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ORIGINAL RESEARCH

Correlation Between the Quality of Life of Stroke Caregivers and the Readiness of Patients and Caregivers for Hospital Discharge

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Objective: This study aimed to evaluate the quality of life of stroke caregivers and analyze its association with the discharge readiness of both caregivers and patients.

Methods: A total of 302 stroke patients and their primary caregivers were recruited from the neurology departments of three hospitals affiliated with Chengdu Medical College using a convenience sampling method. Sociodemographic data, the WHO Quality of Life Scale (WHOQOL-BREF), the Caregiver Preparedness Scale (CPS), and the Readiness for Hospital Discharge Scale (RHDS) were used. Statistical analyses included *t*-tests, analysis of variance (ANOVA), Pearson's correlation analysis, and multiple linear regression.

Results: The overall mean quality of life of primary caregivers is 60.80±6.06, indicating a relatively low level. The mean readiness for discharge scores are as follows: caregivers: 17.66±2.67, indicating a moderate level; stroke patients: 78.17±8.16, indicating a relatively low level. A positive correlation was found between caregivers' quality of life and their own as well as the patients' readiness for discharge ($P < 0.01$). Multiple linear regression indicated four significant factors associated with caregiver quality of life: Patient's disease severity, Patient's readiness for discharge, Caregiver's readiness for discharge, and the Daily hours spent caregiving ($R^2 = 0.589$, $P < 0.001$).

Conclusion: Caregivers' quality of life is generally low but can be improved by enhancing discharge readiness for both caregivers and patients.

Keywords: stroke, primary caregiver, quality of life, readiness for discharge

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Introduction

Stroke ranks as the second leading cause of death and the third leading cause of disability in adults globally, following ischaemic heart disease,[1,2] and is the leading cause of death and disability in adults within our country.[3] Nearly all stroke survivors experience physical, psychological, and life-altering consequences.[4] Approximately 75% of stroke patients face varying degrees of motor, speech, and swallowing difficulties, while around 20% of survivors are either wheelchair-bound or bedridden. Additionally, over 50% of stroke patients are discharged with neurological sequelae requiring long-term, effective rehabilitation care.[1] However, in the context of our country, most stroke patients opt to return home or to the community for follow-up rehabilitation after acute hospital treatment, with family caregivers providing necessary care.[5,6] Studies indicate that 68% of stroke survivors believe caregivers play a critical role in promoting their recovery and health outcomes, particularly in managing stroke-related symptoms.[7] However, many caregivers report a significant decline in their quality of life, as well as physical and mental health, when fully engaged in caregiving. Caregivers often face challenges such as changing family roles, reduced income, sleep deprivation, limited leisure time, and work-related stress.[4,8] Studies show that over half of caregivers experience moderate to high caregiving burdens and reduced quality of

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life, highlighting widespread issues in caregivers' living conditions.[9] Therefore, it is essential that caregivers receive adequate preparation and support.

Discharge readiness is a comprehensive evaluation of a patient's physiological, psychological, and social condition. It helps the hospital identify care needs, facilitate a smooth transition between healthcare settings, and create a tailored care plan to ensure appropriate post-discharge treatment.[10] A standardized approach to discharge readiness ensures the smooth transfer of stroke patients between healthcare facilities and families, providing continuous high-quality care. This reduces complications, lowers readmission rates, improves patient outcomes, and lessens the disease burden on both patients and caregivers.[11] Caregiver preparedness refers to the stress perceived by family members while caring for a patient. It reflects their readiness to meet the care recipient's physiological, psychological, and emotional needs.[12] Caregiver preparedness is the strongest predictor of perceived stress among those caring for stroke patients.[13] Insufficiently prepared caregivers often struggle to adjust to their role, experience greater strain, and risk their own health.[14] Adequate preparation improves caregivers' mood and quality of life, significantly reduces readmission rates, and ensures timely treatment.[15] Research indicates that discharge preparedness is closely linked to unplanned readmissions, emergency department visits, mortality, and post-discharge quality of life. Enhancing discharge readiness in both patients and families could prevent up to a third of readmissions and improve caregivers' physical and mental health.[16,17] Serious illness inevitably affects both patients and caregivers. In addition to psychological stress, caregivers must manage the complexity and uncertainty of the patient's illness. Especially with first-time patients, many family caregivers are unsure how to provide effective care. This can compromise their physical and mental health, leading to inadequate care and potentially worsening the patient's condition, thus hindering recovery.[18,19] To improve caregivers' quality of life and support patient recovery, it is essential to assess caregiver readiness promptly.

To our knowledge, most research on stroke discharge readiness and quality of life has primarily focused on patients, with limited attention to their primary caregivers. This study aimed to assess the quality of life of primary caregivers of stroke patients and analyze its relationship with both the caregivers' and the patients' readiness for discharge.

Materials and Methods

Participants

In this cross-sectional study, convenience sampling was used to select stroke patients and their primary caregivers admitted to the neurology departments of three hospitals affiliated with Chengdu Medical College between August 2023 and February 2024. The inclusion criteria for patients were: 1) Patients who had a cerebrovascular accident and met the 2019 diagnostic criteria for cerebrovascular disease in China, confirmed by cranial CT or MRI; 2) Patients aged ≥18 years; 3) Patients who voluntarily consented to participate. Exclusion criteria were: 1) Patients with mental abnormalities or severe communication or cognitive disorders; 2) Patients with unstable conditions such as severe organ insufficiency, malignant disease, or terminal illness. Inclusion criteria for primary caregivers were: 1) Immediate family members (eg, spouses, children, parents) of the patients; 2) Aged ≥ 18 years; 3) Providing caregiving for ≥ 4 hours per day; 4) Able to complete the questionnaire independently and participate voluntarily. For multiple caregivers, the one with the longest caregiving tenure was selected. Exclusion criteria for caregivers included: 1) Serious chronic diseases (eg, malignant tumor, heart failure, renal failure); 2) Concurrent responsibility for caring for other family members; 3) Significant traumatic events in the past month (eg, divorce, bereavement, unemployment). A subject was considered disengaged if they explicitly refused to continue during follow-up or failed to respond to three consecutive calls. Participants were recruited from the neurology departments of three tertiary hospitals through active screening of medical records, with eligibility confirmed based on diagnosis and disease type. During hospitalization, research team members actively contacted potential participants and provided both patients and their primary caregivers with detailed information regarding the research objectives, methods, risks, and benefits. Written informed consent was obtained from both patients and their primary caregivers to ensure voluntary and fully informed participation.

Measurements

Questionnaire of Patient's General and Clinical Data

The investigators collected demographic data of stroke patients, which included age, gender, average monthly household income, occupation, marital status, education level, healthcare payment method, type of stroke, first-time stroke status, and stroke severity. Stroke severity was assessed using the National Institute of Health Stroke Scale (NIHSS),[20] which ranges from 0 to 42, with higher scores indicating greater severity. Stroke severity was classified as follows: mild (NIHSS 0–4), moderate (5–15), moderately severe (16–20), and severe (>20).[21] Primary caregiver demographics included age, gender, religion, marital status, relationship to the patient, education level, occupation, average monthly income, presence of chronic diseases, shared caregiving responsibilities, and daily caregiving hours.

WHO Quality of Life Scale (WHOQOL-BREF)

The primary caregiver's quality of life was assessed using a World Health Organization scale and its Chinese-language version.[22] The scale includes 26 items categorized into the following domains: environmental (8 items), physical (7 items), psychological (6 items), social (3 items), and two items for overall quality of life and health perceptions. A five-point Likert scale was used, with total scores ranging from 26 to 130, where higher scores indicate better quality of life. Quality of life was classified as "good" or "poor" based on the mean score. Scores above the mean indicated a good quality of life, while scores at or below the mean indicated a poor quality of life.[23] This scale has been widely used in research involving stroke and chronic disease patients in China, and its reliability and validity have been confirmed.[24,25] The Cronbach's alpha coefficient was 0.93, indicating high internal consistency.

Caregiver Preparedness Scale (CPS)

The primary caregiver's readiness for discharge was assessed using a scale developed and validated by Archbold et al[12] The scale is unidimensional and consists of eight items. A five-point Likert scale was used, with scores ranging from 0 to 32, where higher scores indicate greater preparedness. Caregivers were considered prepared if they scored above 12 points.[12] The CPS has been widely used in studies involving caregivers of stroke and chronic disease patients in China, with confirmed reliability and validity.[26,27] The Cronbach's alpha coefficient was 0.925.

Readiness for Hospital Discharge Scale (RHDS)

Stroke patients' readiness for discharge was assessed using a scale developed by Weiss et al[28] This scale, later revised by Lin et al[29] includes 12 items divided into three domains: personal status (3 items), anticipatory support (4 items), and adaptive capacity (5 items). Each item was scored on a scale of 0 to 10, resulting in a total score range from 0 to 120. Higher scores indicate greater readiness for discharge. Readiness for discharge was categorized based on the mean score: low (<7), moderate (7–7.9), high (8–8.9), and very high (≥9). The RHDS is widely used in stroke and chronic disease research in China, demonstrating confirmed reliability and validity.[30,31] The Cronbach's alpha coefficient for this scale was 0.89.

Data Collection

Baseline data and discharge preparation status were collected from stroke patients and their primary caregivers by trained clinical or nursing students on the day of discharge. Follow-up assessments of caregivers' quality of life were conducted one month after discharge, either by telephone or in-person visits. Participants were fully informed about the study's purpose and significance. Written informed consent was obtained to ensure ethical compliance and voluntary participation. Data collectors received standardized training on research protocols, questionnaire administration, and participant query handling to ensure consistency and accuracy. For patients unable to complete questionnaires independently due to severe illness, data collectors read the questions aloud and recorded responses verbatim, with the primary caregiver present to ensure transparency and support. Data collection sessions typically lasted 20 to 30 minutes, depending on participants' comprehension and response time.

Statistical Analysis

All analyses were performed using IBM SPSS 26.0 (IBM Corp., Armonk, NY, USA). Quantitative data are presented as mean±standard deviation after normality testing, while qualitative data are presented as frequency and percentage. T-tests and ANOVA were used to determine significant differences in the quality of life among primary caregivers of stroke patients based on their demographic characteristics. Pearson's correlation analysis was used to explore the relationships between the quality of life of primary caregivers, their readiness for discharge, and the readiness of stroke patients for discharge. Multiple linear regression analysis was used to identify factors affecting the quality of life of primary caregivers of stroke patients. The significance level (α) was set at 0.05 unless otherwise specified.

Results

Demographic Data and Characteristics of Participants

A total of 320 participants were initially selected. Eighteen were lost to follow-up due to loss of contact or refusal to continue, resulting in 302 valid responses and a response rate of 94.4%. The study population was predominantly male (60.9%), and more than half were aged 65 years or older (56%). Most patients had received no more than a junior high school education (70.9%), suffered from ischemic stroke (78.1%), and experienced multiple strokes (80.5%). Primary caregivers were mostly aged 65 years or older (60.3%), predominantly female (60.6%), and typically the patient's spouse (67.9%). Most primary caregivers (69.2%) reported having chronic illnesses. Most caregivers (82.8%) provided care without assistance, and the majority (91.1%) spent 9 or more hours per day caregiving. T-tests and ANOVA showed significant differences in caregivers' quality of life based on patients' age, disease severity, caregivers' age, education, presence of chronic diseases, caregiving responsibilities, and daily caregiving hours ($P < 0.05$). For a detailed overview of the data, refer to Table 1.

Table 1 Comparison of Quality of Life Scores by Socio-Demographic Characteristics (n=302)

	Socio-demographic Characteristics	N (%)	Total Score of WHOQOL-BREF	t/F	P
Patients	Sex				
	Male	184 (60.9)	60.66±6.16	−0.514	0.608
	Female	118 (39.1)	61.03±5.93		
	Age(years)				
	<65	133 (44)	61.94±5.63	2.932	0.004
	≥65	169 (56)	59.91±6.25		
	Family per capita monthly income(CNY)				
	≤3000	38 (12.6)	61.61±8.36	0.495	0.610
	3001–5000	135 (44.7)	60.51±6.19		
	>5000	129 (42.7)	60.87±5.08		
	Occupation				
	In-service (civil servants, etc.)	41 (13.6)	60.51±5.80	0.329	0.720
	Retired	111 (36.7)	61.17±5.63		
	Workers/Farmers or Others	150 (49.7)	60.61±6.45		
	Marital status				
	Married	251 (83.1)	60.69±6.03	0.628	0.535
	Unmarried	16 (5.3)	60.31±6.25		
	Divorced/Widowed	35 (11.6)	61.86±6.28		
	Education level				
	Junior high school or below	214 (70.9)	60.69±5.67	1.907	0.150
	High school/Technical school	48 (15.9)	62.19±7.00		

(*Continued*)

Table 1 (Continued).

	Socio-demographic Characteristics	N (%)	Total Score of WHOQOL-BREF	t/F	P
	College and above	40 (13.2)	59.75±6.74		
	Medical Payment Methods				
	Urban medical insurance	263 (87.1)	60.92±6.11	0.775	0.461
	Self-financed	24 (7.9)	60.63±5.59		
	At public expense	15 (5)	58.93±5.80		
	Stroke type				
	Ischaemic stroke	236 (78.1)	60.76±5.71	−0.232	0.817
	Haemorrhagic stroke	66 (21.9)	60.95±7.21		
	Whether or not to debut				
	Yes	59 (19.5)	61.63±5.53	1.167	0.244
	No	243 (80.5)	60.60±6.18		
	Disease severity				
	Mild	89 (29.5)	65.66±5.62	57.094	0.000
	Moderately	157 (52)	58.42±5.22		
	Serious	56 (18.5)	59.75±4.21		
Caregivers	Age(years)				
	<45	52 (17.2)	63.71±4.57	7.880	0.000
	45–64	68 (22.5)	60.68±5.92		
	≥65	182 (60.3)	60.02±6.26		
	Sex				
	Male	119 (39.4)	60.55±6.65	−0.589	0.556
	Female	183 (60.6)	60.97±5.66		
	Religion				
	Yes	31 (10.3)	61.48±6.99	0.661	0.509
	No	271 (89.7)	60.72±5.96		
	Marital status				
	Married	257 (85.1)	60.73±5.99	0.987	0.374
	Unmarried	21 (7)	62.48±4.98		
	Divorced/Widowed	24 (7.9)	60.08±7.52		
	Relationship with the patient				
	Parents/children	85 (28.1)	60.94±6.16	0.050	0.951
	Spouse	205 (67.9)	60.77±6.09		
	Relative	12 (4)	60.42±7.18		
	Education level				
	Junior high school or below	169 (56)	60.56±6.22	19.270	0.000
	High school/Technical school	74 (24.5)	58.38±5.14		
	College and above	59 (19.5)	64.53±4.86		
	Occupation				
	In-service (civil servants, etc.)	61 (20.2)	60.38±5.63	0.318	0.728
	Retired	109 (36.1)	60.69±5.48		
	Workers/Farmers or Others	132 (43.7)	61.09±6.71		
	Family per capita monthly income(CNY)				
	≤3000	29 (9.6)	59.97±5.74	1.880	0.154
	3001–5000	141 (46.7)	60.26±6.00		
	>5000	132 (43.7)	61.56±6.15		
	Presence of chronic diseases				
	Yes	209 (69.2)	60.24±6.15	−2.415	0.016
	No	93 (30.8)	62.05±5.68		

(*Continued*)

Table 1 (Continued).

	Socio-demographic Characteristics	N (%)	Total Score of WHOQOL-BREF	*t/F*	*P*
	Whether caring responsibilities are shared with others				
	Yes	52 (17.2)	64.15±4.78	0.109	0.000
	No	250 (82.8)	60.10±6.073		
	Care time per day (hours)				
	4–8	27 (8.9)	70.81±4.41	108.377	0.000
	9–16	124 (41.1)	62.54±4.31		
	>16	151 (50)	57.58±4.91		

Abbreviation: CNY, Chinese Yuan.

Quality of Life of Primary Carers

The overall quality of life score for primary caregivers was 60.80±6.06. Scores for the environmental, physical, psychological, and social domains were 14.03±3.95, 13.80±3.33, 13.51±3.16, and 12.00±1.94, respectively. These scores reflect a lower overall quality of life for primary caregivers (Table 2).

Readiness of Primary Caregivers for Hospital Discharge

TThe overall discharge readiness score for primary caregivers was 17.66±2.67, suggesting a moderate level of readiness for discharge (Table 2).

Readiness of Stroke Patients for Hospital Discharge

The overall discharge readiness score for stroke patients was 78.17±8.16, with a mean score of 6.56±0.68 per item. Scores in the domains of personal status, adaptability, and anticipatory support were 19.51±3.63, 32.25±5.21, and 26.41 ±4.37, respectively. These results suggest a low level of discharge readiness among stroke patients (Table 2).

Correlation Between the Quality of Life of Primary Caregivers and Their Readiness for Hospital Discharge and the Readiness of Stroke Patients for Hospital Discharge

A significant positive correlation was found between the primary caregiver's overall quality of life score and their discharge readiness score, as well as between the patient's discharge readiness score and these variables ($P < 0.01$). Additionally, positive correlations were observed among the dimensions discussed (Table 3).

Table 2 Descriptive Analysis of Primary Carers' Quality of Life, Readiness for Discharge and Patients' Readiness for Discharge (n=302)

Variables	Min.	Max.	M	SD
Total carer's quality of life score	43.00	81.00	60.80	6.06
Environmental field	8.00	23.00	14.03	2.95
Physiological field	8.00	24.00	13.80	3.33
Psychological field	6.00	23.00	13.51	3.16
Social field	4.00	15.00	12.00	1.94
Total CPS score	8.00	25.00	17.66	2.67
Total RHDS score	52.00	99.00	78.17	8.16
Personal status	9.00	27.00	19.51	3.63
Adaptive capacity	15.00	43.00	32.25	5.21
Expected Support	15.00	37.00	26.41	4.37

Abbreviations: Min, minimum value; Max, maximum value; M, mean value; SD, standard deviation; CPS, Caregiver PreParedness Scale; RHDS, Readiness for Hospital Discharge Scale.

Table 3 Correlation Analysis Between Primary Carers' Quality of Life, Readiness for Discharge and Patients' Readiness for Discharge (n=302)

Variables	Total CPS Score	Total RHDS Score	Personal Status	Adaptive Capacity	Expected Support
Total WHOQOL-BREF score	0.600**	0.618**	0.293**	0.409**	0.423**
Environmental field	0.320**	0.342**	0.107	0.255**	0.245**
Physiological field	0.317**	0.359**	0.185**	0.228**	0.245**
Psychological field	0.285**	0.309**	0.145*	0.193**	0.227**
Social field	0.243**	0.176**	0.085	0.112	0.125*

Note: *$P<0.05$, **$P<0.01$.
Abbreviations: CPS, Caregiver PreParedness Scale; RHDS, Readiness for Hospital Discharge Scale; WHOQOL-BREF, WHO quality of life scale.

Table 4 Multiple Linear Regression Analysis of the Quality of Life of Caregivers (N= 302)

Variables	*B*	*SE*	*Beta*	*t*	*P*
(Constants)	48.703	4.199		11.599	0.000
Patient's age	−0.746	0.474	−0.061	−1.574	0.117
Severity of the patient's disease	−0.821	0.366	−0.093	−2.241	0.026
Carer's age	−0.352	0.348	−0.045	−1.011	0.313
Educational level of carers	−0.249	0.358	−0.032	−0.695	0.488
Presence of chronic diseases	0.164	0.612	0.013	0.268	0.789
Whether caring responsibilities are shared with others	−0.061	0.830	−0.004	−0.074	0.941
Care time per day(hours)	−3.681	0.399	−0.395	−9.237	<0.001
Total RHDS score	0.223	0.036	0.300	6.129	<0.001
Total CPS score	0.422	0.114	0.186	3.706	<0.001

Note: R^2=0.601, Adjusted R^2=0.589, F=48.969, P<0.001.
Abbreviations: B, Non-standardised coefficient; SE, Standard errors; Beta, Standardised coefficient; CPS, Caregiver PrePreparedness Scale; RHDS, Readiness for Hospital Discharge Scale.

Factors Influencing the Quality of Life of Primary Carers

A multiple linear regression analysis was performed with the primary caregiver's quality of life as the dependent variable. The independent variables included patient age, illness severity, caregiver age, literacy, chronic disease presence, caregiving responsibility sharing, daily caregiving hours, and both the caregiver's and patient's discharge readiness. The analysis revealed that illness severity, caregiver's daily caregiving hours, and both readiness scores were the main predictors of the caregiver's quality of life, explaining 58.9% of the total variance (Table 4).

Discussion

The stroke patient sample in this study was predominantly male (60.9%), mostly married (83.1%), and had a low education level (70.9% with junior high school education or less). Primary caregivers were mainly female (60.6%) and typically the patient's spouse (67.9%). Most caregivers had low literacy levels (56% with junior high school education or less), over half had their own chronic diseases (69.2%), and the majority were solely responsible for patient care (82.8%). These characteristics align with those reported in previous studies.[32–34] Additionally, the high prevalence of ischaemic strokes (78.1%) and the high rate of recurrent strokes (80.5%) are consistent with known patterns of stroke recurrence and prevalence.[35] In this study, the quality of life (QOL) score for primary stroke caregivers was 60.80±6.06, similar to findings from southern Brazil (63.20±4.20),[36] but significantly lower than those from Ethiopia (80.06±13.82), where 47.5% of caregivers had below-average QOL.[23] Meanwhile, this study identified 57.3% of caregivers with QOL scores below the mean (61.61), suggesting a lower quality of life. Similarly, a study in Uganda also reported that over half of caregivers had poor quality of life.[37] In contrast, an Iranian study found that only 17% of caregivers had a low quality of life, a much lower percentage compared to our study.[38] This disparity may be due to differences in geographical, cultural,

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economic, and socio-demographic factors, as well as variations in disease characteristics. Stroke requires long-term rehabilitation, and caregivers face challenges in physiological, psychological, economic, social, and environmental domains. They need strong caregiving skills, psychological resilience, and external support.[39] The WHO Quality of Life Scale includes four domains: environmental, physical, psychological, and social. In this study, the social domain had the lowest score (12.00±1.94), likely due to 82.8% of caregivers providing prolonged, unsupported care, leading to social isolation. Quality of life is a complex, multidimensional construct that necessitates a holistic approach to addressing the emotional, psychological, and social issues faced by caregivers. The physical and emotional demands of caregiving make caregivers vulnerable to depression and anxiety, similar to those experienced by patients.[40] Mental health issues, such as loneliness and stress, are common among caregivers and can negatively impact their physical health.[41] Social care, a key component of quality of life, is strongly influenced by its availability and effectiveness. Economic support, medical services, and community support networks provided by social welfare programs help caregivers cope with the challenges of caregiving.[42] Effective welfare policies, such as subsidized medical services, peer support groups, and flexible working arrangements, can improve mental health, reduce stress, and enhance overall well-being.[42] Combining these social policies with targeted medical interventions can create a more comprehensive support system for caregivers, addressing their diverse needs and improving both care and patient outcomes. This research emphasizes the importance of comprehensive interventions across psychological, physiological, and social dimensions to improve caregivers' well-being.

The study found that the discharge readiness score for primary caregivers was 17.66±2.67. This score is similar to that reported by Pucciarelli et al (15.42±6.6) but significantly higher than the score observed in a study conducted in Indonesia (10.08±1.91).[43] This difference may be due to 80.5% of the patients in our study having previously experienced a cerebrovascular accident, which suggests that their caregivers had some prior experience. Additionally, 69.2% of caregivers had chronic illnesses themselves and had developed caregiving skills over time. Preparation for discharge is a strong predictor of caregiver stress, caregiving burden, mood swings, and overall quality of life.[13] Despite this, the study revealed that discharge preparedness among stroke caregivers was still low. This could be due to inadequate training, ineffective methods, and infrequent education.[44] Thus, it is crucial to enhance support for caregivers both before and after discharge, focusing on improving self-management skills and reducing caregiving burden to better prepare them for their role.

This study found that the total discharge readiness score for stroke patients was 78.17±8.16. This score is similar to the finding of Wu et al (77.72±11.86) but significantly lower than that reported by Wang et al (94.93±18.39).[31,45] The mean score of individual entries was 6.56±0.68, suggesting a relatively low level of discharge readiness among stroke patients. Several factors may explain these results. First, the majority of patients in this study were elderly (56%) and had low literacy levels (70.9% with junior high school education or less). This could impair their ability to learn and understand discharge information. Additionally, cognitive decline often accompanies aging, affecting information retention.[46] Secondly, 70.5% of stroke patients in this study experienced moderate to severe strokes, hindering their ability to understand the disease and prepare for hospital discharge.[47] Therefore, it is essential for healthcare professionals to provide personalized discharge instructions tailored to each patient's condition to improve discharge readiness.

The study found that the mean quality of life score for primary caregivers was 61.61. Notably, 57.3% of caregivers scored below this average, suggesting generally poor quality of life among them. Key factors influencing caregiver quality of life included the severity of the patient's illness, the caregiver's total discharge readiness score, the number of caregiving hours per day, and the patient's discharge readiness score. Moreover, a positive correlation was observed between the caregiver's quality of life and their own readiness for discharge, as well as between the caregiver's quality of life and the patient's readiness for discharge.

The caregiver's quality of life is inversely correlated with the severity of the patient's disease, particularly in stroke cases. Stroke survivors often face significant motor, sensory, speech, and psychological impairments. Patients with mild symptoms may manage some self-care tasks, but those with severe symptoms may experience hemiparesis, total paralysis, or complete loss of self-care abilities, which increases the burden on caregivers.[48] Wu et al[31] found that patients hospitalized for more than a week were less prepared for discharge compared to those hospitalized for less than a week. This correlation suggests that a longer hospital stay is linked to more severe disease and underscores the need for better understanding of rehabilitation, nursing care, and medication. Moderate to severe stroke patients often struggle with self-management after discharge, requiring caregivers to gain additional knowledge and skills, which increases caregiver burden and reduces quality of life for both parties. Ellis KR et al[49] similarly reported that increased caregiver distress correlates with worsening patient functional status and caregiver physical health. These findings highlight the need for healthcare professionals to focus on the severity of the illness and provide tailored interventions to improve functional recovery and support the reintegration of both patients and caregivers into their daily lives.

Stroke is a major life event with profound effects on both the affected individual and their immediate environment.[50] Caregivers must quickly address both the immediate and long-term impacts of stroke. However, this sudden responsibility often overwhelms caregivers, making it difficult for them to prepare adequately.[51,52] Such a drastic change in lifestyle requires extensive support from the entire family; otherwise, caregivers may suffer from physical and mental exhaustion, and potentially develop health issues due to overwhelming stress.[53,54] Ostwald SK et al[13] have shown that strong family and social support can help caregivers adapt more quickly, improving the quality of life for both caregivers and stroke survivors. Nevertheless, most caregivers in this study had to manage their responsibilities alone for extended periods. Although some family and societal support was available, it was insufficient to meet their daily needs. Many caregivers experienced a loss of personal autonomy due to prolonged sole responsibility for their loved ones. This often led to job loss and the inability to manage household tasks or engage in social activities. Caregivers of seriously ill patients frequently cannot leave their patients even briefly, with all decisions revolving around their patients. The lack of recovery hope and constant worry about unexpected events increase psychological stress, leading to a chaotic lifestyle and significant declines in both mental and physical health, which severely impacts quality of life.[55]

A correlation exists between the quality of life of stroke patients and their caregivers and the patients' discharge readiness scores. Lower discharge readiness scores are associated with poorer quality of life. Caregivers' quality of life is affected by various factors such as physical health issues, emotional distress, social support, and financial concerns.[56] In this study, primary caregivers were family members who often lacked professional training, resulting in inadequate caregiving preparation. This inadequacy increased the caregivers' burden, leading to higher risks of depression and anxiety. Additionally, it made effective patient care challenging, which contributed to higher patient readmission rates, further stressing the caregivers and reducing their quality of life. Cheng et al[57] found that lower discharge readiness was significantly linked to a higher short-term readmission rate. Adequate discharge readiness helps patients better understand their medical condition, leading to greater satisfaction, emotional stability, and improved ability to manage familial challenges. It also reduces the caregivers' burden and improves their overall quality of life.[58]

In addition to individual factors, such as caregiver skills and illness severity, systemic factors significantly influence the caregiving experience. Healthcare policies, resource accessibility, and social support networks are critical determinants of caregivers' quality of life. For example, equitable healthcare policies, including affordable medical services, respite care, and nursing education programs, can alleviate caregivers' economic and emotional burdens.[40] Social support networks, such as community organizations and peer support groups, offer crucial emotional and practical assistance, positively influencing the quality of life of both stroke survivors and caregivers.[42] Caregivers receiving support from these systems often report reduced stress and improved overall well-being.[59] Therefore, healthcare professionals should incorporate systemic factors into caregiver support strategies to develop comprehensive interventions that enhance the quality of life for both caregivers and patients.

Enhancing discharge preparation can significantly improve caregivers' quality of life. Proper preparation at discharge not only benefits the patient's health but also reduces caregiver burden and boosts their quality of life.[60] A meta-analysis showed that interventions like psychoeducation, supportive care, and self-care significantly improve caregiver readiness.[61] These interventions included information on disease management, treatment options, symptom control, daily patient care, nutrition, and emotional support.[62,63] Yu et al[64] identified acceptance, proactive coping, restructuring, and planning as the most commonly employed coping strategies among caregivers. Caregivers face substantial challenges in health-related quality of life. Interventions like enhanced social support and promotion of positive coping strategies can help caregivers better prepare for their roles. The study found that problem-focused coping, proactive coping, and planning were positively correlated with caregivers' psychological health. Gholamzadeh et al[65] suggested that adequate training on daily caregiving challenges can enhance caregivers' preparedness and quality of life. Healthcare professionals must acknowledge the critical role of caregivers in patient care. Jin et al[66] emphasized that empowerment education enables caregivers to engage in disease management, alleviate negative emotions, and enhance knowledge, caregiving skills, and discharge readiness. Caregivers should recognize their capacity to provide effective care and actively seek assistance when needed. At the societal level, engaging with health services and seeking assistance or information can reduce depression among caregivers and survivors, improving their preparedness and quality of life.[67] At the family level, caregivers and patients should be treated as a unified entity. Pucciarelli et al[67] demonstrated that viewing stroke patients and caregivers as a unit and providing educational interventions significantly enhances caregivers' preparedness, knowledge, and quality of life. Proactive and effective interventions enhance caregiver readiness for discharge. Greater readiness often correlates with reduced burden, fewer depressive symptoms, and improved quality of life.

Understanding caregiver and patient preparedness is essential for the quality of life of stroke survivors and their caregivers. This highlights the need to support their preparation during the rehabilitation phase to achieve optimal treatment outcomes. Research indicates that well-prepared caregivers experience lower levels of distress, anxiety, and depression, while inadequate preparation can result in significant psychological distress.[60] Enhancing discharge preparation has a lasting impact on caregivers by equipping them with essential skills and knowledge, while alleviating physical and psychological caregiving pressures. Over time, effective preparation not only reduces caregiver burden but also enhances their mental health. Caregiver preparedness can mitigate depression, improve physical health, enhance environmental adaptation, and elevate quality of life, thereby reducing the long-term negative effects of depression on both caregivers and patients.[68] Effective discharge preparation enables caregivers and patients to adapt more effectively to role changes,[69] especially during the early stages of the patient's return home, when caregiver readiness significantly influences quality of life.[67] Well-prepared caregivers exhibit greater confidence and adaptability in handling complex care tasks, which enhances overall quality of life.[67] Better preparation not only alleviates caregiver burden and emotional distress but also promotes self-care and enhances patient outcomes, including reduced readmission rates, improved quality of life, and accelerated recovery.[70,71] Well-prepared caregivers facilitate patients' adjustment to new lifestyles and support their reintegration into society.[72,73] Research demonstrates that effective discharge preparation reduces 30-day patient readmission rates.[74] Baker et al[75] found that early discharge preparation reduces hospital stays by 56% and costs by 43%. Effective preparation facilitates a smooth transition from hospital to home and lowers the incidence of post-discharge adverse outcomes.[74] Adequate preparation of patients and caregivers during the transition period enhances the effectiveness of long-term treatment and follow-up.[76] This underscores the critical role of effective discharge planning in fostering patient independence and facilitating long-term recovery. One year post-stroke, the prevalence of depression among survivors was 31%. Effective caregiver preparation significantly reduces depression rates and its adverse effects on patients' quality of life.[77] This indicates that caregiver involvement in the care process is essential. However, caregivers are frequently excluded from rehabilitation programs, which primarily focus on patient stability while neglecting the essential role of caregivers. The preparedness of nursing staff is a modifiable factor that warrants inclusion in targeted interventions. Ensuring adequate caregiver preparation improves both their outcomes and the quality of life of survivors. Therefore, medical staff should incorporate the role of caregivers into intervention planning and actively encourage their participation.

While our findings are significant, caution is warranted when applying them to other populations. This study was conducted in Chengdu, Sichuan Province, including rural-adjacent sites with a high proportion of migrant workers. Demographic data indicate that stroke patients and their caregivers are typically older, less educated, and predominantly affected by ischemic and recurrent strokes, reflecting the region's underdeveloped economy. This raises a critical question: Can the same research paradigm yield comparable results in other regions of China or culturally distinct countries? For instance, in economically advanced regions like Beijing and Shanghai, nurses tend to be better educated and have greater access to formal support systems, potentially influencing discharge preparation and quality of life differently. In countries like the Netherlands and Australia, the extensive adoption of remote service systems may further enhance care outcomes. Future studies should investigate cross-regional and cross-cultural differences to better understand the applicability of discharge preparation and quality of life across diverse settings. This will provide a robust foundation for developing targeted and universal interventions.

Limitations and Future Directions

Despite the study's adequate statistical power, several limitations must be considered to fully understand the findings. First, although the study aimed to include a large sample, it was drawn from a single region, which may limit the generalizability of the findings. Second, we employed a universal tool to evaluate caregiver preparedness in this study. However, this tool may have limitations in accurately assessing the specific preparedness and skills required for stroke caregiving. Third, the study focused on the interrelationships among three components and did not explore other potential factors affecting quality of life. Additionally, this study used a cross-sectional design, which precludes the assessment of changes in readiness over time. Moreover, caution is needed when interpreting causal relationships.

Future research should involve multi-center, large-sample studies to examine how cultural, economic, and health system differences influence caregivers' quality of life and discharge readiness. Additionally, developing a specialized discharge readiness scale tailored to the specific needs and experiences of stroke caregivers is a critical focus for future research. While current tools have value, they may lack the sensitivity and specificity needed to capture the diverse challenges faced by this group. Simultaneously, the immediate and long-term effects of support interventions, such as tailored educational programs, peer support networks, and telemedicine services, on caregivers' quality of life and discharge readiness should be assessed. Finally, investigating the long-term effects of caregiver education on mental health, quality of life, and patient readmission rates will offer valuable insights for developing evidence-based interventions. This research will offer theoretical support for developing comprehensive strategies to enhance caregivers' adaptability and well-being.

Conclusion

In conclusion, higher discharge readiness is a significant predictor of better quality of life for caregivers. This study found that caregivers' quality of life was related to their daily caregiving hours, their readiness for discharge, and the stroke patients' disease severity and discharge readiness. The study also showed a moderate positive correlation between caregivers' quality of life, their discharge readiness, and patients' discharge readiness. Therefore, enhancing discharge readiness is crucial for reducing caregiver burden, improving care quality, and increasing caregivers' quality of life.

Data Sharing Statement

The datasets used and/or analyzed during the current study are available from the first author upon reasonable request.

Ethical Consideration

This study was conducted in accordance with the ethical standards set forth in the Declaration of Helsinki. Ethical approval for the study was obtained from the Ethics Committee of the First Affiliated Hospital of Chengdu Medical College (approval number: 2020CYFYIRB-BA-104). Informed consent was obtained from all participants, who were thoroughly informed about the study's objectives and details prior to initiation.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis, and interpretation, or all these areas; took part in drafting, revising, or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors report no conflicts of interest in this work.

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