Chain Mediation Model of Perceived Stress, Resilience, and Social Support on Coping Styles of Chinese Patients on Hemodialysis During COVID-19 Pandemic Lockdown

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Background: The recurrence of COVID-19 and the continuous escalation of prevention and control policies can lead to an increase in mental health problems. This study aimed to investigate the perceived stress, coping style, resilience, and social support among patients on maintenance hemodialysis (MHD) during the COVID-19 epidemic lockdown in China.

Material/Methods: This cross-sectional observational study enrolled 197 patients on MHD from the Guangdong Province Traditional Chinese Medical Hospital and the Hedong Hospital of Guangzhou Liwan District People’s Hospital during July 2021. AMOS 24.0 and PROCESS Macro 3.1 model 6 were used for analyses of moderating mediating effects.

Results: Perceived stress was negatively correlated with positive coping style (r=-0.305, P<0.001) and resilience (r=-0.258, P<0.001), whereas resilience (r=0.631, P<0.001) and social support (r=0.300, P<0.001) were positively correlated with positive coping style among patients on MHD. In the moderated mediating model, perceived stress had significant direct predictive effects on positive coping style (95% CI -0.33, -0.07), and perceived stress had significant indirect predictive effects on positive coping styles through resilience (95% CI -0.26, -0.06) or social support (95% CI 0.01, 0.06). Perceived stress had significant indirect predictive effects on positive coping style through both resilience and social support (95% CI -0.04, -0.01).

Conclusions: Perceived stress not only predicted coping style directly, but also indirectly predicted coping style through resilience and social support. Coping style was affected by internal and external factors during the COVID-19 pandemic lockdown period.

Keywords: COVID-19 • Hemodialysis, Home • Resilience, Psychological • Social Support • Stress, Psychological

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Background

COVID-19 is highly a contagious disease with a fast spread and multiple channels that make the population susceptible; it has caused serious health threats worldwide [1]. In May 2021, India’s B.1.617 mutant strain spread for the first time in the Liwan District of Guangzhou, China. It had a short incubation period, fast transmission, high viral load, and long duration until patients had a negative test result. Its suddenness and dissemination in the community posed a huge threat and impact on peoples’ lives. To further strengthen the prevention and control of the COVID-19 epidemic in Guangzhou, the Guangzhou New Coronavirus Pneumonia Epidemic Prevention and Control Headquarters locked down the Liwan District and other places according to the risk level on June 4, 2021 [2].

During the COVID-19 pandemic lockdown period, patients on maintenance hemodialysis (MHD) still needed to have dialysis in the hospital weekly. It is reported that the prevalence of hemodialysis in China was 402.18 per million, and the corresponding number of patients on hemodialysis was approximately 553,000 in 2015 [3]. Dialysis is unable to fully compensate for the metabolic activities of people, and this is considered one of the potential stress factors among patients on dialysis [4].

Previous research has shown that patients on hemodialysis were dealing with many psychological tensions in addition to the problems related to treatment [5]. In dialysis treatment, patients receiving MHD deal with significant stresses due to the aggravation of chronic renal failure, and since the treatment of this disease is a long-term process, it affects the patients’ psychosocial function [6,7]. Many psychiatric disorders are seen in patients on MHD, such as stress, depression, and anxiety. Since the dialysis centers have a large flow of people with unknown contact history, and with the COVID-19 epidemic outbreak and the continuous escalation of prevention, patients on MHD experienced additive psychosocial pressure. It has been reported that some patients were seriously affected in their daily lives from the excessive stress [8]. In addition to dialysis treatment, the COVID-19 outbreak, lack of understanding of chronic kidney disease, and commuting to and from the hospital exposed patients to the prominent contradictions of handling a chronic disease within a pandemic. This fact could lead to a series of physical and mental problems and then affect the prognosis of the disease.

Perceived stress occurs when individuals consider their relationship with the environment to be overwhelming or threatening in a way which could affect well-being [9]. It is the confusion or uncertainty that the individual generates when assessing the threat posed by a stressful event, including tension and loss of control [10]. The stress-response theory points out that when an individual is faced with a stressful event, the event will be perceived by the individual at first, and then the individual will make a preliminary assessment of the degree of stress caused by the stressful event, combine it with the experience and evaluation of other response resources, and finally produce corresponding coping behaviors [11]. Studies show that positive and mature coping styles can improve the mental health of the general population [12]. Therefore, helping patients on MHD take an active response during the lockdown period to reduce the perceived stress has great significance in improving their mental health. The risk of mental health impairment is significantly increased without good coping styles and effective social support under high stress [13]. Patients on MHD need tangible and emotional social support. When they feel the understanding and support from the society and family members, they could take more active measures to relieve the negative emotions; social support helps patients on MHD to better cope with external pressure [14]. Social support can directly affect an individual’s mental health, but it can also act on an individual’s internal psychological factors, and even mental health. Studies have shown that the predictive effect of social support on mental health is achieved through resilience [15]. Better resilience helps people actively cope with the pressure encountered in work and life [16]. García-Martínez et al have confirmed that resilience is one of the important predictors of perceived stress [17]. Therefore, the development of interventions to promote resilience may have a positive impact on the perceived stress of patients on MHD.

The psychological state of patients on MHD changed from indifference and disbelief to fear and excessive tension, and finally toward relaxation during the COVID-19 epidemic [8]. Whether resilience and social support, as an internal driving force and valuable external resource, respectively, could improve patients’ pressure perception and impact coping style is worth studying. This study aimed to investigate the perceived stress, coping style, resilience, and social support among patients on MHD during the COVID-19 pandemic lockdown in

Figure 1. The prediction of a chain mediating model of resilience and social support on the relationship between perceived stress and coping style among patients on MHD in China during the COVID-19 pandemic lockdown period. Resilience and social support may have a certain mediating effect between perceived stress and coping styles (IBM SPSS macro program PROCESS v3.1 Model 6).
China as well as the underlying possible mediating and moderating mechanisms. We also aimed to explore psychological care measures to improve the mental health of patients during the lockdown period. Additionally, we examined a chain mediating model of resilience and social support for the relationship between perceived stress and coping style (Figure 1).

Material and Methods

Participants

All patients on MHD who were treated at the Guangdong Province Traditional Chinese Medical Hospital and the Hedong Hospital of Guangzhou Liwan District People’s Hospital during the lockdown period (June 4-24, 2021) were invited to participate in this study. The inclusion criteria were as follows: (1) patient met the diagnostic criteria of stage 5 chronic kidney disease in the clinical guidelines of the US Kidney Disease Prognosis Quality Initiative [18]; (2) patients was between 25 and 85 years old; (3) patient’s regular dialysis time ≥3 months; and (4) patients was willing to cooperate with the study. The exclusion criteria were as follows: (1) severe liver disease, heart disease, or other systemic diseases; and (2) mental illness or cognitive dysfunction.

Study Design

We conducted a cross-sectional, observational survey. The survey was approved by the Ethics Committee of Guangdong Provincial Traditional Chinese Medical Hospital (no. ZE2021-157-01). This study was performed following institutional guidelines, and all procedures followed were in accordance with the Helsinki Declaration of 1975 in its most recent version. Participation in the study was voluntary and all participants gave their written informed consent.

Setting

The COVID-19 lockdown period in Fangcun was from June 4, 2021 to June 24, 2021. Due to the requirements of pandemic prevention, this study was not allowed to be officially carried out until lockdown ended, so the data were collected in July 2021. When the investigation was officially conducted, the investigator introduced the method and purpose of the study to the patients who met the inclusion criteria and signed the informed consent form. The questionnaires were issued to patients who met the inclusion criteria and signed the informed consent. The patient chose the answers, and then a researcher recorded the answers on the questionnaire.

Outcome Measures

Perceived Stress Assessment

The Perceived Stress Scale [10] was used to assess perceived stress. The scale measured the extent of self-awareness of stress and the belief that one’s life had been overloaded or was unpredictable or uncontrollable during the previous month. The survey includes 2 dimensions of loss of control and tension, and the 10 items are answered on a 5-point Likert scale. The minimum and maximum points are 0 and 40 points, respectively, with a higher score representing greater mental stress. The scale has shown high validity and reliability in the Chinese population [19], with a Cronbach’s alpha of 0.82 [20].

Coping Style Assessment

The Chinese version of the Simplified Coping Style Questionnaire [21] was used to measure coping style. The 20-item scale consists of 2 dimensions: positive and negative coping. The first 12 items cover positive coping, and the latter 8 items cover negative coping. The score is based on a 4-point Likert scale, the minimum and maximum points are 0 and 60 points, respectively, and higher scores indicates greater positive or negative coping. The scale has shown high reliability and validity in a Chinese population [13], with a Cronbach alpha of 0.916 for positive coping and 0.808 for negative coping [21].

Resilience Assessment

The Connor-Davidson Resilience Scale [22] was used to measure resilience, which consists of 3 factors: toughness, strength, and optimism. The scale has a total of 25 items rated on a 5-point Likert scale ranging from 1 (not at all) to 4 (always). The minimum and maximum points are 0 and 100 points, respectively, and a higher score indicates better resilience. The scale has shown high validity and reliability in a Chinese population [23], with a Cronbach’s alpha of 0.882 [24].

Social Support Assessment

The Social Support Rating Scale [25], which consists of 10 items, was used to assess social support. The scale includes 3 dimensions: objective support, subjective support, and availability of support. The minimum and maximum points are 0 and 100 points, respectively, and higher scores reflecting more social support. The scale has shown high validity and reliability in a Chinese population, with a Cronbach’s alpha of 0.949 [26].
Sample Size

The study was designed as a cross-sectional survey, so we sought to include all available patients at our hospitals. Since we did not evaluate the effects of any particular intervention, we did not conduct a sample size calculation. All patients undergoing MHD at the Guangdong Province Traditional Chinese Medical Hospital and the Hedong Hospital of Guangzhou Liwan District People’s Hospital were invited to participate in this study during the lockdown period (June 4-24, 2021). A total of 197 patients agreed to take part in the study.

Statistical Analysis

SPSS Statistics for Windows v21.0 (IBM Corp, Armonk, NY, USA), IBM SPSS Amos 24.0, and IBM SPSS macro program PROCESS v3.1 were used for the statistical analyses of this study. We compared continuous variables using the Kruskal-Wallis test; data are expressed as mean±standard deviation. We compared categorical variables using the chi-squared test or Fisher’s exact test for variables with low expected counts; data are described as n (%). The Pearson-product moment correlational analysis was performed using SPSS, structural equation model was conducted with AMOS 24.0, and analyses of moderating mediating effect was performed with the PROCESS v3.1 Model 6 [27]. Finally, bootstrapping using 5000 resamples with a 95% confidence interval (CI) was used to analyze the significance of moderated mediating model. A P value less than 0.05 was considered statistically significant.

Results

Baseline Characteristics of the Participants

A total of 197 patients undergoing MHD participated in this study. Among the participants were 106 men (53.8%) and 91 women (46.2%), and the age range was from 25 to 85 years. There were 15 (7.6%) participants living alone, while 182 (92.4%) were living with their families. During the lockdown period, transportation to the hospital was by walking (67%), self-driving (16.2%), ambulance (12.2%), and wheelchair and walking (4.6%). Participants had nucleic acid detected either every 2 days (56.3%) or every day (40.6%). The baseline participant characteristics are shown in Table 1.

Descriptive Statistics and Correlations

Table 2 presents the results of the correlational analysis of perceived stress, resilience, social support, and coping style of participants. Patients on MHD scored an average of 15.72±4.58 on the Perceived Stress Scale, 31.09±6.54 on the Simplified Coping Style Questionnaire, 58.28±10.74 on the Connor-Davidson Resilience Scale, and 36.87±6.81 on the Social Support Rating Scale. It was found that perceived stress was negatively correlated with positive coping style (r=-0.305, P<0.001) and resilience (r=-0.258, P<0.001), whereas resilience (r=0.631, P<0.001) and social support (r=0.300, P<0.001) were positively correlated with positive coping style.

Structural Equation Model Analysis

The structural equation model was illustrated in Figure 2. With perceived stress as an independent variable and positive coping style as the dependent variable, the structural equation model was constructed to assess the hypothesis model. It showed good fit based on the chi-squared statistic (χ²/df=2.414) and CFI=0.954, GFI=0.954, TLI=0.920, IFI=0.955, NFI=0.926, and RMSEA=0.085 (0.051-0.120).

Chain Mediation Effects Analysis

This study examined the chain mediating roles of resilience and social support on perceived stress and coping styles (Table 3). Perceived stress was used as an independent variable, coping style was used as a dependent variable, resilience and social support were used as mediating variables, and the PROCESS Macro 3.1 model 6 was used to test the chain mediating effect (Table 4). The results showed that: (1) perceived stress had significant direct predictive effects on positive coping style, with a direct effect value of -0.20 (95% CI [-0.33, -0.07]); (2) perceived stress had significant indirect predictive effects on positive coping styles through resilience, and the indirect effect value was -0.16 (95% CI [-0.26, -0.06]); (3) perceived stress has significant indirect predictive effects on positive coping style through social support, and the indirect effect value was 0.03 (95% CI [0.01, 0.06]); and (4) perceived stress had significant indirect predictive effects on positive coping style through resilience and social support, and the indirect effect value was -0.01 (95% CI [-0.04, -0.01]). Four variables that were significantly correlated were modeled as chain mediators. A bias-corrected percentile Bootstrap (5000 replicate samples) was used to determine the role of resilience and social support in mediating the chain variables between perceived stress and positive coping style. The standardized path coefficients were calculated to reduce Type 1 errors due to distribution [29]. The results of the chain mediation model analysis are shown in Figure 3.

Discussion

The present study explored the relationships between the perceived stress, resilience, social support, and coping style of patients on MHD in China lockdown districts and examined the chain mediating effects of resilience and social support on the relationship of perceived stress and social support. From
| Variables | n   | %   |
|-----------|-----|-----|
| Gender    |     |     |
| Male      | 106 | 53.8|
| Female    | 91  | 46.2|
| Age (years) |   |     |
| 25~40     | 21  | 10.7|
| 41~55     | 44  | 22.3|
| 56~70     | 84  | 42.6|
| 71~85     | 24.4|     |
| Living status |     |     |
| Alone     | 15  | 7.6 |
| With family | 182 | 92.4|
| Marital status |   |     |
| Single    | 10  | 5.1 |
| Married   | 172 | 87.3|
| Divorced/Widowed | 15 | 7.8 |
| Medical payment way |   |     |
| Self-pay  | 5   | 2.5 |
| Medical insurance | 185 | 93.9|
| Public medical | 7  | 3.6 |
| Education level |   |     |
| Primary school or below (0-6 years) | 89 | 45.2|
| Secondary school (7-12 years) | 76 | 38.6|
| University or above (>13 years) | 32 | 16.2|
| Occupational status |   |     |
| Employee  | 22  | 11.2|
| Unemployed | 16  | 8.1 |
| Farmer    | 3   | 1.5 |
| Retired/laid off | 156 | 79.2|
| Transportation ways to the hospital |   |     |
| Self-driving | 22 | 11.2|
| Ambulance  | 24  | 12.2|
| Walking   | 132 | 67.0|
| Wheelchair and walking | 9  | 4.6 |
| Frequency of nucleic acid detection |   |     |
| Once a day | 111 | 56.3|
| Once two days | 80 | 40.6|
| Once three days | 4  | 2.0 |
| Others    | 2   | 1.0 |
Table 2. Correlational matrix of perceived stress, resilience, social support, and coping style of participants. Survey of patients on maintenance hemodialysis (MHD) at the Guangdong Province Traditional Chinese Medical Hospital and the Hedong Hospital of Guangzhou Liwan District People’s Hospital during the COVID-19 pandemic lockdown period in China, 2021.

| Variables               | 1      | 2      | 2.1     | 2.2     | 2.3     | 3      | 3.1     | 3.2     | 3.3     | 4      | 4.1    | 4.2    |
|-------------------------|--------|--------|---------|---------|---------|--------|---------|---------|---------|--------|--------|--------|
| 1. Perceived stress     | 1      |        |         |         |         |        |         |         |         |        |        |        |
| 2. Resilience           | -0.258*| 1      |         |         |         |        |         |         |         |        |        |        |
| 2.1 toughness           | -0.209**| 0.935**| 1        |         |         |        |         |         |         |        |        |        |
| 2.2 strength            | -0.237**| 0.865**| 0.689**| 1        |         |        |         |         |         |        |        |        |
| 2.3 optimism            | -0.259**| 0.769**| 0.585**| 0.606**| 1        |        |         |         |         |        |        |        |
| 3. Social support       | 0.076 | 0.336**| 0.224**| 0.372**| 0.362**| 1      |         |         |         |        |        |        |
| 3.1 objective           | 0.011 | 0.353**| 0.259**| 0.373**| 0.351**| 0.919**| 1       |         |         |        |        |        |
| 3.2 subjective          | 0.108 | 0.172*| 0.074 | 0.214**| 0.251**| 0.761**| 0.510**| 1       |         |        |        |        |
| 3.3 availability        | 0.151*| 0.181*| 0.111 | 0.221**| 0.191**| 0.580**| 0.335**| 0.400**| 1       |        |        |        |
| 4. Coping style         | -0.293**| 0.545**| 0.508**| 0.501**| 0.383**| 0.216**| 0.256**| 0.029 | 0.148**| 1       |        |        |
| 4.1 Positive            | -0.305**| 0.631**| 0.585**| 0.527**| 0.522**| 0.300**| 0.343**| 0.106 | 0.149*| 0.876**| 1       |        |        |
| 4.2 Negative            | -0.104 | 0.089 | 0.088 | 0.166**| -0.067 | -0.047 | -0.035 | -0.113 | 0.061 | 0.620**| 0.165*| 1       |        |
| M                       | 15.72  | 58.28 | 29.27  | 19.36   | 9.65    | 36.87  | 18.38   | 12.07  | 6.42   | 31.09  | 20.73  | 10.36  |
| SD                      | 4.58   | 10.74 | 6.14   | 3.54    | 2.52    | 6.81   | 4.61    | 2.23   | 1.51   | 6.54   | 5.20   | 3.19   |
| Range                   | 25     | 53    | 61     | 37      | 18      | 15     | 38      | 18     | 14     | 8      | 39     | 29     |

* p<0.05, ** p<0.01.

analyzing the mediation effect, the results indicated that perceived stress had a direct impact on the positive coping style of patients with MHD; on the other hand, perceived stress also had an indirect effect on the positive coping style of patients through resilience and social support as a mediating variable. The indirect impact specifically includes 3 mediation paths: the first path is resilience as a mediation variable, the second is social support as the mediation variable, and the third is resilience and social support as the mediation variables and the chain mediation path. Since the standardized regression coefficient (path coefficient) of resilience to coping style is 0.61 (Figure 2), it means the mediation path through resilience has the largest effect in the model.

In this study, perceived stress had a significant negative correlation with positive coping styles of patients on MHD, which is consistent with previous research results [28,29]. Our results showed that the score of the Perceived Stress Scale was high than that reported in a previous study [17], indicating that patients on MHD perceived higher stress during the COVID-19 pandemic lockdown period. This may have been related to the following. First, due to the sudden recurrence of the pandemic and rapid spread and high infection rate of COVID-19, patients had to be isolated at home, and the original treatment plan was disrupted, which could have easily caused nervousness. Second, 97% of patients were tested for nucleic acid at least every 2 days, and frequent nucleic acid testing causes certain psychological pressure in patients. Finally, due to limited transportation, some patients could not get to the hospital for dialysis treatment by themselves, which also increased anxiety. Furthermore, perceived stress was shown to predict anxiety among the general Chinese population during COVID-19 [30].

We found that patients on MHD had a higher level of negative coping style in the present study, which was significantly higher than that of medical staff in the study by Li et al [13]. Possible reasons include the highly contagious SARS-CoV-2 infection, continuous escalation of containment measures, lack of coping experience, and weak coping experience of patients on MHD. Taking incorrect and invalid measures directly or indirectly affected their psychological status. The results of this survey showed that patients on MHD tended to endure negative emotions by themselves during the lockdown period, with only 8.6% of patients often seeking advice from a relative, friend, or colleague. Some 48.1% of patients relieved their worries by smoking, drinking, or taking medication, and
56.9% of patients hardly relied on others to solve problems because they were worried about others’ negative evaluation and were therefore unwilling to seek advice from them. It has been reported that some patients express a range of escape-avoidance behaviors in a stressful situation, such as relaxing by catharsis, such as crying, or by keeping themselves away from the others because they often consider themselves too weak to solve a stressful situation [5]. This finding agreed with our results.

Perceived stress can positively predict the individual’s negative coping style as an external factor, meaning that patients on MHD who have higher pressure may have lower positive coping abilities and tend to adopt negative coping styles. The reason could have been the renewed outbreak of the COVID-19 pandemic and the continuous escalation of prevention and control measures. Some patients experience fear and excessive tension, or even mild insomnia and lack of appetite, which makes them unable to respond with a positive attitude. Therefore, perceived stress is an external risk factor for patients with MHD,

Table 3. The chain mediating model of perceived stress, resilience, social support and positive coping style. Survey of patients on maintenance hemodialysis (MHD) at the Guangdong Province Traditional Chinese Medical Hospital and the Hedong Hospital of Guangzhou Liwan District People’s Hospital during the COVID-19 pandemic lockdown period in China, 2021.

| Variables   | Resilience | Social support | Positive coping style |
|-------------|------------|----------------|----------------------|
| Perceived stress | -0.61 | 0.16 | -3.73** | -0.93, -0.29 | 0.26 | 0.10 | 2.53* | 0.57, 0.46 | -0.20 | 0.65 | -3.07** | -0.33, -0.07 |
| Resilience   | 0.24 | 0.44 | 5.53** | 0.16, 0.33 | 0.26 | 0.29 | 8.98** | 0.20, 0.32 |
| Social support | 0.10 | 0.04 | 2.25* | 0.12, 0.19 | 0.10 | 0.04 | 2.25* | 0.12, 0.19 |
| F           | 13.934** | 15.913** | 49.347** |

*p<0.05, ** p<0.01.
and the continuous accumulation of perceived stress will damage the patient’s physical and mental health [17]. Thus, early warning and making interventions are important to prevent the effects of an accumulation of negative life event by relaxing the psychological pressure of patients.

Our results verified the mediating role of resilience. One study showed that the resilience of patients on MHD was lower during the lockdown period than normal times [31]. Recent studies have found that lower levels of perceived stress are associated with higher resilience, and resilience could predict individual perceived stress [32,33]. In our investigation, 51.8% of participants reported that they could often adapt to changes, and 66.0% of patients reported always feeling in control of their lives, but 13.7% of patients reported being hardly able to cope with situations, whatever happened. Resilience is a positive psychological quality and as an individual’s internal protective factor, we believe that patients with high levels of resilience had stronger subjective well-being and richer psychological capital, such as hope and optimism, so they had fewer negative emotional experiences and could have had a better view of the prevention and control measures of the COVID-19 pandemic.

With a correct understanding of COVID-19, patients on MHD could use psychological resources promptly to deal with difficulties, had a high compliance with prevention and control measures, had a strong sense of identity, and actively cooperated. Thus, in the present study, patients with greater scores of resilience were more likely to comply with the therapeutic regimen during the lockdown period, which is consistent with past research [31]. Resilience is also defined as a coping style that allows positive progress in adverse situations [34]. Our results showed that patients with high resilience tended to use positive coping styles when experiencing psychology stress, and resilience could predict individual coping styles, which is consistent with past research [35]. Briefly, the development of interventions to promote resilience may have a positive impact on perceived stress so that patients receiving MHD have positive coping styles.

Our results also verified the mediating role of social support. The Social Support Rating Scale measured objective support, subjective support, and availability of support; only objective support and subjective support were positively correlated with a positive coping style in the present study. The survey results showed that the objective and subjective support of patients came from many aspects, such as their partner, parents, and friends, which is consistent with the results of Liu et al [36]. Most patients on MHD were living with their families, and the sources of financial support or concern were mainly from a spouse and other family members during the lockdown period. According to Carton’s social support grade compensation model, individuals usually compensate in a specific and orderly way if the source of social support is missing and often choose the way if the source of social support is missing and often choose family members first and then others [37]. A total of 59.7%

### Table 4. The analysis of the chain mediating effect of resilience and social support to perceived stress and positive coping style. Survey of patients on maintenance hemodialysis (MHD) at the Guangdong Province Traditional Chinese Medical Hospital and the Hedong Hospital of Guangzhou Liwan District People’s Hospital during the COVID-19 pandemic lockdown period in China, 2021.

| Pathways | Effect | BootSE | Percentage of mediating effect (%) | 95% CI |
|----------|--------|--------|-----------------------------------|--------|
| Perceived stress → Positive coping style | -0.20 | 0.65 | -0.33 -0.07 |
| Perceived stress → Resilience → Positive coping style | -0.16 | 0.05 | 45.71 -0.26 -0.06 |
| Perceived stress → Social support → Positive coping style | 0.03 | 0.02 | 8.57 0.01 0.06 |
| Perceived stress → Resilience → Social support → Positive coping style | -0.01 | 0.01 | 2.86 -0.04 -0.01 |
| Total mediating effect | -0.15 | 0.06 | 42.86 -0.26 -0.03 |
| Total effect | -0.35 | 0.08 | -0.50 -0.19 |
of patients on MHD reported only relying on themselves and rarely asking for help from others when encountering events. A total of 56.3% of patients never participated in group organized activities, such as party organizations, religious organizations, and trade unions, and 40.6% of patients occasionally participated, which is why the availability of support scored the lowest among the 3 dimensions. Individuals with high levels of social support gain more powerful support in their lives, coming from families, friends, and others. Therefore, they are more able to face a crisis with a relatively active and courageous response and find a solution to the problem.

The results of this study showed that resilience and social support had a chain mediating effect between perceived stress and positive coping styles. Related studies have shown that individuals receiving higher levels of social support obtain a higher level of resilience and can then adopt a positive coping style to respond to stress and difficulties [38]. The social support received by patients on MHD included not only the actual social support resources, but also the social support they subjectively felt, and these factors constituted the external and internal protective factors of resilience. The level of social support received by patients on MHD is relatively high. When the patients encountered the threat of life changes with a relatively high level of social support, they were more able to mobilize the protective factors of individuals, families, and society to resist the adverse effects of the COVID-19 pandemic.

Study Limitations

Despite the valuable contributions of this study, there were several limitations. First, the convenience sampling technique may have led to selection bias. Hence, generalization of the results to other populations is limited. Second, collecting data face to face may have limited the number of participants and the generalization of the results since participants were limited to those willing to voluntarily participate. Future studies should consider this factor. Third, our cross-sectional study could not capture changes in psychological distress during the lockdown period of the COVID-19 pandemic. Therefore, future studies should conduct a follow-up for the current situation and engage in a more consistent analysis of the long-term psychological effects of the COVID-19 pandemic in patients on MHD. Such work should also more generally explore the ability of resilience and social support to mediate the effects of the COVID-19 pandemic on perceived stress and coping style. Nonetheless, the present findings lay the groundwork for further studies on these issues in this part of the world.

Conclusions

Perceived stress not only predicted coping style directly, but also indirectly predicted coping style through resilience and social support. Coping style was affected by internal and external factors during the COVID-19 pandemic lockdown period among patients on MHD. Therefore, the development of interventions to promote resilience and social support may have a positive impact on perceived stress in patients on MHD.

Data Availability Statement

The data used to support the findings of this study are restricted by the Ethics Committee of Guangdong Provincial Hospital of Chinese Medicine to protect patient privacy. Data are available from Guangdong Provincial Hospital of Chinese Medicine for researchers who meet the criteria for access to confidential data.

Ethics Statement

The study was conducted according to the guidelines of the Declaration of Helsinki and was approved by the Ethics Committee of the Second Affiliated Hospital of Guangzhou University of Chinese Medicine (no: ZE2021-157-01).

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Declaration of Figures’ Authenticity

All figures submitted have been created by the authors, who confirm that the images are original with no duplication and have not been previously published in whole or in part.

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