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Evaluating Somatization, Depression, Anxiety, and Health Anxiety Symptoms in Caregivers of COVID-19 Inpatients

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Qualitative Study

Abstract

Background: Coronavirus disease 2019 (COVID-19) is a highly infectious disease with no definite treatment; delayed intervention can increase mortality risk. These factors can have a significant impact on psychological health. This study aimed to evaluate somatization, depression, anxiety, and health anxiety symptoms in caregivers of COVID-19 inpatients.

Methods: This cohort study was conducted in Al-Zahra and Khorshid hospitals, COVID-19 centers in Isfahan, Iran, from February 2021 to August 2021. Ninety caregivers of COVID-19 inpatients participated in the study group and ninety of their relatives in the control group. Three standard questionnaires were used: the Patient Health Questionnaire (PHQ) to assess somatic symptom severity, the Depression, Anxiety, and Stress Scale (DASS) to evaluate main symptoms of depression, anxiety, and stress, and the Short Health Anxiety Inventory (HAI) to assess health anxiety. Caregivers completed these questionnaires at the time of hospital admission, immediately after patient discharge/death, and one month later. The control group completed the questionnaires once during the study period. All statistical analyses were performed using SPSS software, and a significance level of $P < 0.05$ was considered statistically significant. To compare the mean scores of all questionnaires in caregivers with the control group, the generalized linear model (GLM) was employed. On two groups of caregivers based on their patient outcome (death/discharge) and depending on the normality of the mean score distribution, the Mann-Whitney U test or the independent t-test was used to compare the mean scores of all questionnaires between these two caregiver groups.

Results: There were no significant differences in mean scores of the three questionnaires between the control group and caregivers at baseline. Health anxiety levels increased in caregivers following patient death ($P = 0.003$), both immediately after and one month later ($P = 0.001$). The death of a patient significantly increased somatization in their caregivers ($P = 0.003$), and this score did not decrease after one month of follow-up. There was a significant magnitude of change in depression ($P = 0.05$) and anxiety ($P = 0.03$)

among caregivers of deceased patients, and stress levels were significant in both groups of caregivers (P = 0.001 and P = 0.003).

Conclusion: Our analysis indicates that caregivers of COVID-19 inpatients, particularly those caring for deceased patients, should be considered high-risk cases for psychological problems.

Keywords: Somatoform disorders; Somatic symptoms; Anxiety; Death; Caregivers; COVID-19

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Introduction

Since the beginning of 2019, the world has been grappling with a viral outbreak known as coronavirus disease 2019 (COVID-19). This novel virus, officially named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), causes a highly contagious respiratory disease that spreads rapidly and easily through droplets transmitted between humans. Currently, there is no definitive treatment for COVID-19, and delayed intervention increases the risk of mortality (de Siqueira, Almeida, Zica, Brum, Barceló, & de Siqueira Galil, 2020; Mas-Ubillus et al., 2022; Price-Haywood, Burton, Fort, & Seoane, 2020). Given these circumstances, the pandemic has the potential to significantly impact public mental health.

Somatization refers to the presence of physical symptoms that have no medical explanation. Individuals experiencing somatization often suffer from psychological distress and express their distress through physical symptoms in hopes of finding relief or treatment. Anxiety disorders are the most common mental disorders associated with somatization (De Gucht & Fischler, 2002; Lipowski, 1987).

Health anxiety is defined as excessive concern about the individual health, whether it is about the present or future. It can be ranged from mild to severe (Rachman, 2012). Some evidence has shown that health anxiety can be a part of other anxiety disorders such as panic disorder, obsessive-compulsive disorder, and generalized anxiety disorder (GAD) (Abramowitz, Olatunji, & Deacon, 2007). During the outbreak, both high and low levels of health anxiety can lead to negative health behaviors. High health anxiety may result in avoiding doctors or hospitals as pathogen sources, excessively seeking information or reassurance about one's health status, and engaging in safety behaviors such as unnecessary social isolation and overspending on unneeded protective items. On the other hand, low health anxiety is associated with ignoring prevention protocols (Asmundson & Taylor, 2020).

Evidence has shown that the mental health burden has increased during the recent pandemic. Many people have experienced negative feelings like anxiety and depression during the COVID-19 outbreak. These negative emotional states have been found to be associated with somatic symptoms (Liu, Liu, & Liu, 2020). Moreover, experiencing higher levels of anxiety, depression, stress, and worrying during this period is associated with factors such as age, sex, underlying disease, overthinking about the disease, recent COVID-19 symptoms, and being a healthcare worker (Kibbey, Fedorenko, & Farris, 2021; Lee et al., 2007; Price-Haywood et al., 2020). Other evidence has shown that isolation-related anxiety and distress were the most frequent psychological complaints after the beginning of COVID-19. The prevalence of post-traumatic stress disorder (PTSD) has also increased significantly. Pandemic-related PTSD has been found to be more persistent than other mental consequences like depression and anxiety (Han, Schmidt, Waits, Bell, & Miller, 2020).

Therefore, mental health is a vital component of one's life and becomes even more important during the pandemic and post-pandemic. When it comes to providing more efficient and practical ways to deliver mental health care, we need to identify more effective aspects of this situation for individuals. The present study aimed to evaluate the change in health anxiety, somatization, depression, anxiety, and stress symptoms in the caregivers of COVID-19 inpatients over the study duration while considering the patient outcome.

Methods

This cohort study was conducted from February 2021 to August 2021 at Al-Zahra and

Khorshid hospitals in Isfahan, Iran. These two hospitals are the main tertiary centers affiliated with Isfahan University of Medical Sciences and specialize in the treatment of patients with COVID-19 during the pandemic.

Participants

Study population: The study population consisted of main caregivers aged 18-65 years old who were living with COVID-19 inpatients. Participants were obtained using a convenience sampling method via SPSS software (version 19, SPSS Inc., Chicago, IL, USA). One control was selected for each case from their second-degree or third-degree relatives who had no direct association with patients with COVID-19. The minimum sample size was estimated to be 98 participants, taking into account a power of 80%, a confidence interval (CI) of 0.95, a significance level of 0.05, and a dropout rate of 10%. The control group was matched for age and sex to compare the baseline psychological condition differences between the study group and the population without any association with patients with COVID-19. The control group was included to determine if the caregiver group had a higher baseline score in the assessments than non-caregivers. Participants who met any of the following criteria were excluded: illiterate individuals, those with a history of any psychological disorder according to Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V) criteria, participants who refused to cooperate, subjects who had not filled out the questionnaires at a certain period, and individuals in the control group who had been involved with COVID-19 or had family members affected by it.

Ethical considerations: The study protocol received approval from the Research Committee of Isfahan University of Medical Sciences, and the Ethics Committee confirmed its compliance with ethical standards (Ethics code: IR.MUI.MED.REC.1400.408). Informed consent was obtained from participants online, providing them with comprehensive information about the study goals and questionnaires. Participants were assured of the confidentiality of their personal information. Those who agreed to participate signed the consent form, and contact information for the assigned researcher was provided.

Data collection: All participants completed an online checklist of demographic data. Caregivers were asked to complete the questionnaires at three time points: upon hospital admission, immediately after their patient's discharge or death, and one month after discharge or death. The control group only completed the questionnaires once during the study period.

Assessment instruments: The demographic data checklist collected baseline information such as age, sex, number of family members, marital status, education level, job status, place of residence, sources of family income, recent financial problems, satisfaction with information provided by healthcare workers, and patient outcome. Participants were also asked about their frequency of following COVID-19-related news and adherence to safe interpersonal distancing.

Three standardized questionnaires were used to assess somatization and health anxiety symptoms:

1. The Depression, Anxiety, and Stress Scale (DASS-21)
2. The Patient Health Questionnaire-15 (PHQ-15)
3. The Short Health Anxiety Inventory-18 (HAI-18)

DASS-21: DASS-21 is a 42-item questionnaire used to assess these three negative emotional statuses. The main version consists of 14 items in three subscales assessing depression, anxiety, and stress. The DASS-21 was developed by Lovibond and Lovibond in 1995. This shorter version with seven items in each category which was

used in this study has high internal reliability (α = 0.93). The DASS-21 was translated and validated in Persian by Sahebi, Asghari and Salari, 2005, with Cronbach's alpha values of 0.77, 0.79, and 0.78 for the depression, anxiety, and stress scales, respectively. Respondents rated each question using a 4-point scale, and the final depression, anxiety, and stress scores were calculated based on the sum of each section's scores (Asghari, Saed, & Dibajnia, 2008; Parkitny & McAuley, 2010).

PHQ-15: The PHQ-15 was developed in 2002 by Kroenke, Spitzer and Williams as a tool for assessing somatization symptoms. It is a self-report questionnaire that assesses the severity of common somatic symptoms using a three-item Likert format. The total score ranges from 0 to 30. The severity of somatization is classified as mild (scores
≥ 5), moderate (scores ≥ 10), and severe (scores ≥ 15). The Persian version of the PHQ-15 was translated and validated by Abdolmohammadi et al., with acceptable internal reliability (α = 0.76) (Abdolmohammadi, Ghadiri Sourman Abadi, Sadat Seyed Pourmand, & Falsafinejad, 2018; Dadfar, Asgharnejadfarid, Hosseini, Esfahani, Lester, & Kalibatseva, 2020; Interian, Allen, Gara, Escobar, & Díaz-Martínez, 2006).

The Short HAI-18: The Short HAI questionnaire measures health anxiety regardless of physical health. It was developed by Salkovskis, Rimes, Warwick and Clark, 2002. It consists of eighteen items, with respondents selecting a sentence that best describes their mental condition over the past week. Each item score ranges from 0 to 3, and the scores are summed to achieve a total score ranging from 0 to 54. The Iranian version of this tool was validated by Rabiei et al., with a Cronbach's alpha of 0.89 (Abramowitz et al., 2007; Alberts, Hadjistavropoulos, Jones, & Sharpe, 2013; Rabiei, Kalantari, Asgari, & Bahrami, 2013).

Statistical analysis: Quantitative variables were presented as mean ± standard deviation (SD), while qualitative variables were expressed as number (percentage). The normality of the questionnaire's score was assessed using the Kolmogorov-Smirnov test. The distribution of PHQ-15 scores in caregivers after one month was found to be normal, whereas the other scores did not exhibit a normal distribution. To compare the mean scores of all questionnaires in caregivers with the control group, after adjusting for covariates (age, sex), the generalized linear model (GLM) was employed. Subsequently, all statistical analyses were conducted on two groups of caregivers based on their patient outcome (death/discharge). Depending on the normality of the mean score distribution, the Mann-Whitney U test or the independent t-test was used to compare the mean scores of all questionnaires between these two caregiver groups. The repeated measures analysis of variance (ANOVA) was utilized to examine changes in mean scores over the study duration in two models: unadjusted and adjusted for covariates such as age, sex, number of family members, marital status, education level, job status, living place, family income sources, recent financial problems, satisfaction with the information provided by health workers, following COVID-19 news, and maintaining safe interpersonal distancing. Additionally, the mean score at each time point was compared separately with the other two time points using either a paired t-test or Wilcoxon test to fulfill the objectives of the study. All statistical analyses were performed using SPSS software, and a significance level of $P < 0.05$ was considered statistically significant.

Results

Out of 135 caregivers who were initially evaluated, 90 met the inclusion criteria and were included in the study. In addition, 90 second or third-degree relatives of them were selected as control group. All of these participants completed the follow-up (Table 1).

Table 1. Baseline demographic data

Variables		Caregivers (n = 90)	Control group (n = 90)
Age (year)		39.92 ± 13.70	39.02 ± 12.70
The mean number of family members		3.60 ± 1.40	3.80 ± 1.40
Gender	Women	35 (38.8)	34 (37.7)
	Men	55 (61.2)	56 (62.3)
Marital status	Single	28 (31.0)	46 (51.1)
	Married	62 (69.0)	44 (48.9)
Education level	Primary education or lower	11 (12.2)	1 (1.1)
	High school diploma	18 (20.0)	14 (15.6)
	Under-graduate	43 (47.8)	17 (18.8)
	Post-graduate or higher	18 (20.0)	58 (64.4)
Job status	Unemployed	36 (40.0)	8 (8.9)
	Self-employed	18 (20.0)	13 (14.4)
	Health-worker	8 (8.9)	11 (12.2)
	Employee	18 (20.0)	25 (27.8)
	Student	10 (11.1)	33 (36.7)
Living place	Suburb	8 (9.0)	0 (0)
	Rural	2 (2.2)	4 (4.4)
	Urban	80 (88.8)	86 (95.6)
Family income sources	Patient	26 (28.9)	-
	Caregiver	48 (53.3)	33 (36.7)
	Others	16 (17.8)	57 (63.3)
Recent financial problems	Yes	63 (70.0)	56 (62.2)
	No	27 (30.0)	34 (37.8)
Patient outcome	Dead	13 (14.4)	-
	Discharged	77 (85.5)	-
Satisfaction with the obtained information by health workers	Poor	11 (12.2)	-
	Moderate	51 (56.7)	-
	Good	28 (31.1)	-
Following COVID-19 news	Never	0 (0)	0 (0)
	Rarely	15 (16.7)	27 (30.0)
	Sometimes	36 (40.0)	51 (56.7)
	Always	39 (43.3)	12 (13.3)
Keeping a safe interpersonal distancing	Never	0 (0)	0 (0)
	Rarely	2 (2.2)	12 (13.3)
	Sometimes	20 (22.2)	35 (38.9)
	Always	68 (75.6)	43 (47.8)

Data are presented as mean ± standard deviation (SD) or number (percent)
COVID-19: Coronavirus disease 2019

The mean age of patients in the caregiver group was 39.92 years old, while in the control group, it was 39.02 years old. Table 1 summarizes the baseline data of our participants in both groups.

Table 2 shows the distribution of responses to the PHQ and DASS in the caregiver and control groups. This table reveals that 41.6% of caregivers and 38.9% of the control group reported very mild somatic symptoms at the baseline assessment. Additionally, the majority of caregivers and the control group experienced a normal level of depression, anxiety, and stress.

Table 3 presents the mean scores of all questionnaires in the caregiver and control groups at the baseline. As shown in this table, there were no statistically significant differences between the mean scores of the questionnaires in the two groups.

Table 4 presents the results of the mean score changes during the follow-up and between diffrent time points in caregivers based on their patient outcome.

Group 1 consists of caregivers of discharged patients, while group 2 consists of caregivers of patients who passed away.

Table 2. Distribution of responses of Patient Health Questionnaire-15 (PHQ-15) and Depression, Anxiety, and Stress Scale-21 (DASS-21) in two groups

Variables			Control group	Caregivers		
				Time 1	Time 2	Time 3
PHQ-15		Very mild	37 (41.6)	35 (38.9)	39 (43.3)	39 (43.3)
		Mild	20 (22.5)	24 (26.7)	15 (16.7)	31 (34.4)
		Moderate	20 (22.5)	19 (21.1)	14 (15.6)	14 (15.6)
		Severe	12 (13.5)	12 (13.3)	22 (24.4)	6 (6.7)
DASS-21	Depression	Normal	43 (47.8)	55 (61.1)	51 (56.7)	37 (41.1)
		Mild	10 (11.1)	4 (4.4)	4 (4.4)	14 (15.6)
		Moderate	18 (20.0)	10 (11.1)	14 (15.6)	24 (26.7)
		Severe	13 (14.4)	10 (11.1)	6 (6.7)	7 (7.8)
		Very severe	6 (6.7)	11 (12.2)	15 (16.7)	8 (8.9)
	Anxiety	Normal	61 (67.8)	53 (58.9)	53 (58.9)	57 (63.3)
		Mild	6 (6.7)	10 (11.1)	6 (6.7)	4 (4.4)
		Moderate	10 (11.1)	15 (16.7)	15 (16.7)	19 (21.1)
		Severe	1 (1.1)	0 (0)	4 (4.4)	1 (1.1)
		Very severe	12 (13.3)	12 (13.3)	12 (13.3)	9 (10.0)
	Stress	Normal	55 (61.1)	61 (67.8)	57 (63.3)	67 (74.4)
		Mild	6 (6.7)	0 (0)	8 (8.9)	5 (5.6)
		Moderate	17 (18.9)	14 (15.6)	8 (8.9)	6 (6.7)
		Severe	6 (6.7)	8 (8.9)	9 (10.0)	11 (12.2)
		Very severe	6 (6.7)	7 (7.8)	8 (8.9)	1 (1.1)

Data are presented as number (percent)
PHQ: Patient Health Questionnaire; DASS: Depression, Anxiety, and Stress Scale; Time 1: Time of hospital admission; Time 2: Immediately after patient discharged/dead; Time 3: One month after patient discharged/dead

The mean scores for health anxiety decreased in caregivers of discharged patients and increased in caregivers of deceased patients. The difference was statistically significant in the latter group after adjusting for all covariates. The mean score for somatic symptoms in caregivers of deceased patients increased over the study duration, and this difference was significant with or without adjusting for all covariates. On the other hand, the mean score for somatization in caregivers of discharged patients decreased non-significantly during the study period. According to the DASS-21 score analysis, depression symptoms increased in both groups of caregivers, while anxiety and stress symptoms decreased. However, the magnitude of the changes was significant for depression and anxiety in caregivers of deceased patients, and significant for stress in both groups after adjusting for all covariates.

Table 5 represents the results of the comparison between the two groups based on patient outcome. The comparison of PHQ and DASS mean scores showed no significant differences between the two groups of caregivers. However, we found that health anxiety was significantly higher in caregivers of deceased patients compared to caregivers of discharged patients one month after their patient died or was discharged (P = 0.049).

Table 3. The baseline mean scores of all questionnaires in two study groups

Variables		Control group	Caregivers	P*
PHQ-15		7.6 ± 6.1	7.5 ± 6.3	0.9
DASS-21	Depression	11.8 ± 9.5	10.9 ± 12.2	0.5
	Anxiety	7.2 ± 8.8	8.7 ± 10.2	0.3
	Stress	13.6 ± 10.5	12.8 ± 11.9	0.6
HAI-18		14.4 ± 7.4	15.3 ± 9.6	0.4

Data are presented as mean ± standard deviation (SD)
*P-value adjusted for following covariates: age, sex, number of family members, marital status, education level, job status, living place, family income sources, recent financial problems, satisfaction with the obtained information by health workers, following COVID-19 news, keeping a safe interpersonal distancing
PHQ: Patient Health Questionnaire; DASS: Depression, Anxiety, and Stress Scale; HAI: Health Anxiety Inventory

Table 4. The total mean score changes during the follow-up and between times in caregivers respecting their patient outcome* (Part II)

Variables		Patient outcome	Time 1	Time 2	Time 3
PHQ-15		Group 1 (discharge of patient)	8.0 ± 6.4	8.7 ± 6.9	6.3 ± 6.0
		Group 2 (death of the patient)	4.6 ± 5.2	6.1 ± 5.6	5.6 ± 3.5
DASS-21	Depression	Group 1 (discharge of patient)	11.0 ± 10.3	11.5 ± 10.4	12.4 ± 9.8
		Group 2 (death of the patient)	10.6 ± 9.2	14.9 ± 9.8	11.8 ± 10.9
	Anxiety	Group 1 (discharge of patient)	8.6 ± 7.9	8.4 ± 7.3	7.0 ± 6.1
		Group 2 (death of the patient)	9.2 ± 7.1	10.9 ± 6.7	8.6 ± 5.2
	Stress	Group 1 (discharge of patient)	12.8 ± 11.4	12.5 ± 11.7	10.8 ± 10.0
		Group 2 (death of the patient)	12.7 ± 11.1	15.0 ± 14.6	8.3 ± 7.2
HAI-18		Group 1 (discharge of patient)	15.0 ± 8.8	14.5 ± 9.1	14.7 ± 9.2
		Group 2 (death of the patient)	16.8 ± 11.9	19.5 ± 12.0	19.6 ± 6.6

Table 4. The total mean score changes during the follow-up and between times in caregivers respecting their patient outcome* (Part II)

Variables		Patient outcome	P 1	P 2	P 1-2	P 2-3
PHQ-15		Group 1 (discharge of patient)	0.200	0.200	0.015	0.006
		Group 2 (death of the patient)	0.006	0.003	0.003	0.800
DASS-21	Depression	Group 1 (discharge of patient)	< 0.001	0.400	0.060	0.240
		Group 2 (death of the patient)	0.600	0.030	0.001	0.340
	Anxiety	Group 1 (discharge of patient)	< 0.001	0.060	0.700	0.060
		Group 2 (death of the patient)	< 0.001	0.050	0.016	0.850
	Stress	Group 1 (discharge of patient)	0.004	0.003	0.180	0.020
		Group 2 (death of the patient)	0.900	0.001	0.030	0.050
HAI-18		Group 1 (discharge of patient)	< 0.050	0.700	0.040	0.770
		Group 2 (death of the patient)	0.200	0.015	0.003	0.001

Data are presented as mean ± standard deviation (SD)

*Repeated measures analysis of variance (ANOVA) for P-value 1 and P-value 2, paired t-test or Wilcoxon test for P-value 1-2 and P-value 2-3

Group 1: Caregiver of discharged patients; Group 2: Caregiver of patients who passed away; Time 1: Time of hospital admission; Time 2: Immediately after patient discharged/dead; Time 3: One month after patient discharged/dead; P-value 1: Unadjusted P-value for total mean score change; P-value 2: P-value adjusted for following covariates, age, sex, number of family members, marital status, education level, job status, living place, family income sources, recent financial problems, satisfaction with the obtained information by health workers, following COVID-19 news, keeping a safe interpersonal distancing for total mean score change; P-value 1-2: Adjusted P-value for comparing time 1 and time 2; P-value 2-3: Adjusted P-value for comparing time 2 and time 3; PHQ: Patient Health Questionnaire; DASS: Depression, Anxiety, and Stress Scale; HAI: Health Anxiety Inventory

The following paragraphs will explain the results of the mean scores of each time comparison in both caregivers, with respect to their patient outcomes, in detail.

The mean score differences between the first and second assessment time

The health anxiety level in caregivers of deceased patients increased immediately after the patient's death, while it decreased in caregivers of discharged patients at the time of discharge. Both of these changes were found to be statistically significant.

Additionally, the level of somatic symptoms was significantly higher in caregivers of both groups at the time of discharge or death compared to the baseline.

Furthermore, there was a statistically significant increase in DASS-depression scores in both groups, but this increase was only significant in caregivers of deceased patients. In the same group, there was also a significant increase in DASS-anxiety and DASS-stress scores, whereas in caregivers of discharged patients, these scores decreased insignificantly.

The score differences between the second and third assessment time

One month after the patient's death or discharge, the health anxiety level increased slightly in caregivers of discharged patients, while caregivers of deceased patients showed a significant increase in health anxiety level. Moreover, the manifestation of somatic symptoms decreased in both groups, but this change was only significant in caregivers of discharged patients.

Table 5. Comparison of two groups (caregivers of discharged patient and caregivers of dead patient) during the fallow-up

Time	Variable		P
Time 1		HAI-18	0.752
		PHQ-15	0.054
	DASS-21	Anxiety	0.392
		Depression	0.912
		Stress	0.568
Time 2		HAI-18	0.262
		PHQ-15	0.262
	DASS-21	Anxiety	0.894
		Depression	0.130
		Stress	0.665
Time 3		HAI-18	0.049
		PHQ-15	0.136
	DASS-21	Anxiety	0.750
		Depression	0.590
		Stress	0.604

Time 1: Time of hospital admission; Time 2: Immediately after patient discharged/dead; Time 3: One month after patient discharged/dead
PHQ: Patient Health Questionnaire; DASS: Depression, Anxiety, and Stress Scale; HAI: Health Anxiety Inventory

Discussion

The aim of present study was to evaluate the change in health anxiety, somatization, depression, anxiety, and stress symptoms in the caregivers of COVID-19 inpatients over the study duration while considering the patient outcome. This study revealed that caregivers of COVID-19 inpatients had similar levels of health anxiety, somatic symptoms, and general depression, anxiety, and stress compared to the control group during the initial assessment. This suggests that these psychological scales of the caregivers were not significantly impacted at the beginning of the study.

This study revealed that there were no significant differences in somatic symptoms, stress, anxiety, and depression between the two groups of caregivers. However, it was found that health anxiety was significantly higher among caregivers of deceased patients compared to caregivers of discharged patients one month after the patient's death or discharge. These findings suggest that the death of a patient leads to a significantly higher level of health anxiety in comparison to being a caregiver of a discharged patient. As the study progressed and patient outcomes were observed, it became evident that the level of health anxiety, somatic symptoms, and psychological distress varied depending on the timeline and patient outcome**.** The following paragraphs discuss the results in detail.

Health anxiety

Health anxiety, was found to decrease in caregivers of discharged patients at the time of discharge. Therefore, caring the discharged patient most probably leads to lower worrying about health matters. On the other hand, caregivers of deceased patients experienced a significant increase in health anxiety immediately after the patient's death. This increase persisted even one month after the patient's death, indicating a lasting impact on the caregivers' health anxiety.

Somatic symptoms

Somatic symptoms were significantly higher in caregivers of both discharged and deceased patients at the time of discharge or death compared to the baseline. However, while caregivers of discharged patients showed a decrease in somatic symptoms one month after discharge, caregivers of deceased patients did not experience a significant

decrease in somatic symptoms. This suggests that the manifestation of somatic symptoms may be more prolonged in caregivers of deceased patients.

Depression, anxiety, and stress

Depression scores did not change significantly in caregivers of discharged patients throughout the study. However, caregivers of deceased patients showed an increase in depressive symptoms, and this scale did not decrease significantly even one month after the patient's death. This indicates a greater impact on the depression scale of caregivers who experienced the death of their patients**.**

Similarly, caregivers of deceased patients also experienced an increase in general anxiety immediately after the patient's death. Although there was a slight decrease in anxiety symptoms one month after the patient's death, it was not statistically significant. This suggests that the impact of patient's death on caregiver anxiety may be more long-lasting.

In terms of stress levels, caregivers of discharged patients experienced a decrease in stress levels at the time of discharge, and this decrease was significant one month after discharge. On the other hand, the death of a patient led to a significant increase in stress levels for caregivers. However, one month after the patient's death, there was a decrease in stress levels.Overall, the study findings highlight the significant impact that patient outcomes can have on the mental health of caregivers. The death of a patient appears to have a more profound and lasting effect on caregivers' health anxiety, somatic symptoms, depression, anxiety, and stress levels compared to caring for a discharged patient.

Several studies have been conducted addressing mental health during a pandemic, including the impact of COVID-19 on various populations. For example, a cohort study on Danish children found high levels of health anxiety during the COVID-19 outbreak, with no association between health concerns and family exposure to the virus (Hulgaard et al., 2021). Similarly, a study on Iranian medical students confirmed an increase in health anxiety levels (Bahmaei, Beheshti Nasab, Maniati, Afshari, & Haghighizadeh, 2022). In Germany, a survey compared anxiety related to COVID-19 with anxiety related to other severe diseases in 12 patients with pathologic health anxiety. The study found that anxiety related to COVID-19 was significantly lower than anxiety related to other severe diseases during the first peak of the pandemic (Sauer, Schmidt, Jungmann, Bailer, & Witthöft, 2022).

In a cross-sectional study of 641 undergraduate students, nearly half reported experiencing health anxiety, general anxiety, and depression symptoms. These symptoms were associated with factors such as sex, recent viral symptoms, comorbidities, overthinking, and worrying about the COVID-19 virus (Kibbey et al., 2021). Moreover, parents of children suspected of having COVID-19 and those who underwent nasopharyngeal swab tests were found to have a higher likelihood of presenting with anxiety, depression, and posttraumatic stress symptoms (Orsini et al., 2021). Another cross-sectional study assessed somatic symptoms using the PHQ-15 and general depression, anxiety, and stress using the DASS-21 in patients with COVID-19 admitted to the intensive care unit (ICU). The study found that 92.9% of participants experienced mild to severe somatic symptoms, with dyspnea, palpitation, back pain, epigastric pain, fatigue, and sleep problems being the most frequent symptoms. Additionally, 27.86%, 40.40%, and 52.45% of participants experienced mild to severe depression, anxiety, and stress symptoms, respectively (Jamil, Syed, Kiyan, Gul, Shakeel, & Mustafa, 2022).

A Chinese study investigated the prevalence of somatic symptoms in college and

primary school students during the COVID-19 pandemic. The study found a higher incidence of somatic symptoms in college students (34.85%) compared to primary school students (2.39%). There was also a significant correlation between somatization score, general anxiety, and depression with a total concern score (Liu et al., 2020). Another online cross-sectional survey reported moderate to severe somatic symptoms in 48.14% of students. The severity of these symptoms was higher in women, singles, those with inefficient sleep, individuals with relatives infected with COVID-19, those in higher-risk groups for COVID-19, and those with occupational exposure to patients with COVID-19. Anxiety was also positively associated with the severity of somatic symptoms (Shehata & Abdeldaim, 2022).

Additionally, studies have also examined the mental health of caregivers of patients with COVID-19. For instance, a cross-sectional study on caregivers in Zanjan, Iran, found high rates of depression, anxiety, and stress symptoms. In this study, follow-up assessment was not performed (Rostami et al., 2022). Another study in Shahrud, Iran, reported that as depression and anxiety scores increased, care burden scores also increased (Mirhosseini, Grimwood, Basirinezhad, Montazeri, & Ebrahimi, 2022). An Online-based research on caregivers of COVID-19 outpatients found high rates of depression, anxiety, and stress symptoms, with these symptoms being associated with various factors such as age, marriage status, occupation, exercise, and income (Jafari-Oori, Ebadi, Moradian, Jafari, Dehi, & Ghasemi Fard, 2022). A study comparing somatic symptoms in different caregiver groups during the pandemic found that long-term caregivers experienced more symptoms compared to non-caregivers and short-term caregivers (Park, 2021).

Similar to previous studies, our study found that caregivers of COVID-19 inpatients experienced significant somatization and health anxiety. However, the significant difference in our study was the assessment of caregivers at different time points. We found that in caregivers of deceased patients, these changes, especially regarding health anxiety, were persistent after one month. Our study also found that anxiety, depression, and stress levels significantly increased after patient's death, but there were no notable changes in these scales among caregivers of discharged patients.

This suggests that the death of a patient due to COVID-19 may lead to significant psychological issues in caregivers. Deceased patients were likely admitted to the ICU and had longer hospital stays and more severe disease, making their caregivers more vulnerable to experiencing psychological complications**.**

However, our study has several limitations. The number of caregivers of deceased inpatients was small, and after patient death, caregivers declined further participation. Additionally, the grief experienced due to patient death may have contributed to the psychological impact, making it difficult to differentiate between grief and the effects of being a caregiver. The follow-up duration in our study was short, and we only followed caregivers, which limits the generalizability of our findings. Future studies should be conducted on a larger scale and for longer periods to draw more comprehensive conclusions. To differentiate the impact of grief and being a caregiver of patients with COVID-19, further studies are needed to compare caregivers of COVID-19 patients with caregivers of patients who died from other conditions. Including a larger sample size, especially in cases of patient death, can also make the results more applicable. Additionally, other parameters such as duration of hospitalization, history of ICU admission or cardiopulmonary resuscitation (CPR) during hospitalization, patient's age, and COVID-19 severity should be considered when assessing the mental health of caregivers.

Conclusion

Caregivers of COVID-19 inpatients should be recognized as high-risk individuals for psychological issues, including somatization symptoms, health anxiety, depression, anxiety, and stress. The loss of a patient due to COVID-19 can have lasting psychological effects on caregivers. It is crucial to update psychiatric rehabilitation programs to address the specific needs arising from the pandemic. These findings underscore the importance of society promoting resilience, coping strategies, grief counseling, and crisis management to support psychological well-being. Regularly following up with grieving caregivers, who are at a higher risk, for potential necessary interventions is recommended.

Conflict of Interests

Authors have no conflict of interests.

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