

# The Mediating Effects of Resilience on Perceived Social Support and Fear of Cancer Recurrence in Glioma Patients

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**Objective:** To investigate the mediating effect of resilience on perceived social support and fear of cancer recurrence (FCR) in glioma patients.

**Methods:** A total of 128 glioma patients were enrolled for the survey by Connor-Davidson resilience scale (CD-RISC), perceived social support scale (PSSS) and Chinese version of fear of progression questionnaire-short form (FoP-Q-SF). Structural equation model was used to analyze the effects of resilience.

**Results:** The score of FCR in glioma patients was  $29.52 \pm 8.30$ . A total of 47 patients had FCR (total score  $\geq 34$ ), with an incidence of 36.7%. There was a correlation between FCR, resilience and social support ( $P < 0.01$ ). The resilience between perceived social support and FCR in glioma patients had good fitting with the structural equation model. Resilience played a mediating role between perceived social support and FCR, with a mediating effect of 48.4%.

**Conclusion:** The level of resilience can be improved by improving the perceived social support in patients with glioma to reduce the FCR of patients.

**Keywords:** glioma, fear of cancer recurrence, resilience, perceived social support, mediating effect

## Introduction

Glioma is a high incidence intracranial tumor, accounting for 50%–60% of central nervous system tumors. Surgery is still the main treatment method for glioma, but the 5-year survival rate of glioma patients is very poor.<sup>1,2</sup> Due to the high recurrence rate and progression rate of glioma, glioma not only brings physical discomfort to patients, but also causes a series of psychological problems that seriously affect the prognosis and quality of life of patients. Fear of cancer recurrence (FCR) is one of the most common psychological reactions.<sup>3</sup> FCR refers to cancer patients' fear of cancer recurrence, progression or metastasis, which is manifested in over examination, over vigilance and over attention to the body, and some symptoms such as pain and chest tightness are regarded as signs of aggravation of the disease. It has been shown that 39–97% of patients have different degrees of FCR.<sup>4</sup>

Perceived social support is an emotional response that individuals experience to be respected, understood and supported in the stress process, which can help individual reduce stress and respond to stress effectively. Resilience belongs to the category of positive psychology and is a process of positive response and good adaptation of individuals in traumatic events, which may reduce the impact of FCR.<sup>5</sup> Studies have shown that individuals who perceive high social support tend to have a higher level of resilience, which can reduce the impact of traumatic events on themselves.<sup>6</sup> At present, the relationship of resilience, perceived social support and FCR is unclear. The purpose of this study is to explore the effect of perceived social support on resilience and FCR and reduce FCR and improve the quality of life of glioma patients.

## Subjects and Methods

### Subjects

A total of 128 glioma patients hospitalized in the Department of Neurosurgery of Huai'an First Hospital Affiliated to Nanjing Medical University (Huai'an, China) from July 2018 to December 2019 were selected by a convenient sampling method. Inclusion criteria: pathologically diagnosed as glioma; aged 18–70 years old; conscious and able to communicate. Exclusion criteria: critically ill patients; patients who have a history of mental disorders and are unable to communicate; patients complicated with serious diseases such as heart, lung and kidney or tumors. All patients provided informed consent. This study was approved by the Ethics Committee of Huai'an First Hospital Affiliated to Nanjing Medical University and complied with the Declaration of Helsinki. All patients finished the questionnaire to obtain information on total 15 independent variables, including age, gender, residency, education, marriage, occupation, family income, insurance, disease grade, disease duration, surgery, recurrence or metastasis, FCR, resilience, and perceived social support.

### Fear of Progression Questionnaire-Short Form (FoP-Q-SF)

The Chinese version of the FoP-Q-SF scale was used in this study. The scale was composed of 12 items in the two dimensions of health and social family, and a grade 5 scoring method (1–5 points) was used, with a total score of 12–60. The higher the score, the higher the patient's fear of disease progression, and the total score  $\geq 34$  indicated dysfunctional fear of recurrence. The Cronbach's  $\alpha$  coefficient of the scale in this study was 0.883.

### Connor-Davidson Resilience Scale (CD-RISC)

The Chinese version of CD-RISC contained 25 items in three dimensions of tenacity, strength and optimism, and a grade 5 scoring method (0–4 points) was used, with a total score of 0–100.<sup>7</sup> The higher the score, the higher the level of resilience. The internal consistency coefficient of the scale was 0.91, and the Cronbach's  $\alpha$  coefficient of each dimension was 0.60–0.88. The Cronbach's  $\alpha$  coefficient of the scale in this study was 0.954.

### Perceived Social Support Scale (PSSS)

The PSSS was used to measure the degree of social support perceived by individuals, including a total of 12 items in 3 dimensions of family support, friend support and other support. A grade 7 scoring method (1–7 points) was used, with a total score of 12–84, the higher the score, the more the perceived social support. The Cronbach's  $\alpha$  coefficient of the scale was 0.88, and the test–retest reliability was 0.85. The Cronbach's  $\alpha$  coefficient of the scale in this study was 0.840.

### Statistical Methods

SPSS 22.0 and AMOE 17.0 statistical software were used for data analysis. Counting data were expressed as frequency. The measurement data in line with the normal distribution were expressed as the mean  $\pm$  standard deviation. Correlation analysis of the influencing factors and FCR was performed and the structural equation modeling (SEM) was constructed. In general, the closer  $\chi^2/df$  is to 1, the better the model fitting is. Goodness of fit index (GFI), adjusted goodness of fit index (AGFI), normed fit index (NFI), incremental fit index (IFI), comparative fit index (CFI) values were greater than 0.90, and root mean square error of approximation (RM-SEA) was smaller than 0.08, indicating that the fitting was reasonable. Pearson correlation was used to analyze the relationship between perception of social support, resilience and FCR in patients with glioma.  $P < 0.05$  was considered statistically significant.

## Results

### General Information of Patients with Glioma

As shown in Table 1, among the 128 subjects 76 cases were male and 52 cases were female. They were 27–69 years old (mean  $42.54 \pm 5.54$ ). For residence, 58 cases lived in rural area, and 70 cases lived in urban area. For education, 65 cases graduated from middle school and below, 45 cases graduated from high school, and 18 cases graduated from college and above. For marriage, 98 cases were married, and 30 cases were unmarried or others. The duration of disease of 48 cases was  $< 6$  months, that of 43 cases

**Table 1** General Information of Patients with Glioma

Item		n	%
Gender	Male	76	59.4
	Female	52	40.6
Residence	Rural	58	45.3
	Urban	70	54.7
Education	Middle school and below	65	50.8
	High school	45	35.2
	College and above	18	14.0
Marriage	Married	98	76.6
	Unmarried or others	30	23.4
Occupation	Employed	46	35.9
	Retired	28	21.9
	Self-employed	54	42.2
Family income (yuan/month)	< 1000	16	12.5
	1000–3000	65	50.8
	>3000	47	36.7
Grade	I	21	16.4
	II	50	39.0
	III	43	33.6
	IV	14	10.9
Surgery	Yes	120	93.8
	No	8	6.2
Disease duration	< 6 months	48	37.5
	6–12 months	43	33.6
	12–24 months	23	18.0
	> 24 months	14	10.9
Recurrence or metastasis	Yes	36	28.1
	No	92	71.9

was 6–12 months, that of 23 cases was 13–24 months, and that of 14 cases was >24 months; and 36 cases had recurrence or metastasis.

## FCR Scores in Glioma Patients

As shown in Table 2, the total score of FCR in glioma patients was  $29.52 \pm 8.30$ , and the mean score of each item was  $2.46 \pm 0.69$ . We found that 47 patients (36.72%) had total score of  $\geq 34$ .

The scores of perceived social support in glioma patients were shown in Table 3. Total score of perceived social support in glioma patients was  $61.47 \pm 11.20$ , which was at the upper level, and the mean score of family support was the highest and the mean score of friend support was the lowest. The resilience scores in glioma patients are shown in Table 4. The total score of resilience in glioma patients was  $52.94 \pm 10.05$ , which was at the medium level, and the mean score of tenacity dimension was the highest and the mean score of optimism dimension was the lowest.

**Table 2** The Scores of FCR in Glioma Patients

Item	Number of Items	Score	Item Score
Overall	12	$29.52 \pm 8.30$	$2.46 \pm 0.69$
Physical health	6	$16.48 \pm 5.45$	$2.75 \pm 0.91$
Social family	6	$13.04 \pm 3.85$	$2.17 \pm 0.64$

**Table 3** The Scores of Perceived Social Support in Glioma Patients

Item	Number of Items	Score	Item Score
Overall	12	61.47±11.20	5.12±0.93
Family support	4	23.79±3.82	5.59±0.96
Friend support	4	17.35±6.64	4.34±1.67
Other support	4	21.39±3.48	5.35±0.87

**Table 4** The Scores of Resilience in Glioma Patients

Item	Number of Items	Score	Item Score
Overall	25	52.94±10.05	2.12±0.40
Tenacity	13	27.09±11.38	2.08±0.88
Strength	8	17.69±5.37	2.21±0.67
Optimism	4	8.16±3.55	2.04±0.89

## Correlation Analysis of Perceived Social Support, Resilience and FCR in Glioma Patients

The correlation analysis of perceived social support, resilience and FCR in glioma patients was shown in Table 5. The perceived social support in glioma patients was negatively correlated with FCR ( $P < 0.01$ ); resilience was negatively correlated with FCR ( $P < 0.01$ ); perceived social support was positively correlated with resilience ( $P < 0.01$ ). Among them, the dimensions of friend support and tenacity were significantly correlated with FCR.

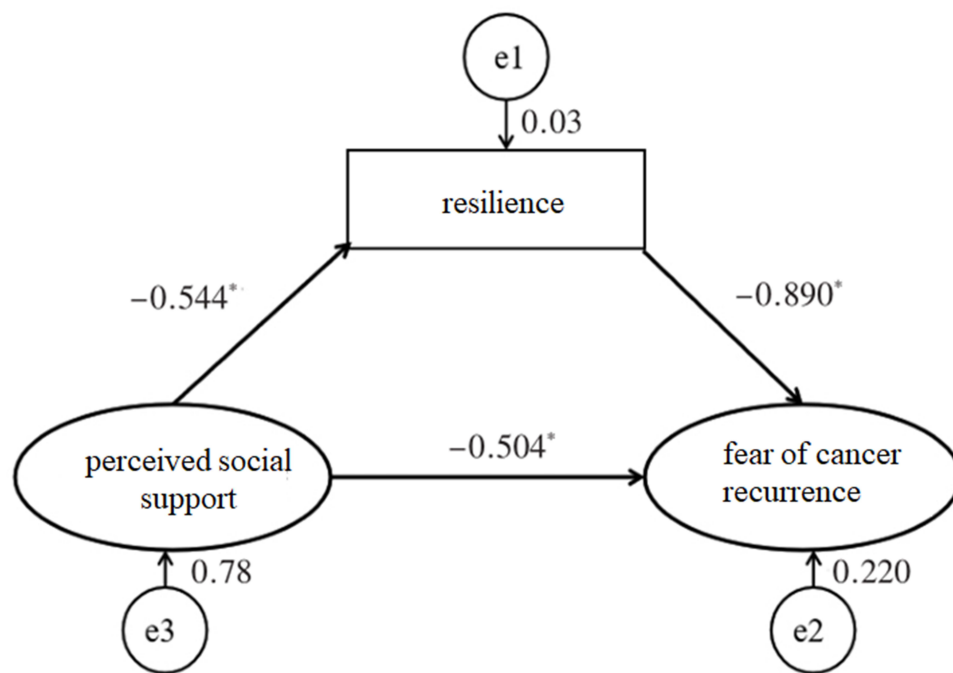
## Path Analysis of Perceived Social Support, Resilience and FCR in Glioma Patients

Using FCR as the dependent variable, perceived social support as the independent variable and resilience as the mediating variable, we constructed path analysis model with resilience as the mediating effect. The fitting parameters of structural equation model were  $\chi^2/DF = 1.157$ , GFI = 0.976, AGFI = 0.94, NFI = 0.967, CFI = 0.986, RMSEA = 0.053, IFI = 0.974, and RMR = 0.006. The path analysis model of perceived social support, resilience and FCR in glioma patients is shown in Figure 1. The path coefficients between perceived social support, resilience and FCR were significant ( $P < 0.05$ ). Perceived social support and resilience in glioma patients had direct effect on FCR (path coefficients were  $-0.544$  and  $-0.890$ , respectively). Perceived social support also indirectly affected FCR through resilience (Table 6).

**Table 5** Correlation Between Perceived Social Support, Resilience and FCR in Glioma Patients

Item	Perceived Social Support				Resilience				FCR
	Total Score	Family Support	Friend Support	Other Support	Total Score	Tenacity	Strength	Optimism	
Social support	1.000								
Family support	0.793	1.000							
Friend support	0.779	0.527	1.000						
Other support	0.818	0.658	0.651	1.000					
Resilience	0.544	0.491	0.646	0.501	1.000				
Tenacity	0.536	0.498	0.641	0.496	0.978	1.000			
Strength	0.488	0.466	0.560	0.462	0.918	0.844	1.000		
Optimism	0.463	0.335	0.565	0.400	0.845	0.766	0.712	1.000	
FCR	-0.505	-0.428	-0.599	-0.485	-0.901	-0.877	-0.813	-0.797	1.000

**Abbreviation:** FCR, fear of cancer recurrence.



**Figure 1** Path analysis model of perceived social support, resilience and FCR in glioma patients. Note:  $*P < 0.05$ .

## Discussion

Resilience is inherent psychological quality of individuals and an important protective factor for mental health. The results of this study showed that the score of resilience in glioma patients was  $52.94 \pm 10.05$ , lower than the norm score of resilience of 65% in healthy controls reported by Yu et al.<sup>7</sup> It is expected that the level of resilience will decrease when individuals facing trauma or suffer from major diseases. We found that the score of family support was the highest and the score of friend support was the lowest, which may be related to the tradition of Chinese to regard family as the main source of support.

The score of FCR in glioma patients was  $29.52 \pm 8.30$ , higher than the score of 25% reported previously.<sup>8</sup> We found that perceived social support in glioma patients was negatively correlated with FCR. Perceived social support can predict negative psychological emotions of individuals, and is an important factor to promote behavior and development.<sup>9</sup> Social support can help patients reduce psychological pain and reduce stress response. Individuals with high social support are more likely to seek the help of relatives, friends and medical staff, and improve the confidence in overcoming diseases, thereby reducing the level of FCR. In addition, we found a significant negative correlation between resilience and FCR in glioma patients. Fear conditioning is mainly mediated by the amygdala cortex, and high resilience can effectively inhibit the activity of the medial prefrontal cortex of the amygdala, thereby reducing fear.<sup>10</sup> In addition, individuals with high resilience usually adopt a positive coping style to face diseases, thereby reducing the level of FCR. The results of this

**Table 6** Effect Values of Influencing Factors of FCR in Glioma Patients

Item	Direct Effect	Indirect Effect	Total Effect
Perceived social support	-0.504	-0.484	-0.988
Resilience	-0.890	–	-0.890

study showed a significant positive correlation between perceived social support and resilience in glioma patients. Perceived social support and resilience jointly reduce the level of FCR.

In fact, perceived social support can affect FCR through resilience.<sup>11</sup> The direct effect of perceived social support on FCR is reflected in the emotional, material and information support from family, relatives and friends, and society, which help patients adapt to the difficulties and accelerate the recovery of mental health. Furthermore, resilience and perceived social support jointly act on FCR from internal and external aspects to help patients better face cancers. Social support has been proposed as effective method for cancer management.<sup>12–16</sup>

In conclusion, this study showed that 36.7% of glioma patients had FCR. The level of FCR in glioma patients decreased with the increase of their perceived social support and resilience, and resilience may play a mediating role in perceived social support and FCR. The resilience of glioma patients can be improved by enhancing the perceived social support, leading to reduced FCR.

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## Disclosure

The authors declare no conflicts of interest.

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