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Original Article

Stress, Anxiety and Depression Among Family Caregivers of COVID-19 Patients in Northwest Iran: A Cross-sectional Study

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Abstract

Background: Taking care of a patient with COVID-19 can have a significant psychological burden. This study aimed at determining the levels of stress, anxiety and depression symptoms among family caregivers of Covid-19 patients.

Methods: This cross-sectional study was conducted on 236 main caregivers of coronavirus patients in Zanjan, Iran in 2020. The data measurement tool was the DASS-21 electronic questionnaire which was designed using the Porsline platform and was sent to the participants *via* SMS and WhatsApp messages. Descriptive statistics and Pearson's R, Student's T test and analysis of variance were performed to analyze the data in SPSS version 25.

Results: The mean age of participants was 34.72±9.52 years. Of the participants, 57.21, 70.77 and 55.09% had symptoms of depression, anxiety and stress, respectively. Females experienced higher levels of stress than males (p=0.049). Additionally, the mean score of depression sub-scale was significantly different between categories of employment status (p=0.029), as self-employed workers had significantly higher depression sub-scale scores (10.97±10.85) compared to the other two groups. No significant associations were found between age and depression, anxiety, and stress of the participants. Moreover, the mean scores of depressions, anxiety, and stress sub-scales were not significantly different between categories of marital status and levels of education.

Conclusion: The majority of family caregivers experienced depression, anxiety, and stress symptoms. This significant prevalence of psychological burden among these individuals underscores the need for supportive measures by policy makers and communities to prevent further severe consequences and help them reduce these symptoms.

Keywords: Anxiety, Caregivers, COVID-19, Depression, Stress

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Introduction

Pneumonia caused by a new coronavirus was first reported in December 2019 in Wuhan, China. In February 2020, as the epidemic spread, the World Health Organization officially named the disease as "Coronavirus Disease 2019 (COVID-19)", and now publicly the virus is also called "the COVID-19 virus". At the beginning of September 2020, the disease was confirmed in more than 26 million cases, and caused over 800,000 deaths worldwide. This disease has arrived in Iran since February 2020 and many cases have been confirmed so far (1-4). This pandemic is not only a threat to human health, but it also has devastating impacts on people's lives in every aspect (5). Therefore, COVID-19 might be an important cause of stressors that can strongly affect people's mental health (6).

The outbreak of infectious diseases along with physical problems causes psychological distress in patients and their families. These people express common social and psychological responses to this disease, which often include anxiety, stress, and depression (7). Psychological effects of recent outbreaks such as irritability, anger, fear of contracting and transmission to family members, anxiety and depression have been shown (8). Moreover, in the coronavirus pandemic, the high abundance of patients and the resulting deaths can lead to stress and anxiety in the community (9). Some studies have also reported high levels of stress, anxiety, depression symptoms and fear of COVID-19 in the Iranian population. Besides, they have shown several contributing factors such as being married, younger age, having a child and having poor night sleep that have a significant effect on the psychological burden of COVID-19 on family caregivers (10-12).

The epidemic of infectious diseases such as COVID-19 can cause significant stress that might result in adverse effects on the quality of life and mental health of patients, especially their caregivers. This stress and anxiety might be significant in patients' caregivers in terms of the fear of contamination as the transmission is mainly from person-to-person, especially between family members (13). Additionally, family caregivers might experience serious psychological symptoms due to their realization of COVID-19 as a life-threatening disease; thus, they feel worried about losing their loved ones (14). Psychological burdens of COVID-19 on family caregivers encompass a wide range of psychological symptoms such as emotional distress, depression, stress, mood swings, irritability, insomnia, post-traumatic stress disorder, anger, and emotional numbness (14-18). Therefore, it is necessary to identify the psychological impacts of the COVID-19 epidemic in order to take timely preventive measures and interventions to avert more severe and chronic consequences. The aim of the present study was to determine the levels of stress, anxiety, and depression in main caregivers of COVID-19 patients in Zanjan, Iran.

Materials and Methods

Study design and population

This was a cross-sectional study which was conducted in the period of March 2020 to May 2020. The study population were 620 family caregivers of COVID-19 patients at Vali-e-Asr Hospital in Zanjan, north-west of Iran. The participants were included in the study by the convenience sampling and the sample size was estimated to be 238 based on Cochran's formula. The inclusion criteria were primary family caregivers of Covid-19 patients with >18 years, who had access to smart phones and the ability to read and write in order to be able to complete questionnaires electronically. In fact, the participants were the COVID-19 patients' family members who were primary caregivers of them before hospitalization and after discharge at home. Caregivers who were illiterate or unwilling to participate in the study as well as those with a history of mental illness were excluded. All patients were in "severe" category (patients with clinical signs of pneumonia as well as a respiratory rate>30 breaths/min; severe respiratory distress; or SpO2<90% on room air) according to World Health Organization (WHO) clinical management of COVID-19 guidance (19). An online questionnaire which was designed using the Porsline platform was sent to the participants *via* SMS and WhatsApp messages. After providing a complete explanation of the aims and process of the study, the written informed consent was obtained electronically from all the participants. The present study was approved by the Ethics Committee of Zanjan University of Medical Sciences (IR.ZUMS.REC.1398.490).

Measures

The data gathering tool was a questionnaire consisting of two sections. The first section was about the demographic and occupational characteristics of the participants, such as age, gender, marital status, educational level, and employment status. It should be noted that in terms of employment status, we considered the career of the person in a household that mainly supports the family financially. The second section was the Persian version of Depression Anxiety Stress Scales (DASS-21), with adequate internal consistency for the 21-item scale (Cronbach's α=0.82). Asghari *et al* in a study on Persian version of DASS-21, showed the test-retest reliability for depression, anxiety and stress sub-scales to be 0.77, 0.89 and 0.85, respectively. They reported the Cronbach's alpha of 0.94 for the total 21-item scale. Moreover, the Cronbach's alpha of depression, anxiety and stress sub-scales achieved 0.85, 0.85, and 0.87, respectively. They also demonstrated a satisfactory validity (convergent validity and discriminant validity) of the three scales of the DASS-21 (20). The DASS-21 scale consists of 3 dimensions DASS-D (depression), DASS-A (anxiety), and DASS-S (stress). Each domain comprises 7 items. For each item, the available options for responding are 4-point Likert scale considered from zero (does not apply to me at all) to 3 (absolutely applies to me). The final score is obtained through the sum of the scores on the answers to the items corresponding to each of the domains. DASS-21 is the short form of DASS-42, thus we multiplied by two the total score for each sub-scale and assessed based on its severity rating index (21). "For Depression, the criteria were normal (0–9 points), mild (10–13 points), moderate (14–20 points), severe (21–27 points), and extremely severe (28+ points). For Anxiety, the standards were normal (0–7 points), mild (8–9 points), moderate (10–14 points), severe (15–19 points), and extremely severe (20+ points). For Stress, the criteria were normal (0–14 points), mild (15–18 points), moderate (19–25 points), severe (26–33 points), and extremely severe (34+ points)" (22).

Statistical analysis

Continuous variables were reported as mean± Standard Deviation (SD) and categorical data were reported as numbers and percentages. A Kolmogorov–Smirnov test was utilized to define the normality of data distribution. In the inferential analysis, Pearson correlation coefficient was conducted to examine the relationship between age and DASS-21 sub-scales. Additionally, the students' t test and analysis of variance were performed to compare DASS-21 sub-scales between groups, as applicable. We used a multiple linear regression analysis to determine the predictors of DASS sub-scales scores. Data were analyzed utilizing SPSS software version 25. All findings were considered statistically significant at $p<0.05$.

Results

Basic characteristics of the participants

In the present study, 236 people participated, all of whom were family caregivers of patients admitted to Vali-e-Asr Hospital. The mean age of the participants was 34.72 ± 9.52. Of the participants, 121 were female (51.3%), 144 were high school diploma (61.02%), and 156 were single (66.10%) (Table1).

Depression, anxiety, and stress of the participants

According to the study results, 57.21, 70.77 and 55.09% of the participants had symptoms of depression, anxiety, and stress, respectively (Table 2). Association between all dimensions of DASS 21 and socio-demographic characteristics of the participants were examined (Table 3). The findings showed that there was a significant difference in the levels of stress between females and males as the mean scores of "stress" were 16.25 ± 10.19 and 12.87 ± 9.05 in females and males, respectively (t=-1.99, p=0.049). In addition, the self-employed workers' levels of depression were higher than those of employees and retirees as the mean scores of "depression" were 10.97 ± 10.85, 7.29 ± 6.85, and 5.58 ± 8.11 in self-employed workers, retirees, and employees, respectively (F=4.36, p=0.048). There was no significant association between age, marital status and level of education with depression, anxiety, and stress sub-scales.

We performed a multiple regression analysis to examine the employment status of the participants in terms of depression sub-scale as well as gender

Table 1: Descriptive characteristics of the participants *

Variable	Participants (n=236)
Age, years	34.72 ± 9.52
Gender, female	121(51.3)
Marital status, single	156 (66.1)
Level of education	
HSD	144 (61.02)
B.A.	57 (24.15)
M.A.	35 (14.83)
Employment status	
Employee	69 (29.23)
Self-employed	127 (53.81)
Retired	40 (16.96)

*Values are n (%) and means ± SD. HSD = High School Diploma;
B.A. = Bachelor's degree; M.A. = Master's degree.

Table 2: Descriptive statistics on depression, anxiety, and stress

Variable	Mean ± SD / N (%)
DASS-21	Score = 16.37±12.76
DASS-D	Score =9.44 ± 10.32
No depression	101 (42.79)
Mild	39 (16.54)
Moderate	38 (16.1)
Severe	25 (10.59)
Extremely severe	33 (13.98)
DASS-A	Score = 9.01 ± 8.10
No anxiety	69 (29.23)
Mild	52 (22.03)
Moderate	57 (24.15)
Severe	39 (16.54)
Extremely severe	19 (8.05)
DASS-S	Score = 14.29 ± 9.77
No stress	106 (44.91)
Mild	30 (12.71)
Moderate	40 (16.94)
Severe	33 (13.98)
Extremely severe	27 (11.46)

DASS-21= 21-item Depression Anxiety Stress Scale; DASS-D = 7-item DASS-21 Depression subscale; DASS-A= 7-item DASS-21 Anxiety subscale; DASS-S = 7-item DASS-21 Stress subscale.

Table 3: The association between participants' basic characteristics and DASS-21 sub-scales

Variable	DASS-D Mean ± SD	DASS-A Mean ± SD	DASS-S Mean ± SD	DASS-21 Mean ± SD
Age *	0.044(0.618)	-0.164(0.062)	-0.069(0.438)	-0.044(0.618)
Gender †				
Female	10.44 ± 10.89	9.88 ± 8.60	16.25 ± 10.19	36.17 ± 26.25
Male	8.35 ± 9.63	8.06 ± 7.48	12.87 ± 9.05	29.00 ± 24.38
p-value	-1.15 (0.251)	-1.28 (0.202)	-1.99 (0.049) **	-1.61 (0.110)
Marital status †				
Single	10.79 ± 11.08	10.46 ± 7.76	16.23 ± 11.29	37.48 ± 27.79
Married	8.76 ± 9.99	8.27 ± 8.26	13.25 ± 8.85	30.30 ± 24.28
p-value	1.04 (0.298)	1.44 (0.151)	1.63 (0.104)	1.5 (0.134)
Level of Education ‡				
HSD	10.38 ± 11.22	9.04 ± 8.56	14.28 ± 10.003	33.71 ± 27.34
B.A.	7.74 ± 7.70	9.41 ± 6.73	14.58 ± 9.78	31.74 ± 21.29
M.A.	7.73 ± 9.67	8.00 ± 8.48	13.73 ± 9.003	29.46 ± 22.90
p-value	0.97 (0.381)	0.15 (0.857)	0.03 (0.964)	0.2 (0.815)
Employment status ‡				
Employee	5.58 ± 8.11	7.58 ± 5.69	11.70 ± 8.48	24.88 ± 20.01
Self-employed	10.97 ± 10.85	9.67 ± 8.90	15.00 ± 10.21	35.65 ± 27.31
Retired	7.29 ± 6.85	6.81 ± 4.54	12.47 ± 10.25	33.14 ± 24.80
p-value	3.64 (0.029) **	1.87 (0.206)	2.15 (0.120)	2.9 (0.083)

DASS-21= 21 item Depression Anxiety Stress Scale; DASS-D = 7-item DASS-21 Depression subscale; DASS-A= 7-item DASS-21 Anxiety subscale; DASS-S = 7-item DASS-21 Stress subscale.

* Values are Pearson's coefficient (p-value).

† Values are t (p-value).

‡ Values are f (p-value).

**p < 0.05.

regarding stress sub-scale. Stepwise regression analysis indicated that being solely a self-employed worker is significantly associated with higher scores of depression sub-scale in comparison to either employees or retiree (b=5.24, p=0.008) which indicates that on average, self-employed workers experienced depression symptoms that are 5.24 points more than two other groups. Moreover, R2=0.054, implying only 5.4% of the variability in depression sub-scale score is due to being self-employed (r=0.233, F=7.26, p=0.008).

With regard to gender, regression analysis revealed that female caregivers reported a significant higher scores of stress symptoms (b=3.37, p=0.049) which suggests that female caregivers experienced about 3.37 points more stress symptoms compared to males. The R2 was equal to 0.030 that can be interpreted as only 3% of the variability in stress sub-scale scores explained by being female (r=0.173, F=3.95, p=0.049).

Discussion

The findings showed that there was a significant prevalence of depression (57.21%), anxiety (70.77%) and stress (55.09%) symptoms among the study population. Besides, there was a significant difference

between males and females in terms of stress sub-scale score. Importantly, the mean scores of depressions sub-scale was significantly higher for self-employed workers in comparison to retirees and employees.

The results of this study were aligned with the results reported in the studies of Kim (14), Gallagher (23), and Park (24). In the Kim study, caregivers of hospitalized children with COVID-19 suffered significant psychological problems. Gallagher *et al* showed that COVID-19 with negative psychological effects on caregivers, is an important factor in their depression. In the Park study, the caregivers of the patients with COVID-19 suffered from psychological distress, which varied by their status, as the long-term caregivers suffered more psychological distress compared to short-term caregivers. A high rate of psychological illness and social stigma was found in medical staff associated with Ebola and SARS. In addition, the use of protective clothing, which makes the treatment much more difficult than normal conditions, as well as the fear of getting sick and making others sick, caused stress and anxiety in these people (25, 26). It seems that one of the reasons why the rate of stress, anxiety, and depression symptoms were high in the participants is due to the unknown dimensions of COVID-19 at the time of the present study. In fact, at the onset of the COVID-19 epidemic in the country, all its dimensions were unknown to the people and even to the medical staff. Additionally, due to the lack of a definite treatment for this disease and the fact that caregivers are witnessing an unknown and severe disease in their loved ones, they would experience a high level of depression, anxiety and stress.

Jafari-Oori *et al* in a study enrolled 350 family caregivers of COVID-19 patients used DASS-21 as a tool in order to measure psychological burden of COVID-19. They reported the prevalence of depression, anxiety, and stress symptoms, 77.75, 75, and 80%, respectively. Although they reported a higher prevalence of depression and stress symptoms, the results of their study were consistent with the present study in terms of the prevalence of anxiety symptoms. It was also revealed that there was a significant relationship between being younger and married with high levels of psychological symptoms (12).

In the SARS epidemic in Hong Kong, caregivers and patients' families reported a high percentage of stress and mental pressure after direct contact with patients. The levels of stress and anxiety were higher among people who had direct contact with COVID-19 patients, and this showed that direct contact with patients was a factor in aggravating stress and anxiety in caregivers (27). The results of Koh study at the time of the SARS epidemic demonstrated that half of the Singaporean healthcare workers and patients' caregivers suffered from stress and mental pressure (28).

Moreover, in the present study, the relationship between gender and stress was significant. Female caregivers showed higher scores in this sub-scale, which was consistent with the results of Lai's study (29). In Lai's study, women suffered from high stress in direct contact with patients, while men scored lower. Moreover, it has been shown that women are more vulnerable to stressors (30). It is worth mentioning that in Iranian culture, caring for patients, children, and the disabled is dominantly the responsibility of women and girls in the family. Therefore, they may feel more psychological burdens as a result of caring for patients with COVID-19 and this might lead to a higher level of stress symptoms among them (31).

The depression sub-scale was significantly related to employment status. Self-employed workers had a higher mean in depression than employees and retirees. One of the important reasons for explaining this relationship might be the lack of job security for self-employed workers during the pandemic. From the beginning of the lockdown and restriction of many non-governmental jobs, this group of people was endangered in terms of living and economic conditions, and the support plans failed to compensate all their losses while employees and retirees were constantly receiving their monthly income. Also, the financial problems might be even worse for the family caregivers of patients who were the main financial supporter of the family with a non-governmental job since they were not able to leave home due to illness. Even a qualitative study on the family caregivers of COVID-19 patients in Iran clearly indicated that being self-employed leads to more financial needs during the pandemic; therefore, it might result in feeling more psychological burdens among family caregivers (32).

Limitations

This study faced two main limitations. First, this was a cross-sectional study and no control group was included in the study. Conducting studies with family caregivers of COVID-19 patients at different categories, as well as including control groups who do not care for COVID-19 patients, can provide useful information to better understand the psychological symptoms in this population. Second, in this study, only a limited number of basic characteristics of the participants were examined. Indeed, there might be numerous contributing factors that can have an impact on family caregivers' mental health. Thus, they should be studied as they can play a fundamental role in making decisions for this population by policy makers.

Conclusion

In summary, our results demonstrated that depression, anxiety and stress symptoms were prevalent among caregivers of COVID-19 patients. This paramount evidence suggests that during the COVID-19 pandemic, family caregivers should receive effective mental support in order to reduce the psychological burden of the current crisis on their mental health. Indeed, there is a need for plans and measures by policy makers and health care providers to prevent family caregivers from developing serious psychological consequences. Besides, the findings indicated that females experienced a significantly higher level of stress than males and considering the employment status, self-employed workers had a higher level of depression symptoms compared to the other two groups. The mentioned findings emphasize paying attention to gender and socio-economic differences between family caregivers to be able to implement effective policies tailored to different circumstances to reduce the symptoms of stress, anxiety and depression of these individuals and improve their mental health.

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