Original Article

Psychological stress and coping strategy in caregivers for hemiplegic patients with acute cerebral infarction during coronavirus disease pandemic

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Background: This study aimed to analyze the changes of psychological stress and coping strategy in caregivers for hemiplegic patients with acute cerebral infarction at the early stage of coronavirus disease pandemic.

Methods: Ninety-nine caregivers for hemiplegic patients with acute cerebral infarction were selected from Wuhan city during January to February 2020; they were divided into family caregivers group (FCG) and professional caregivers group (PCG). Symptom Checklist 90 (SCL-90) was used to assess psychological stress and Simplified Coping Style Questionnaire (SCSQ-20), coping strategy.

Results: The results of SCL-90 showed that the scores of somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, and paranoid ideation in FCG were significantly higher than those in PCG ($P<0.05$, or $P<0.01$), while the scores of hostility, phobic anxiety, and psychoticism were not different between the two groups ($P>0.05$). The comparison of the SCSQ-20 scores between the two caregiver groups showed that FCG had lower scores on positive coping and negative coping as compared to PCG ($P<0.01$).

Conclusions: The family caregivers for hemiplegic patients with acute cerebral infarction had obvious psychological stress, and their coping ability decreased during the coronavirus disease 2019 (COVID-19) pandemic. The medical staff and society should provide educational, cognitive behavioral intervention and social support for hemiplegic patients and their caregivers to cope with their psychological responses.

Keywords: Acute cerebral infarction; hemiplegic patients; caregiver; mental health; coronavirus disease 2019 pandemic (COVID-19 pandemic)

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Introduction

Although the mortality rate of acute stroke has decreased significantly, the proportion of patients with hemiplegic is increasing annually (1). Caregivers play a substantial role on support at acute stroke survivors after hospitalization. In the process of caring for the hemiplegic patients, it inevitably leads to mental health problems such as anxiety and depression of the caregivers, because caregivers have to sacrifice their own physical and emotional needs in the process of caring for patients (2,3). An observational study (4) with 63 caregivers for acute stroke patients was recruited from urban acute-care settings. The results showed that caregiver uncertainty, perceived stress, coping, social support, income, time spent on care, stroke-survivor race,

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and functional status were independently associated with caregiver depressive symptoms. Through reviewing the research literature of Chinese stroke caregivers from 2005 to 2019, it was concluded that not many research papers have been published and no professional research teams have focused on stroke caregivers and their copy responses (5).

Coping strategies refer to the cognitive and behavioral changes that result from the management of an individual's specific external or internal stressors (6,7). The coping strategies embraced by an individual may depend on different factors, such as personality, progression of the disease and severity of challenges faced in daily life. With regard to the general population, some persons tend to be more accepting and let matters take their own course, that is, showing more negative coping strategies. In contrast, other persons show more mature coping strategies and approach their disease in a positive coping strategy (8). One previous study (9) analyzed 160 caregivers of hospitalized patients with acute stroke, the results showed that the mental status scores of caregivers of acute stroke patients from high to low were anxiety, depression, inter-irritation and outer-irritation. The scores of positive coping styles and negative coping styles were 10.32±2.76 and 15.08±2.96.

At the early stage of coronavirus disease 2019 (COVID-19) pandemic, many hospitals were transformed into designated hospitals for the treatment of COVID-19 pneumonia. Therefore, many patients with acute stroke refused to go to the hospital for timely treatment in the fear of contracting the COVID-19 (10). This situation not only brought physical and psychological burden to normal people living in Wuhan city and Hubei province, but also affected medical treatment for patients with acute stroke. One questionnaire study (11) included 801 frontline medical workers and 505 non-frontline medical workers; they found the prevalence of sleep disturbances in frontline medical workers was higher than that in non-frontline medical workers. However, few studies to investigate the mental health of caregivers for acute stroke patients due to the closed management were applied in the hospital ward. The aim of this study was to analyze the psychological stress and coping strategy in caregivers for hemiplegic patients with acute cerebral infarction at the early stage of COVID-19 pandemic in Wuhan city. We present this article in accordance with the STROBE reporting checklist (available at https://jxym.amegroups.com/article/view/10.21037/jxym-23-23/rc).

Highlight box

Key findings

- Family caregivers for hemiplegic patients showed worse psychological stress and coping strategy than professional caregivers during the coronavirus disease 2019 (COVID-19) pandemic.

What is known and what is new?

- One previous study showed the prevalence of sleep disturbances in frontline medical workers was higher than that in non-frontline medical workers during the COVID-19 pandemic.
- This study was to analyze the psychological stress and coping strategy in caregivers for hemiplegic patients with acute cerebral infarction at the early stage of COVID-19 pandemic in Wuhan city.

What is the implication, and what should change now?

- The scores of somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, and paranoid ideation in family caregivers group (FCG) were higher than those in professional caregivers group (PCG). Meanwhile, FCG showed lower scores on positive coping and negative coping as compared to PCG.
- It is necessary for medical staff and society to provide educational, cognitive behavioral intervention and social support for caregivers to cope with their psychological problems during the COVID-19 pandemic.

Methods

Participants

In this study, patients who experienced first-ever acute cerebral infarctions with hemiplegia who needed caregivers were identified from hospitals in Wuhan city during January to February 2020. The diagnosis of acute cerebral infarction met the criteria for the diagnosis of various cerebrovascular diseases formulated by the Chinese Neuroscience Association, and was confirmed by head computed tomography (CT) or magnetic resonance imaging (MRI) (12). We collected clinical data of enrolled patients, including basic information, present history, past history, results of blood biochemical tests and imaging examinations after admission, and excluded patients with psychological and psychiatric disorders. At the same time, we asked caregivers for basic information, current physical health status, past medical history, and excluded caregivers with psychological and psychiatric disorders. A total of 99 patients with acute cerebral infarction with hemiplegia were divided into two groups according to their caregivers. Forty-eight patients were taken care of by professional caregivers, called the professional caregivers group (PCG). The group consisted of 18 males and 30 females, aged 45 to 64 years old, with an average age of 52.8±4.3 years. The remaining 51 patients were taken care of by the patient's family members; they were called the family caregivers

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group (FCG). The group consisted of 20 males and 31 females, aged 44 to 65 years, with an average age of 53.1±4.8 years. All caregivers were in good health condition, had no medical history of mental illness. The informed consent was obtained from all caregivers. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013), and approved by the ethics board of Zhongnan Hospital of Wuhan University (No.: 2020074K).

Mental health assessment

The psychological stress in caregivers was assessed using the Self-Reporting Inventory, also called the Symptom Checklist 90 (SCL-90) (13), while the coping strategy in caregivers was assessed using the Simplified Coping Style Questionnaire (SCSQ-20) (14). The psychological assessment scale used in this study has been proven to have good reliability and validity in the Chinese population.

The Chinese version of the SCL-90 was used to measure the psychological stress in caregivers for hemiplegic patients with acute cerebral infarction. Basically, SCL-90 includes 9 subscale dimensions: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. Each subscale of the SCL-90 adopts a 5-level scoring system as follows: 1= no impact (there is not conscious symptom); 2= very slight impact (the symptom is conscious, but there is no actual impact on the subject, or the impact is very small); 3= moderate impact (there is conscious symptom, it has some influence on the subject); 4= severe impact (there is conscious symptom, it has a considerable impact on the subject); and 5= severe impact (the frequency and intensity of the symptom are very serious and the impact on the subject is serious). The higher the total scores of SCL-90, the more urgent the need for individual intervention.

The Chinese version of the SCSQ-20 was used to measure the coping strategy in caregivers for hemiplegic patients with acute cerebral infarction. The SCSQ-20 is a self-report questionnaire containing 20 items, including positive coping strategy (12 items) and negative coping strategy (8 items). It is based on the Ways of Coping Questionnaire developed by Folkman and Lazarus (15), and revised by Xie (14) to be applicable to Chinese people. The test requires the subjects to agree or disagree on the scale based on the frequency they use for each item: 0= not to use; 1= use occasionally; 2= use sometimes; and 3= use often. The higher the SCSQ-20 score, the better the positive or negative coping strategy. The dimension of positive coping reflects the characteristics of the subjects' active coping styles when encountering stress, while the dimension of negative coping reflects the characteristics of the subjects' passive coping styles when encountering stress.

Statistical analysis

The data in this study were expressed as mean ± standard deviation (SD). GraphPad Prism 5.01 software (GraphPad, San Diego, California, USA) was used for statistical analysis. Student's *t*-test was used to compare the differences between the two groups of measurement data, and the chi-square test was used to compare the two groups of count data. $P<0.05$ was considered as statistically significant.

Results

Characteristics of two groups of hemiplegic patients and their caregivers

In this study, two groups of caregivers for hemiplegic patients with acute cerebral infarction had no significant differences in age, sex, and past medical history during the COVID-19 pandemic. Detail information about the patients and their caregivers is listed in *Table 1*.

Psychological stress in caregivers for two groups of hemiplegic patients

This study showed that the SCL-90 scores in caregivers for hemiplegic patients with acute cerebral infarction were different between the two groups, with the scores of somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, and paranoid ideation significantly higher in FCG than those in PCG ($P<0.05$, or $P<0.01$). There were no significant differences in the scores of hostility, phobic anxiety, and psychoticism between the two groups ($P>0.05$). These results suggest that the occurrence of acute cerebral infarction during the COVID-19 pandemic has different psychological stress on the caregivers for hemiplegic patients, and the stress reaction is more obvious in FCG (*Table 2*).

Coping strategy in caregivers for two groups of hemiplegic patients

Based on the results of SCSQ-20, the scores of positive coping strategy and negative coping strategy in FCG were

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Table 1 Characteristics of hemiplegic patients and their caregivers in two groups

Characteristics	PCG (n=48)	FCG (n=51)	P value
Patients information			
Age (years)	65.4±8.6	66.3±8.8	0.608
Male	31 (64.6)	33 (64.7)	0.990
Hypertension	26 (54.2)	28 (54.9)	0.941
Dyslipidemia	18 (37.5)	20 (39.2)	0.861
Diabetes mellitus	14 (29.2)	15 (29.4)	0.979
Ischemic heart disease	12 (25.0)	14 (27.5)	0.782
Atrial fibrillation	8 (16.7)	9 (17.6)	0.897
Glucose (mmol/L)	5.52±0.64	5.48±0.70	0.767
TC (mmol/L)	6.68±1.12	6.72±1.20	0.864
TG (mmol/L)	4.68±0.74	4.84±0.81	0.308
HDL-C (mmol/L)	1.18±0.22	1.20±0.26	0.681
LDL-C (mmol/L)	4.42±0.68	4.56±0.65	0.297
TACS	7 (14.6)	7 (13.7)	0.903
PACS	17 (35.4)	19 (37.3)	0.849
POCS	6 (12.5)	7 (13.7)	0.857
LACS	18 (37.5)	20 (39.2)	0.861
NIHSS score on admission	14.8±6.6	15.2±6.8	0.767
Caregivers information			
Age (years)	52.8±4.3	53.1±4.8	0.744
Male	18 (37.5)	20 (39.2)	0.861
Drinking	15 (31.3)	17 (33.3)	0.825
Smoking	12 (25.0)	13 (25.5)	0.955
Hypertension	9 (18.8)	10 (19.6)	0.914
Dyslipidemia	16 (33.3)	18 (35.3)	0.837
Diabetes mellitus	6 (12.5)	7 (13.7)	0.857
Ischemic heart disease	3 (6.3)	3 (5.9)	0.939

Data were presented as mean ± standard deviation or n (%). PCG, professional caregivers group; FCG, family caregivers group; TC, total cholesterol; TG, triglycerides; HDL-C, high density lipoprotein cholesterol; LDL-C, low-density lipoprotein cholesterol; TACS, total anterior circulatory stroke; PACS, partialanterior circulatory stroke; POCS, posterior circulatory stroke; LACS, lacunar stroke; NIHSS, National Institutes of Health Stroke Scale.

significantly lower than those in PCG (P<0.01). This result indicated that in the face of acute cerebral infarction during the COVID-19 pandemic, the coping ability in FCG was worse than that in PCG (*Table 3*).

Discussion

Most research studies conducted during the pandemic period has focused on the mental health in patients with COVID-19 pneumonia and medical staff (16-18).

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Table 2 SCL-90 scores in two groups of caregivers for hemiplegic patients

Variables	PCG (n=48)	FCG (n=51)	P value
Somatization score	1.85±0.46	2.10±0.64	0.028
Obsessive-compulsive score	1.73±0.64	2.20±0.69	0.001
Interpersonal sensitive score	1.80±0.49	2.10±0.40	0.001
Depression score	1.94±0.56	2.43±0.78	0.001
Anxiety score	2.04±0.80	2.55±0.92	0.004
Hostility score	1.96±0.54	2.14±0.49	0.085
Phobic anxiety score	2.13±0.61	2.12±0.55	0.931
Paranoid ideation score	1.34±0.40	1.65±0.52	0.001
Psychoticism score	2.50±0.55	2.51±0.58	0.098

Data were presented as mean ± standard deviation. SCL-90, Symptom Checklist 90; PCG, professional caregivers group; FCG, family caregivers group.

Table 3 SCSQ-20 scores in two groups of caregivers for hemiplegic patients

Variables	PCG (n=48)	FCG (n=51)	P value
Positive coping score	19.58±6.72	15.74±5.83	0.003
Negative coping score	12.85±4.37	10.05±3.66	0.004

Data were presented as mean ± standard deviation. SCSQ-20, Simplified Coping Style Questionnaire; PCG, professional caregivers group; FCG, family caregivers group.

An online survey (19) included 927 subjects and found that medical health workers had a higher prevalence of insomnia, anxiety, depression, somatization, and obsessive-compulsive symptoms during the COVID-19 outbreak. To assess the prevalence of fatigue among first-line nurses combating with COVID-19 in Wuhan, 2,667 participants completed the investigation. The results showed that 35.06% nurses were in the fatigue status; regression analysis revealed the participants in the risk groups of anxiety, depression and perceived stress had higher scores on physical and mental fatigue (20). Another study (21) to evaluate the psychological impact of COVID-19 on nursing professionals in Rioja Health Service, they found that the vast majority of nurses had risk factors for mental health. As compared with professionals with more than five years of experience, professionals with less experience had higher stress levels. This study analyzed the psychological stress in caregivers for hemiplegic patients with acute cerebral infarction at the early stage of COVID-19 pandemic in Wuhan city. The SCL-90 scores of somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, and paranoid ideation in FCG were significantly higher than those in PCG. These results suggested that the psychological stress in family caregivers for hemiplegic patients with acute cerebral infarction was greater than that in professional caregivers during the COVID-19 pandemic.

Coping strategy appear to play an important role in the management of emergencies and related occupational stress among health care professionals (22). The positive and negative characteristics of coping methods can indeed be observed in real life and are easy to be recognized and understood by people; therefore, Xie (14) proposed to divide coping methods into positive coping styles and negative coping styles. It is well-known that positive coping styles will help alleviate the impact on individuals and maintain both physical and mental health, whereas negative coping styles can damage mental health. The key positive coping strategy is a positive attitude towards problems, social networking, peer support, teamwork, self-reliance, problem negotiation and self-care. Negative coping strategy included wishing the problem would go away, imagining miracles, and drinking or using drugs. It also includes adopting avoidance behaviors, such as avoiding verbal, physical and social contact with people suspected of having an infection.

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A systematic review (23) showed that health care workers are using both positive (e.g., use of social support and prayer) and negative (e.g., use of distracting activities) coping strategy to effectively manage stress associated with COVID-19 pandemic. Meanwhile, health care workers like to use support from and communication with family, friends and colleagues as their primary coping mechanisms to manage the adverse mental health consequences of the COVID-19 pandemic. One Spanish study (24) to investigate the impact of stressors on nurses' psychological distress during the COVID-19 pandemic. They found that poorly prepared nurses and nurses with a high fear of infection did not develop appropriate coping strategy. Some frontline nurses may engage in negative coping behaviors during the pandemic. In this study, the scores of positive coping and negative coping in family caregivers were significantly lower than those in professional caregivers. This situation implies that family caregivers can easily adopt immature coping strategy during the COVID-19 pandemic.

Social support has been usually considered as the important resource to alleviate mental distress and psychological barrier for nurses (25). It played a substantial role in improving psychological health by helping individual to reduce perceived severity of the problem and the adverse effects of stress (26). In general, social support includes moral and material support from the family and outside the family. At the early stage of COVID-19 pandemic, a range of measures has been urgently adopted, including closed non-essential public places, restricted mass gathering activities, delineating control areas, contact tracing and monitoring to effectively control the spread of the virus, which may bring public uncertainty and a sense of crisis (27,28). In order to avoid the potential risk of infection among family members, family members were not allowed to enter the hospital and visit in-patients. Meanwhile, frontline health care workers were quarantined or asked not to go home after work during the COVID-19 pandemic. This situation leads to frontline health care workers and in-patients might perceive less support from their family.

During the difficult times of the global COVID-19 pandemic, the World Health Organization has advised people to use positive coping strategy to address a range of stress and mental health issues. However, negative coping behaviors might provide stress reduction in the immediate or short term but it did not address the cause of stress (29). Zyga *et al.* (30) argue that avoidance is not an escape, but a way to divert attention or temporarily alleviate conflict. To some extent, it can reduce the occurrence of negative psychology. Therefore, it is possible to guide patients or caregivers to adopt avoidance coping style in clinical nursing, so as to reduce the uncertainty of disease in the course of disease treatment and promote the recovery of disease. In addition, there are a number of coping strategies that can ease the psychological stress of COVID-19 pandemic. For example, religious coping mechanisms were associated with reduced anxiety, aggression, psychological distress, and depressive symptoms, but were also positively associated with increased optimism, hope, and mental health (31,32). Therefore, the use of religious coping mechanisms may help reduce stress and anxiety for some individuals during the COVID-19 pandemic (33-35). Besides, engage in distracting activities, such as exercise, music or yoga has also been suggested as an important coping mechanism used by health care workers at the peak of the COVID-19 pandemic (34-37). Other coping mechanisms identified by healthcare workers include knowledge of COVID-19 and its preventive measures (36) and adherence to infection control guidelines (37). The use of online peer support and social media was also recommended to provide social or emotional support to caregivers (38). For those patients or caregivers with obvious psychological stress, we provide timely psychological counseling and psychological intervention treatment.

Fortunately, none of the patients or caregivers in this study was infected with COVID-19. However, this study has some limitations. The sample size is small, and the selected subjects are from the early stage of COVID-19 outbreak in Wuhan city, and cannot represent all hemiplegic patients with acute cerebral infarction. Further expansion of the sample size and follow-up time will help to understand more about the mental health in caregivers for hemiplegic patients with acute ischemic stroke.

Conclusions

To the best of our knowledge, this is the first study to show that the COVID-19 pandemic has had a significant psychological impact on caregivers for hemiplegic patients. Family caregivers showed lower scores on positive coping and negative coping as compared to professional caregivers. Therefore, it is necessary for medical staff to provide family caregivers with the nursing knowledge and skills for hemiplegic patients in hospital, to popularize knowledge and preventive measures about COVID-19 to copy with the psychological burden on caregivers for hemiplegic patients.

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Footnote

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Conflicts of Interest: Both authors have completed the ICMJE uniform disclosure form (available at https://jxym.amegroups.com/article/view/10.21037/jxym-23-23/coif). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013), and approved by the ethics board of Zhongnan Hospital of Wuhan University (No.: 2020074K). The informed consent was obtained from all caregivers.

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