Influence of Social-support on Depression and Mental Toughness after Stroke

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Abstract [**Objectives**] To explore the mediating effect of social support between depression and resilience in elderly patients with first-episode stroke. [**Methods**] The general information questionnaire, PHQ-9 depression screening scale, Social Support Rating scale and Connor-Davidson Resilience Scale were used to construct and test the mediation model. [**Results**] The total score of depressive symptoms was (8.64 ± 3.28) points, the detection rate of depressive symptoms was 51.65%, the score of social support was (37.28 ± 5.98) points, and the score of psychological resilience was (22.05 ± 5.25) points. The resilience of patients was positively correlated with social support ($r = 0.470$, $P < 0.01$), and negatively correlated with depressive symptoms ($r = -0.470$, $P < 0.01$). Social support was negatively correlated with depressive symptoms ($r = -0.523$, $P < 0.01$). Social support played a partial mediating role between depression and resilience in elderly patients with first-episode stroke, and the mediating effect accounted for 16.1% of the total effect. [**Conclusions**] Social support can mediate the effect of depression on resilience in elderly patients with first-episode stroke. Medical staff can improve patients' psychological resilience by psychological counseling of depression and improving their social support, so as to promote their subjective well-being and maintain a healthy and positive mental state.

Key words First-episode stroke, Cerebral apoplexy, Old age, Depression, Social support, Mental toughness

1 Introduction

As a serious disease, cerebral apoplexy is characterized by high morbidity, high disability rate and high mortality rate, and has become a main cause for disability and death[1-2]. Among them, 70% to 80% of the elderly stroke patients cannot live independently due to disability, and the incurable and stigmatized disease seriously affects all aspects of life of the patients, causing anxiety, depression and other negative emotions[3]. Depression is a negative emotional state characterized by abnormal depression[4], which is a risk factor leading to depression due to the frequent presence of dysfunction after stroke[5-6]. Social support is the perceived or desired support from the outside world, which plays a positive role in mental health[7]. Good social support can effectively relieve the psychological stress response of patients after the occurrence of the disease and promote the psychological development of patients[8]. It has been found that depression can have a negative impact on psychological resilience, which is not conducive to the treatment and rehabilitation of patients, and social support can have a positive impact on psychological resilience[9-10]. Besides, the theory of social support buffer points out that the impact of social support does not directly affect the event itself, but may affect the individual's subjective evaluation of the event when the individual is exposed to the stressor. When the individual is exposed to the stressor, if he or she can get certain social support, then the individual's perception of the stressor will be reduced, and social support can improve his or her ability to solve problems, reduce the impact of the event by reducing his or her subjective perception of the severity of the problem, and thus enhance the psychological resilience of the patient[11]. Based on the theory of social support cushioning, this study explored the mediating effect of social support on depression and psychological resilience in elderly stroke patients.

2 Data and methods

2.1 Patients The general data were collected by convenient sampling from March 2022 to December 2022. The first senile stroke patients in neurology department of four Grade A hospitals in Chongqing were selected as study subjects.

2.1.1 Inclusive criteria: (i) conforming to the diagnostic standards for stroke formulated at the 4th National Academic Conference on Cerebrovascular Diseases; (ii) being diagnosed as a stroke upon examination of head CT or magnetic resonance imaging (MRI); (iii) being at or above 60 years old, being hospitalized for the first time due to stroke and in stable condition; (iv) being hospitalized for a period of not less than 72 h, being ordered to leave the hospital by a doctor; (v) being clear in consciousness, having no barrier to communicate with the investigators and volunteering to participate in this study.

2.1.2 Exclusion criteria: (i) serious heart, lung, liver, kidney, endocrine disease or malignant tumor patients; (ii) automatic discharge, transfer, death and hospital stay less than 72 h after discharge; (iii) patients with conscious disorder and severe cognitive and communication disorder; (iv) accompanied by mental illness; (v) the investigation process is not very good cooperation.

2.2 Procedure The researchers were all from 4 teachers, 3

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postgraduates and 4 undergraduates from a third-class hospital. Before the formal investigation, the staff involved in the investigation will be strictly trained, which involves the purpose, content and method of the investigation. After the training is qualified, the investigation will be carried out. With the assistance of nursing management staff of neurology department of the survey hospital, the patients entered the ward for face-to-face investigation. Unified guidance was adopted, and the scale was filled in by the investigators. Quality control was carried out throughout the questionnaire survey, and questionnaires with incomplete data and serious deviation from the facts were eliminated. A total of 248 copies of questionnaires were sent out in this survey, and 242 valid copies were collected, with an effective rate of 97.58%.

2.3 Sample size The study involved 41 items (18 items of general data, 10 dimensions of health knowledge scale, 10 dimensions of mental health status scale, and 3 dimensions of social support scale), and used Kendall sample size estimation method,The sample size was 5 to 10 times the number of variables, and the need for invalid or absent questionnaires was increased by 10% to 20%. At least 226 cases were needed in this study.

2.4 Measures The general information questionnaire was designed by the investigator according to the purpose of the investigation, including the patient's name, age, gender, marital status, education level, living style, occupation, medical payment method and income.

2.4.1 The Mental Health Resilience Scale (CD-RISC 10). The Mental Health Status Scale adopts the simplified version of the Mental Health Resilience Scale (CD-RISC 10), which is revised by Wang[12] and is used to measure an individual's mental resilience level. There are ten items in total. The score of each item is set at 0 – 4 points, and the total score of ten items is set at 0 – 40 points. The higher the score is, the higher the psychological resilience is. The reliability and validity of the scale are good, the internal consistency coefficient $\alpha = 0.91$, and the retest reliability of the scale is 0.90 every 2 weeks. The Cronbach's alpha coefficient of the scale was 0.941.

2.4.2 Depression Screening Scale (PHQ-9). This scale is used to evaluate the corresponding symptoms or feelings of depression in the last 2 weeks[13], and Likert4 score is adopted. There are 9 questions in total, with the total score ranging from 0 to 27, and score $\geqslant 7$ is regarded as the critical point for screening clinical depression symptoms. Cronbach's α coefficient of the scale in this study was 0.856.

2.4.3 The Social Support Rating Scale (SSRS). The Social Support Rating Scale (SSRS) prepared by Xiao[14] is composed of 10 items, with the Likert 4 scoring method provides 12 to 66 scores, the total score $\leqslant 22$ is at a low level, 23 to 44 is at a medium level, and 45 to 66 is at a high level. The higher the score, the higher the social support obtained, the higher the social support level. The Cronbach's alpha coefficient of the scale was 0.670.

2.5 Analytic strategy The statistical method used EpiData 3.0 software dual entry to establish the database. The quantitative data in line with normal distribution shall be described by frequency ± standard deviation ($\bar{x} \pm s$) with SPSS 27.0 software. AMOS26.0 was used to construct and verify the hypothesis model of the relationship between depression state mediating social support and mental resilience.

3 Results and analysis

3.1 General situation of patients Among 242 elderly patients with first-episode stroke, gender: 144 (59.5%) males and 98 (40.5%) females. Marital status: 57 cases (23.55%) had no partner, 185 cases (76.45%) had partner. Place of residence: 143 cases (59.09%) in urban areas, 99 cases (40.91%) in rural areas. Education level: 164 cases (67.77%) in primary school, 51 cases (21.07%) in junior middle school, 27 cases (11.15%) in junior college or above. Living mode: 25 cases (10.33%) lived alone, 82 cases (33.88%) lived only with spouse, 93 cases (38.43%) lived with children (no spouse), 36 cases (14.88%) lived with spouse and children, and other 6 cases (2.48%).

3.2 Scores of depression, social support and mental toughness in first-episode senile stroke patients The depression, social support and resilience scores ($n = 242$) of the middle-aged and elderly patients with first stroke were scored. Depression: (37.28 ± 5.98) points; social support: (8.64 ± 3.28) points; psychological resilience: (22.05 ± 5.25) points.

3.3 Correlation of depression, social support and mental resilience There was a negative correlation between depression and mental toughness score in first-stage senile stroke patients ($P < 0.01$), a positive correlation between social support and mental toughness score ($P < 0.01$), and a negative correlation between depression and social support score ($P < 0.01$), as demonstrated in Table 1.

Table 1 Correlation of depression, social support and mental toughness in elderly patients with first-stage stroke (r)

Variable	Depression	Social support	Psychological resilience
Depression	1.000		
Social support	−0.523**	1.000	
Psychological resilience	−0.470**	0.470**	1.000

NOTE ** denotes $P < 0.01$.

3.3 Construction of structural equation model affecting depression, social support and mental toughness in elderly patients with first-stage stroke Based on the relevant hypotheses and the correlations among the variables, the results were obtained. Using depression as an exogenous variable and social support and psychological resilience as endogenous variables, the structural equation model was constructed. The model test results are shown in Table 2, the fitting indicators among the variables in the fitting model are shown in Table 3, and the structural equation model is shown in Fig. 1.

Table 2 Model fitting indicators of depression, social support and mental toughness in first-episode elderly stroke patients

Variable	X^2/df	GFI	CFI	NFI	IFI	RMSEA
Adaptation standard	<3.00	>0.90	>0.90	>0.90	>0.90	<0.09
Inspection result	1.111	0.993	0.998	0.985	0.998	0.021

Table 3 Structural equation model fitting indicators of depression, social support and mental toughness in stroke patients

Simulated path	Direct effect	Indirect effect	Total effect
Depression → psychological resilience	−0.309	−0.161	−0.470
Social support → Psychological resilience	0.309	0	0.309
Depression → Social support	−0.523	0	−0.523

NOTE The total effect is the sum of direct effect and indirect effect, and the table shows the standardized path coefficient β.

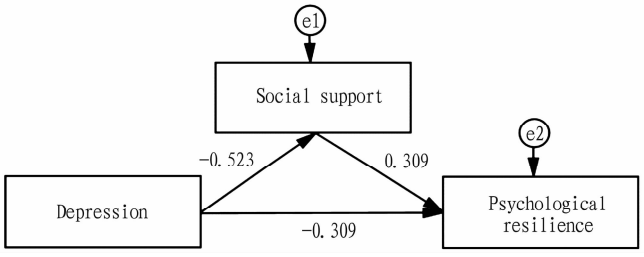

Fig. 1 Structural equation model of depression, social support, and resilience in first-episode stroke patients (standardized)

4 Discussion

The results showed that the mental resilience items of the first elderly stroke patients were all (22.05 ± 5.25) points, which were lower than those of Han[15], indicating that the mental resilience of the first elderly stroke patients in China still has a great improvement compared with that in foreign countries. The analysis of the reasons may be related to the fact that 66.77% of the subjects in this group have primary school education or below. The patients with low education level have limited access to health knowledge and are unable to understand and use information. They slow down in accepting disease-related information and are unable to relieve inner pressure in a scientific and healthy manner. The increase of age will lead to the decrease of cognitive ability and the influence of stubborn traditional cultural factors. There may be feudal superstition that a series of complications brought about by the disease cannot be viewed correctly, which leads to weak compliance with the doctor, and their body also has different degrees of damage and defects, which leads to the emergence of inner anxiety and depression, and finally their psychological resilience is not good, which leads to the ill mental health of the patients[16-17]. It is suggested that doctors and nurses should mobilize patients' self-management awareness and actively promote common participation in decision-making mode of disease diagnosis and treatment, enhance patients' understanding and participation of their own diseases, understand patients' adverse emotional reactions and respect their right to express grief so as to improve their mental health. It is suggested that the patients' psychological pressure should be reduced and social support should be strengthened. According to individual differences, the practical and progressive rehabilitation plan should be made together with the patients and their families.

Structural equation model results showed that depression had a direct negative effect on mental toughness of first-episode stroke patients, and indirectly through social support. This is consistent with the study by Jia *et al.*[18] that negative emotions such as self-denial, anxiety and depression may occur after stroke due to physiological, psychological and social factors. Social support has a positive effect on psychological resilience, which is consistent with Wang[19] and other studies. The reason may be that family members give more financial and emotional support to elderly people when they suddenly fall ill, more support from relatives and less participation in social activities. These are due to disability and different from young people good at using the network means to make friends and contact[20]. It is consistent with the research of Hernandez[21] that the elderly patients are often more sensitive to emotion than the young patients, their ability to resist stressors has decreased significantly, tend to adopt negative coping styles such as avoidance, and are more likely to suffer from anxiety, depression and other emotional disorders. The direct and indirect effects of this study suggest that we need to give full play to the positive role of social support, medical staff and patients' families to communicate effectively, encourage families to take the initiative to communicate with patients, listen to patients' bad mood, ease inner pressure, guide them to correctly cope with difficulties in communication, maintain an optimistic attitude, so as to improve patients' mental health. At the same time, social support such as community and hospital can also be used to help patients to seek social love assistance and to encourage patients who have just become ill to establish the confidence to overcome the disease by inviting some patients who have recovered well so as to fundamentally reduce the psychological burden of patients[22].

To sum up, our findings demonstrate that negative mental resources may have negative effects on the improvement of psychological resilience of patients. Therefore, medical personnel shall, in light of the current situation, formulate a social support program for patients' discharge from hospital, guide patients and their families to participate in the nursing plan, encourage patients' families to pay more attention to patients' inner world, provide them with psychological comfort and companionship, and create ways for patients to participate in social activities through hospital-family-community interaction, so as to enhance the level of psychological health, enhance the sense of well-being and promote the early recovery. This study also has some limitations, such as cross-sectional study, can not reflect the true reaction of patients and dynamic changes. Therefore, qualitative study and longitudinal study can be used to study the mental health level and influencing factors of the first stroke patients in the future.

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