed anxiety symptoms in GAS-10 scale. This rate was 60% in the control group. A total of 86.6% of COVID-19 survivors compared to 46.6% of the controls reported symptoms of depression in GDS-15 scale.

Conclusion: The rate of depression and anxiety symptoms in elderly COVID-19 survivors and controls found to be high during the pandemic. However, COVID-19 survivors significantly suffered more.

Keywords
COVID-19 survivors, elderly, psychopathology

Introduction

Several months have passed since the first cases of pneumonia caused by a new viral agent called corona virus 2019 (COVID-19) were reported in the Chinese city of Wuhan. Coronaviruses are negatively stranded RNA viruses, which cause infections ranging from common colds to severe acute respiratory syndrome. The rapid worldwide spread of the virus has led the World Health Organization (WHO) to declare the COVID-19 disease a global pandemic on March 2020.

During this unprecedented pandemic, the entire population has suffered physical risks in addition to impaired emotional well-being, but the elderly has undoubtedly been one of the most vulnerable groups due to having more preexisting medical problems and higher rate of mortality.

In a recent study on elderly COVID-19 survivors, 11.5% of the elderly survivors met the cut score for clinical significant symptoms of anxiety and 46.2% of them had clinically significant symptoms of depression. Taquet et al in their study of 62354 patients diagnosed with COVID-19 reported the probability of having any psychiatric illness was 18.1% (95% CI 17.6-18.6), significantly higher than for all control health events (HRs 1.24-1.49, all p < 0.0001). The most common psychiatric diagnosis after COVID-19 diagnosis was anxiety disorder (12.8%, 95% CI 12.4-13.3), followed by mood disorders (9.9%, 9.5-10.3). Vindegaard and benros reviewed 43 study related to COVID-19 pandemic. Of those, two papers reported on psychiatric symptoms among COVID-19 survivors. The first study showed that post traumatic stress disorder (PTSD) symptoms were present among 96.2% of hospitalized patients. The second study revealed that prevalence of depression (29.2%) was significantly higher among patients recovered from COVID-19 compared to participants in quarantine (9.8%) (p = 0.016). A recent research studying psychological symptoms in 238 COVID-19 survivors four months post hospital discharge revealed that 61 patients (25.6%) had mild PTSD symptoms, 27 patients (11.3%) had moderate PTSD symptoms, and 14 patients (5.9%) had severe PTSD symptoms.

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COVID-19, as a new type of emerging infectious disease, shows different characteristics such as high infectivity, high prevalence, and significant public health impact. Knowledge on COVID-19 patients’ psychological status after cure remains inadequate; thus, our goal is to investigate the psychological symptoms in COVID-19 survivors within two weeks post hospital discharge. We would study anxiety and depressive symptoms of elderly COVID-19 survivors after hospital discharge (average length of hospital stay was 8 days).\textsuperscript{3-20} We also have a control group of age and sex matched residents in the same community that were not infected by COVID-19. Our results would help the clinicians to better understand the psychiatry symptoms of elderly COVID-19 survivors.

\section*{Methods}

\subsection*{Participants}

All elderly COVID-19 patients (69 patients) that were discharged from Aliasghar hospital affiliated with Shiraz University of Medical Sciences, Shiraz, Iran from March 2020 to June 2020 entered in to our study. These patients were admitted in the hospital wards and intensive care units (ICUs). Inclusion criteria were: age 65 or older, diagnosis of COVID-19 by PCR test of a nasopharyngeal sample during inpatient hospital admission and being a resident of Shiraz city. Exclusion criteria were: inability to participate in the psychometric testing due to neurocognitive impairment, learning disability and having uncontrolled medical problems or pre-existing psychiatric disorders.

A control group of 60 elderly residents (age 65 or older) in Shiraz city was recruited. They had not suffered from COVID-19 disease. Their names were randomly selected among the elderly residents of Shiraz who were registered with Shiraz health office. They were called by their cell phones and invited to participate.

\subsection*{Procedures}

All the COVID-19 survivors within two weeks post discharge and the controls were invited to attend a meeting at Shiraz health center. They were encountered face to face by a psychologist who discussed the aims and procedure of the research project with them and also went over the self-rating scales. During the interview, all the precautionary measures for COVID-19 such as having face mask and social distancing were followed. We also made sure the ventilation and air cleaning system were appropriate in the office while they were visiting. The psychologist who administered the tests was blinded to the assigned groups. The interviews and assessments lasted between 1 to 2 hours for each participants. The participants medical and psychiatry records were screened. Furthermore, during the interview, preexisting psychiatric conditions were asked directly. Patients with uncontrolled medical condition or preexisting psychiatric disorder were excluded. Sociodemographic information such as age, gender and education status were asked from the patients. The two groups were evaluated for anxiety, depression and mental health by three self-rated scale.

Written informed consent was obtained from the participants and the study protocol was approved by the ethic committee of Shiraz University of Medical Sciences that adheres to the Declaration of Helsinki Ethical Principles for Medical Research involving human subjects.

\subsection*{The Measurements}

Geriatric anxiety scale-10 (GAS-10) was used to assess anxiety symptoms.\textsuperscript{11} GAS-10 is a self-reported assessment tool for anxiety among older adults. It has 10 items and assesses different anxiety symptoms. Items 1 through 10 scores are added up to provide a total score. Each item score ranges from 0 to 3. Patients with a score of 7 to 9 are considered mild, 10 and 11 moderate and 12 or more severe, respectively.

Geriatric depression scale (GDS-15) was administered to assess depressive symptoms.\textsuperscript{12} This scale consists of 15 questions and the answers are yes or no. One point is given for each one selected. A score of 0 to 5 is normal. A score of 6 to 10 is considered mild depression and 11 to 15 suggests severe depression.

General health questioner (GHQ-28) has been administered to assess mental health and psychosocial well-being. This scaled version was intended for studies in which the investigators seek more information than that provided by a single severity score. In the construction of the GHQ-28, items were selected to cover four main areas: somatic symptoms, anxiety and insomnia, social dysfunction and severe depression.\textsuperscript{13} The GHQ-28 requests participants to indicate how their general health has been over the past few weeks, using items with a 4-point scale indicating the following frequencies of experience: “not at all,” “no more than usual,” “rather more than usual” and “much more than usual.” The scoring system applied in this study was the same as the original scoring system, the Likert scale 0, 1, 2, 3. The minimum score for the 28 version is 0, and the maximum is 84. Higher GHQ-28 scores indicate higher level of distress. Goldberg suggests that participants with a total score of 23 or below should be classified as non-psychiatric, while participants with scores > 24 may be classified as psychiatric.\textsuperscript{14}

\subsection*{Statistical Analysis}

Our study is a cross sectional comparative research. Obtained data were statistically analyzed with IBM SPSS Statistics 21.0 for Windows. Chi-Square and independent t tests were used, as appropriate, to compare the demographic and clinical characteristics of the two groups. P-value less than 0.05 were considered statistically significant.

\section*{Results}

Average length of hospital stay was 8 days for COVID-19 survivors.\textsuperscript{3-20} The demographics, GAS-10 scores, GDS-15...
Table 1. COVID-19 Survivors and the Control Group Demographic and Psychological Status.

|                          | COVID-19 Survivors | Control Group | P-Value |
|--------------------------|--------------------|---------------|---------|
| Sex (%female)            | 35                 | 39            | 2.34    |
| Age                      | 67.4               | 68.6          | 4.19    |
| Education (years of education) | 11.6 ± 4.725     | 12.7 ± 5.914  | 5.13    |
| GDS-15 total score       | 12.46 ± 5.765      | 5.73 ± 2.094  | <0.000  |
| GAS-10 total score       | 12.06 ± 3.987      | 6.53 ± 2.749  | <0.000  |
| GHQ-28 total score       | 52.7 ± 24.265      | 29.8 ± 15.165 | <0.000  |
| GHQ-28 somatic symptoms subscale | 14.7 ± 7.537          | 8.5 ± 4.321  | <0.000  |
| GHQ-28 anxiety and insomnia subscale | 11.5 ± 5.491             | 6.7 ± 3.745  | <0.000  |
| GHQ-28 social dysfunction subscale | 13.6 ± 6.931               | 7.5 ± 4.099  | <0.000  |
| GHQ-28 severe depression subscale | 12.7 ± 6.867            | 7.1 ± 3.934  | <0.000  |

GAS-10: Geriatric Anxiety Scale-10; GDS-15: Geriatric Depression Scale-15; GHQ-28: General Health Questiona-

scores and GHQ-28 scores of COVID-19 survivors and their counterparts are provided in Table 1. The two groups were matched in regard to sex, age and education status. The mean age of the COVID-19 survivors and the controls were 67.4 and 68.6, respectively. 35% of COVID-19 survivors and 39% of the controls were female.

The COVID-19 survivors and the controls differ significantly in anxiety and depressive symptoms (GDS-15: P < 0.001; GAS-10: P < 0.001). GHQ-28 and its subscales scores were also significantly higher in COVID-19 survivors (GHQ-28: P < 0.001; GHQ-28 somatic: P < 0.001; GHQ-28 anxiety and insomnia: P < 0.001; GHQ-28 social dysfunction: P < 0.001; GHQ-28 depression: P < 0.001).

In the COVID-19 survivors group, all the patients had GHQ-28 scores > 24 which indicates psychopathology. In the control group, 60% of the patients had GHQ-28 scores > 24. Table 2 depicts the scores of the two groups on the rating scales.

**Discussion**

Our study revealed that both elderly COVID-19 survivors and the controls had high rates of depression and anxiety symptoms during the pandemic. All of the elderly COVID-19 survivors scored in the pathological range in General Health Questioner-28 scale compared to 60% of the control group. The mean anxiety and depression scores were also significantly higher in elderly COVID-19 survivors compared to age matched individuals.

Several studies have reported high rates of PTSD symptoms, depression and anxiety symptoms in the population during the pandemic and social restrictions. A survey reported the prevalence of anxiety symptoms in the elderly population to be 4.95% (95%CI: 4.42%-5.48%) before the pandemic and as high as 10.10% (95%CI: 9.36%-10.83%) during the epidemic which is doubled. In line with these studies, we observed high rates of depression and anxiety symptoms in the elderly COVID-19 survivors and the controls during the pandemic.

Cai et al, in their study revealed overall prevalence of psychological distress among the COVID-19 survivors to be 54.8%, with 31%, 22.2%, and 38.1% meeting the criteria for excessive stress, anxiety, and depression, respectively. A significant number of patients with COVID-19 who were admitted in ICU showed symptoms common to other ICU patients such as dyspnea, anxiety, depression, prolonged pain and impaired physical function. Bo et al showed that PTSD symptoms were present among 96.2% of hospitalized COVID-19 patients. Another study on COVID-19 survivors showed that the prevalence of depression was significantly higher among patients recovered from COVID-19 compared to participants in quarantine (29.2 versus 9.8%) (p = 0.016). We found that all of our COVID-19 survivors scored in the pathological range in GHQ-28 scale. Furthermore, 86.6% of our COVID-19 survivors showed symptoms of depression and 26.2% of them was found to have severe depression symptoms. Also, 93.2% of our COVID-19 survivors had anxiety symptoms and 46.6% of them revealed severe anxiety symptoms. The reason for higher rates in our study compared with the other studies might be the older age of our patients. In addition, all of our patients were hospitalized and were assessed during the first two weeks post hospital discharge.

Biopsychosocial factors might contribute to the high rate of psychiatric symptoms in covid-19 survivors. Direct viral infection of the central nervous system (CNS) or indirectly via an immune response may lead to psychopathology in these patients. Clinical, post-mortem, animal, in vitro, and cell culture studies demonstrated that coronaviruses are potentially neurotropic and can induce neuronal injuries and neurological complications such as stroke. Furthermore, “cytokines storm” involved in the immune response to coronaviruses may cause psychiatric symptoms by precipitating neuroinflammation. On the other hand, psychological factors such as fear of death due to the potential life-threatening nature of the disease, worries about infecting family members, and stigmatization associated with this disease would led to anxiety, depression and post-traumatic stress disorder symptoms. Being in quarantine, isolation, social distancing and financial difficulties are social factors contributing to psychopathology in
COVID-19 survivors. With the popularization of internet and smart-phones, people are overwhelmed with all kinds of information, resulting in more misunderstandings about the disease, excessive worries, and unnecessary fears. Lack of effective drugs against the virus is another source of anxiety that would contribute to psychopathology in COVID-19 patients.

It has been reported that 45% of patients discharged from hospital will require some type of support from healthcare and social services and 4% will require rehabilitation in inpatient setting. Therefore, there is a clear need to plan for post-acute and chronic rehabilitation of patients recovering from COVID-19. In our hospital system, all the COVID-19 with psychiatric symptoms during the hospital course or in follow ups sessions post discharge would be referred to psychiatry services for further evaluations and treatments. We also have psychiatrists and psychologists available in in all general hospitals that care for COVID-19 patients. Throughout our survey, patients who had scores in the pathological range on the psychological assessments were referred for further mental health evaluations and treatment.

Limitations

This study has several limitations. Our study did not have hospital survivors without COVID-19 as control group. Therefore, we are not able to differentiate hospitalization effects from COVID-19 effects. Some of our patients had ICU stays. Admission to ICU may contribute to the psychopathology of the patients. Furthermore, we had not compared the psychological status of ward admitted patients with ICU admitted patients. Another flaw of our study is that we did not conduct psychological testing at baseline to compare that with the results obtained after hospital discharge. Small sample size in both groups is another pitfall of our study. So our results are preliminary and larger studies are needed to confirm the results. And finally, our study has not any discussion about predictors of psychological disease between the two groups.

In conclusion, we found that the rate of depression and anxiety symptoms in elderly COVID-19 survivors and elderly individuals without COVID-19 is high during the pandemic. However, COVID-19 survivors significantly suffer more. Considering the detrimental impact of COVID-19 on psychiatry symptoms, we suggest routine assessment of depression and anxiety symptoms in elderly COVID-19 survivors in order to diagnose and treat emergent psychiatric conditions. Furthermore, our study results demonstrated the importance of longitudinal studies to survey the psychological symptoms in COVID-19 survivors and also the result of the treatments that have been administered.

Author Contributions

All the authors contributed to study designing, data collection, data analysis and writing the manuscript. Dr. Arash Mowla is the principal investigator of this research. All authors read and approved the final version of the manuscript.

Declaration of Conflicting Interests

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