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ORIGINAL RESEARCH

Identification of Facilitators and Barriers to Functional Ability in Elderly Stroke Patients: A Descriptive Qualitative Study

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Purpose: Stroke can cause long-term disability in elderly individuals, and improving the functional ability of patients is vital. This study sought to determine the facilitators and barriers to functional ability in elderly stroke patients from the perspective of healthy aging and to provide a theoretical basis for precise interventions.

Patients and Methods: This study was conducted between December 2023 and January 2024. Eleven patients and eight medical staff from a tertiary hospital were selected for semi-structured interviews using purposive sampling. The interview data were analyzed using thematic analysis.

Results: A total of 19 interviewees participated, including 11 patients and eight medical staff members. Among the patients, four had hemorrhagic stroke and seven had ischemic stroke; ages ranged from 60 to 77 years. Among the medical staff, five had bachelor's degrees and three had master's degrees; ages ranged from 30 to 47 years. Five major themes were identified, including 16 sub-themes. Key themes included: medical service factors, health belief factors, patient factors, family factors, and social/environmental factors.

Conclusion: The core elements for improving the functional ability of patients are establishing a service model of multidisciplinary teamwork; guaranteeing the continuity of in-hospital and home rehabilitation; enriching the form and content of health education to improve patient knowledge of the disease; providing psychological support to alleviate patients' negative emotions; and establishing of effective social safeguards and support systems.

Key Points:

- Functional ability is a key indicator of the health status of elderly patients with stroke based on the principles of healthy aging.
- Multidisciplinary teamwork model and positive health beliefs can promote patients' functional abilities. Disease symptoms, negative psychological emotions, and insufficient family and social support may be detrimental to functional abilities.
- This article provides suggestions of measures for practitioners to undertake to improve patient functional abilities in response to facilitators and barriers.

Keywords: facilitators, barriers, functional ability, elderly, stroke, qualitative

Introduction

Stroke are common among the older individuals, and the average age of stroke patients is about 65 years old in China.[1] Despite advances in acute management, stroke remains a leading cause of disability worldwide.[2] Many survivors of stroke have long-term physical functional disabilities that can lead to sensory, motor, and cognitive impairments. These impairments result in reduced ability to provide self-care and diminished participation in social and community activities,[3,4] thus leading to a decreased quality of life.[5,6] Therefore, focusing on the health status of elderly patients after stroke has become an important issue for actively facing healthy aging. Some studies have suggested that effective

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rehabilitation exercises during the recovery period after stroke can alleviate functional disabilities in patients,[7] thereby accelerating the stroke recovery process.[8] Therefore, rehabilitation and prevention during the recovery period of stroke are as important as acute treatment and have a significant and positive role in improving the health of patients during the recovery period, thereby reducing the disease burden.[9] The current focus of the rehabilitation of stroke patients is mainly on the recovery of physical independence and functional ability, with the ultimate goal of improving walking function and restoring physical balance and motor function.[10]

In its 2015 Global Report on Aging and Health, the World Health Organization (WHO) proposed a model of healthy aging as it relates to public health. From a functional perspective, this model suggests that the essence of health in the elderly is the ability to function properly.[11] This indicates that, to improve the health of elderly individuals, improving and maintaining functional abilities is of paramount importance. Functional ability refers to a range of abilities that individuals need to achieve activities they consider valuable and meaningful, including the ability to meet basic needs, learn, grow, make decisions, move, build and maintain relationships, and contribute to society.[12] One report proposed that intrinsic capacity (IC), a combination of all physical and mental abilities at any time, is a powerful indicator of functional abilities in elderly individuals. Belloni et al[13] found that IC focuses on the existing functions of the elderly and has a more positive connotation than frailty. Therefore, IC reflects a shift in the treatment focus from traditional disease-centered measures for promoting health in the elderly population to healthy aging methods based on the maintenance of stable functional abilities.

Stroke is currently one of the main diseases that leads to long-term disability in elderly individuals, and its clinical prognosis is directly related to early assessment and intervention.[14]

It is necessary to evaluate whether they can achieve well-being, which may rely on several common essentials, such as identity, relationships, enjoyment, autonomy, security, and personal growth.[15] While, functional ability is an indicator that can cover these aspects. Therefore, from the perspective of healthy aging, using functional ability as an indicator of the health status of elderly stroke patients is reasonable and comprehensive. However, few studies empirically examined the influence factors of functional ability of the elderly stroke patients based on the WHO's framework for healthy aging. Previous studies have analyzed the current status and influencing factors of IC in elderly stroke patients, and have shown that IC is influenced by factors such as age, educational level, self-efficacy, physiological resilience, and social support.[16] These factors may indirectly affect functional abilities. However, the environment in which a patient is located is also an important factor contributing to IC. Even in cases of high IC, patients may not be able to perform normal functions once they leave an optimal environment. Therefore, this study incorporated the WHO healthy aging model as the theoretical framework to deeply analyze the factors facilitating and hindering functional ability in elderly stroke patients. Results will serve to provide a scientific basis for develop effective interventions and policies for improving functional ability and consequently the long-term quality of life in elderly individuals after stroke.

Materials and Methods

Design

This study used a descriptive qualitative method and was conducted through semi-structured interviews following the guidelines of qualitative research.[17] The results are reported according to harmonized standards for reporting qualitative studies.[18]

Participants

The participants were recruited by three registered nurses respectively using purposive sampling from the Departments of Neurology, Neurosurgery, and Rehabilitation Medicine at a tertiary hospital in China. We recruit eligible participants according to the principle of maximum-variation sampling to improve the representativeness of the selected sample. In this study, different types of stroke, patients with different disease stages and frequency of onset were selected. In addition, medical staff with different professional titles and years of service's duration were selected. The medical staff and elderly stroke patients are represented by "D" and "P" respectively. The sample size was determined according to data saturation, that is, interviews stopped only when no new data appeared within two consecutive interviews.

The inclusion criteria for the medical staff were as follows: (1) incumbent staff in the Departments of Neurology, Neurosurgery, or Rehabilitation Medicine; (2) five or more years of service; (3) bachelor's degree or higher; (4)

intermediate or higher technical/professional title; and (5) voluntary interviewers. Those who are unable to complete the interview for various reasons were excluded.

The inclusion criteria for the elderly stroke patients were as follows: (1) age 60 years or older; (2) confirmed stroke diagnosed using computed tomography and/or magnetic resonance imaging of the head, including strokes from subarachnoid hemorrhage, cerebral hemorrhage, and cerebral infarction; (3) stable vital signs, and conscious/able to cooperate with the researcher; and (4) ability to communicate and provide informed consent. The exclusion criteria were as follows: (1) other comorbid craniocerebral diseases and (2) serious organic diseases.

Ethics Approval Statement

This study was conducted in accordance with the Declaration of Helsinki, and all the participants agreed to be interviewed and signed a written informed consent form, including publication of anonymized responses/direct quotes. This study was approved by the Ethics Committee of the First Affiliated Hospital of the Wannan Medical College, China (Approval Number: 2022/No.98).

Interview Guide

Based on the purpose of the study, an interview guide was initially developed based on a literature review and group discussion. In addition, three experts with rich qualitative research experience were consulted to evaluate the specific content of the interview guide and the sequence of questions. We repeatedly modified and improved the questionnaire according to the opinions of the experts to improve interviewee comprehension and understanding of the purpose of the interview. Moreover, the interview questions were developed with a focus on ensuring that the questions were such that they would lead to the most appropriate and accurate responses. Before the formal interviews, the two participants were interviewed according to the proposed interview guidelines. Based on any difficulties that arose in the pre-interview, the preliminary interview guide was revised and eventually a formal interview guide was created, as shown in Table 1.

Data Collection

Interviews were conducted between December 2023 and January 2024. All interviews were conducted by the first author, who is a registered nurse currently engaged in rehabilitation nursing for patients who have sustained a stroke. The interviews were face-to-face, and the interview ended when no further information was gathered. Each interview was audio recorded and lasted between 30 and 40 minutes. Before the interview, the interviewer introduced himself and explained the purpose and methods of the study and the contents of the interviews. The interviewer assured the participants of the anonymity of the study and confidentiality of their data. After obtaining the interviewees' consent, in-

Table 1 Interview Guide

Class	Number	Interview Content
Patient	1	What do you feel about your current health status? Can you tell me about that specifically?
	2	What difficulties do you think you have encountered during the whole illness process? Can you give an example? How did you solve these difficulties?
	3	How did your family, relatives and friends help you during your illness?
	4	What social resources do you think are the most helpful to your health?
	5	What do you think of the medical services received in the community and hospital?
	6	What can you do right now? What else do you want to do? Can you give an example?
	7	Can you do what you want to do while recovering at home? What factors would impact your ability to accomplish those things?
	8	Is there anything else you want to say?
Staff	1	What is your understanding of the health of the elderly? Can you make that specific?
	2	What health problems do you think exist in the elderly stroke patients? Can you give it an example?
	3	Does your unit have a rehabilitation plan for the patient? Do you think it is helpful for the patients?
	4	What do you think are the facilitators to improve the health level of stroke patients?
	5	What do you think are the barriers to improving the health level of stroke patients?
	6	Do you have anything else to add?

depth interviews were conducted according to the interview guidelines. During the interview, the interviewer observed the tone, mood, and movement changes of the interviewees and recorded relevant observations.

Data Collation and Analysis

After each interview, the audio files were converted into verbatim text by the second author (R.R Ma) on the same day. The second author also completed a preliminary analysis. To ensure that the transcribed text was clear and logical, the audio files were listened to again for comparison. The record of each interviewee was numbered and archival records were established. Thematic analysis, a method of identifying, analyzing, and reporting patterns (themes) from data, was used to analyze the interview data.[19] The first step was to read the transcribed text and reflective records. The second step was to analyze the transcribed text sentence by sentence to identify significant statements and code them based on the two dimensions of intrinsic capacity and environmental characteristics of healthy aging. Any statements related to the five dimensions of intrinsic abilities (activity, vitality, sensation, cognition, and psychology) and two aspects of environmental characteristics (macro environment and micro environment) will be encoded and belong to the corresponding category. Next, the coding was organized to form potential themes followed by the collection of all relevant information for each potential theme. Finally, all codes were classified, and themes were defined and named based on the information under the code. This cycle was continued until no new themes appeared. The researchers responsible for data analysis and coding have received systematic training in qualitative research, and rich experience in stroke-related research, ensuring the reliability of results. To ensure the accuracy of the results of the study, three meetings were held amongst the authors to discuss and reach an agreement on the coding, and all authors collaboratively discussed whether the themes, subthemes, and elaborations under the themes matched.

Results

Participant Demographics

To ensure the heterogeneity of the study participants and sample size, 19 interviewees participated, including 11 patients and eight medical staff members. No participant withdrew from the study. Among the patients, four had hemorrhagic stroke and seven had ischemic stroke; ages ranged from 60 to 77 years (mean, 66 years). Among the medical staff participants, five had bachelor's degrees and three had master's degrees. Ages ranged from 30 to 47 years (mean, 35 years), and years of service ranged from 5 to 29 years (mean, 12 years). Table 2 present the demographic data of the participants.

Table 2 Sociodemographic of Patients and Medical Staff

Characteristics	Total (N = 19)	Patients (N = 11)	Medical Staff (N = 8)
Age, mean ± SD, y	53.00±16.58	65.91±5.94	35.25±5.87
Sex, n (%)			
Male	9(47.37)	7(63.64)	2(25.00)
Female	10(52.63)	4(36.36)	6(75.00)
Degree of education, n (%)			
Diploma below high school	4(21.05)	4(36.36)	0(0)
Junior college	6(31.58)	6(54.55)	0(0)
Undergraduate	6(31.58)	1(9.09)	5(62.50)
Postgraduates	3(15.79)	0(0)	3(37.50)
Occupation, n (%)			
Peasant		2(18.18)	
Retire		6(51.55)	
Worker		2(18.18)	
Liberal professions		1(9.09)	
Physician			2(25.00)
Nurse			6(75.00)
Disease type, n (%)			
CI		7(63.64)	
CH		1(9.09)	

(*Continued*)

Table 2 (Continued).

Characteristics	Total (N = 19)	Patients (N = 11)	Medical Staff (N = 8)
SAH		3(27.27)	
Course of disease (y), n (%)			
<1		9(81.82)	
1–3		1(9.09)	
>3		1(9.09)	
The number of onset, n (%)			
First time		9(81.82)	
Second time		2(18.18)	
Professional titles, n (%)			
Middle level			5(62.50)
High level			3(37.50)
Duration of service (y), n (%)			
5–10			5(62.50)
11–20			2(25.00)
>20			1(12.50)

Abbreviations: CI, Cerebral infarction; CH, Cerebral haemorrhage; SAH, Subarachnoid haemorrhage.

Findings

Two categories, five themes, and 16 sub-themes were summarized by refining and analyzing the interview data of the 19 interviewees, as detailed in Figure 1. It is worth noting that compared to previous studies, we have some unique findings. For example, we emphasize the importance of early risk warning and management, comprehensive continuing care services, health promotion behavior motivation and peer support for stroke patients.

Facilitator Factors

Theme 1: Medical Service Factors

Diagnosis, Treatment, and Nursing Services

The overall course of stroke recovery is long; therefore, it is of great importance for high-quality medical care services to promote the health of patients during hospital and/or home rehabilitation.

> The theoretical and technical level of professionals is very important. Doctors and nurses work together to develop a rehabilitation protocol and health education for patients, so that the formation of a team will be helpful to patients. (D1)

> I think it takes a team effort to improve the health of patients. Secondly, it is the concepts, theoretical knowledge, and technical level of the medical staff, so that a high level of diagnosis, treatment and nursing service can be formed. (D5)

Early Risk Warning and Management

The disability and recurrence rates of patients after stroke are high, and the risk factors of disability and recurrence can be effectively identified in the early stages of stroke recovery. The targeted prevention timeline for high-risk groups is early to reduce the mortality, disability, and recurrence rates of stroke and improve the quality of life of patients.

> If we can predict some risks of symptoms that may occur for elderly stroke patients, and do a good job of early warning management, complications of patients will be much less, so as to avoid the occurrence of disability. (D1)

> For some high-risk diseases like hypertension and diabetes, it's definitely important to monitor and adjust the patients' blood pressure and blood glucose, so as to control the risk factors of triggering stroke in another part of the brain to the minimum. (D8)

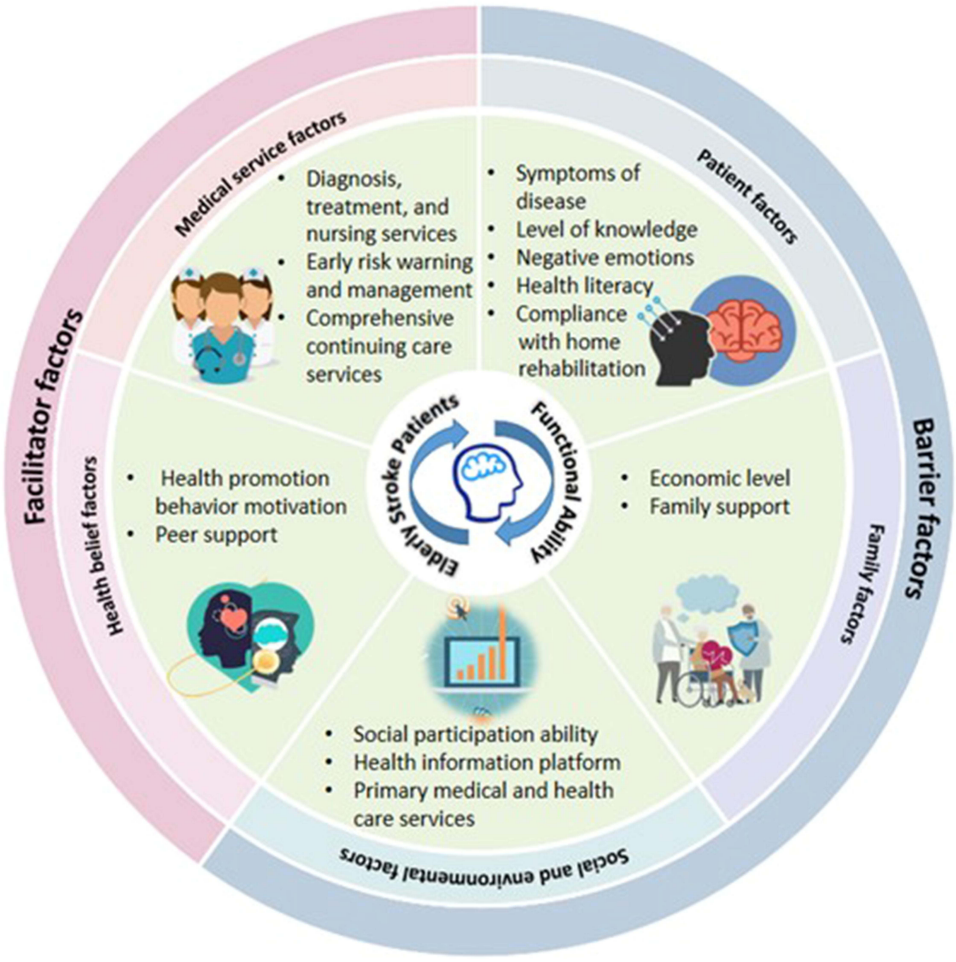

Figure 1 Pattern mapping of factors influencing functional ability in elderly stroke patient.

Comprehensive Continuing Care Services

Stroke patients and their families have a relatively low awareness of treatment and nursing care, which leads to deficiencies in their health management after discharge. As a continuation of nursing services after discharge, continuous nursing care can provide patients with various interventions, such as life nursing, psychological nursing, and rehabilitation guidance, to promote their rehabilitation.

> The continuation nursing care is necessary for patients. If hospital and the community can form a joint system, it must be beneficial for the patients. (D5)

> If more on-site services can be provided in the future, such as guidance for rehabilitation exercises at home or follow-up visits, it would definitely be more beneficial. (D7)

Theme 2: Health Belief Factors

Health Promotion Behavior Motivation

Health promotion behaviors represent a series of behaviors undertaken by individuals to maintain or promote health and realize their self-worth.[20] Positive health-promoting behavior motivation enables patients to correctly choose and adhere to behaviors beneficial to their health, with a positive impact on health outcomes.

> The attitude of patients and their families who are willing to undergo rehabilitation training may be important, and motivation is a promoting factor for restoring health. (D3)

I think as long as my condition and physical strength permit, I will definitely adhere to healthy lifestyle habits and methods and will not change them. (P8)

Peer Support

Peer support, also known as peer education, refers to peers with similar diseases or treatment experiences who provide knowledge and informational and emotional support through sharing, understanding, and identification of strategies to solve existing or potential health problems.[21] Good peer education can enable patients to obtain emotional resonance in mutual communication, reduce adverse moods (depression, anger) among patients after stroke, and stimulate their hope and confidence in recovering their health.

Peer education is a very important factor, for example, if everyone is in the same ward, and one patient has a high level of enthusiasm and autonomy, the recovery speed will definitely be faster than others, which [has] a promoting effect on other patients. (D7)

I often tell my old friends to exercise more. Usually, I have to walk at least one or two thousand steps every day, and I pay close attention to this aspect. (P8)

Barrier Factors

Theme 1: Patient Factors

Symptoms of Disease

Most patients reported that due to the impact of stroke, various problems occurred in their physical function, such as in walking, eating, and defecating. Two participants reported that urinary incontinence could occur due to sensory dysfunction, requiring a catheter to assist urination (P1, P6).

This leads to a decline in the patients' self-care ability, inconvenience in daily life, and the need for support and help from caregivers for an extended period of time.

I had a brain hemorrhage and my right arm and leg are not as good as they used to be, so that I can't lift my feet when I walk. (P3)

I feel a little numbness in my right hand and foot, I can't feel anything in my hand, and I'm still a little limited in eating. (P8)

Level of Knowledge

Most of the elderly patients with stroke in this study had an educational level of junior high school or below, relatively low knowledge of strokes, including disease treatment and rehabilitation exercises, insufficient awareness of health management, and neglect of scientific treatment, which led to a decline in the quality of treatment and rehabilitation.

Some patients and their families have limited educational level, and may have some difficulties in understanding, and the compliance in the later stage is not very high. (D1)

We usually do some education for patients, including disease prevention and treatment after illness, but it depends on the education level, which will make them have a different understanding of stroke. (D7)

I don't know much about treatments and just listen to what the doctors tell me. (P2)

Negative Emotions

Due to a lack of awareness of the disease, stroke patients are unable to correctly understand the overall purpose of treatment. After a short period of rehabilitation, some patients believe that they have not achieved satisfactory results, lose confidence in the rehabilitation, and lack the willingness to seek medical care. One participant said, Some patients question the usefulness of medical treatment, which makes them feel insecure (D1).

In our interviews, we found that some patients worried about adverse outcomes after stroke, resulting in a series of negative psychological emotions, such as low levels of self-efficacy and worry about increasing the family burden. The

participants expressed thoughts such as: I don't think it's working, so I've kind of given up (P3, P7). I'm not feeling well (P10); I don't want to bother my family (P6, P8).

In addition, some patients may experience post-stroke depression. According to statistics, the incidence of depression after stroke is between 18% to 33%.[22] Patients worry about their own health and limb function recovery, find it difficult to fall asleep at night, and wake easily. Patients with anxiety and depression cooperate poorly with rehabilitation, which seriously affects later recovery.

> Some patients may have post-stroke depression, and then they are less motivated, and of course they don't recover well. (D5)

> The mood is good and bad at times. I've got this serious illness, and I always feel like there is something wrong in my mind. (P10)

Health Literacy

Health literacy is essential for individuals to obtain information about their health and its benefits.[23] When patients have long-term deficits after having a stroke, they experience a heavy life and psychological burden, and their desire for treatment and rehabilitation may decrease. This will lead to the standardization of self-management behavior, and overall health behavior will also be affected.

> Some bad habits, such as smoking, drinking, and eating habits, which can cause high blood pressure, arteriosclerosis and so on, increasing the risk of stroke recurrence. (D7)

> Many stroke patients are accompanied by chronic diseases, such as hypertension and diabetes, but [also have a] lack of healthy lifestyle behaviors. (D5)

Compliance With Home Rehabilitation

After discharge, some stroke patients and their families see no hope for treatment; therefore, compliance with rehabilitation exercises at home is low, leading to a decline in physical function and quality of life.

> Once the patient arrives at home and steps into his or her own routine, ongoing rehabilitation exercises are neglected. (D7)

> Back at home the caregiver has to be involved in life as well, so it becomes difficult for him to be with him 24 hours a day and then urge him to do rehabilitation exercises. (D8)

Theme 2: Family Factors

Economic Level

Stroke has a long course and treatment cycle. Patients need regular review and treatment in the early stages of recovery and long-term rehabilitation exercises in the later stages, resulting in a heavy medical burden. Some patients and their families have poor economic conditions, leading to an inability to achieve optimal recovery.

> Economic level is very important, if [conditions are better] better, [caregivers] may carry out some transformation to the home, like the installation of toilet handrails, decompression mattress, and other necessities. (D4)

> I have to do rehabilitation for my illness, and hospitals cost a lot of money, so I can't do it without money. (P1)

> The biggest difficulty is that the economy condition is not good and I feel a bit of pressure inside. (P3)

Family Support

Rehabilitation of patients after stroke requires a certain economic basis, time, and caregivers. However, the caregivers may also face life and work pressure. Consequently, home rehabilitation exercises may not be performed adequately or properly due to insufficient support from their family, and malnutrition, stress injury may also occur. These challenges can eventually lead to adverse outcomes in elderly stroke patients. Thus, family support is of critical importance.

> The support of family members throughout the course of the disease, including human, material and financial resources, as well as the adequacy of support for rehabilitation, is important. (D2)

> My son came to visit me sometimes when I was sick in the hospital, but he has a life to live, and he's always busy. (P1)

Theme 3: Social and Environmental Factors

Social Participation Ability

Most patients and their families are worried that the disease will cause adverse outcomes, a lack of confidence in participating in social activities, and social alienation. Some participants said that "I can't continue working like beforehand (P7, P9)." Moreover, the lack of community activity sites in most rural areas has led to a decline in the social participation of patients.

> The elderly patients in rural areas lack activities. Maybe more attention should be paid to the social participation ability of the elderly in these suburbs or remote areas. (D4)

Health Information Platform

With the advent of the information age, most health knowledge is disseminated through informational platforms. The establishment of health information platforms has challenges, such as unreasonable and complex operation processes. This results in difficulty for patients, particularly elderly patients, to obtain useful information for their health.

> It is difficult for the elderly to master the use of intelligent equipment, so there are some obstacles. (D1)

> There may be many channels for obtaining health knowledge, whether it is legitimate or not, whether it meets the patient's health needs, and the patient [has difficulty determining] right from wrong. (D2)

Primary Medical and Health Care Services

Some rehabilitation for patients after stroke must be completed at home; however, grassroots medical institutions have insufficient types, frequency, and pertinence of medical services. Most participants indicated that the role of grassroots hospitals was minimal. Participants said, If there's anything I need, I'd go to a big hospital (P3, P6, P11).

> Most community hospitals do not provide guidance or intervention (D4).

Unfortunately, some rural areas have no medical or health service centers, and the participants reported that the penetration rate of grassroots hospitals is relatively low (D1).

The professional level, service ability, and health management level of the medical staff in grassroots medical institutions are low. Many are unable to provide professional health guidance to patients and caregivers, which is unfavorable for the rehabilitation of stroke patients at home. Consequently, patient recovery and maximum function cannot be achieved.

> Most community hospitals may not play a good role, and some doctors in primary hospitals may feel that they do not need to consider that much in this position.(D5)

Discussion

Against the background of the high incidence of stroke and the resulting high rates of death and disability, focusing on the functional deficits of elderly patients who have sustained a stroke from the perspective of healthy aging and helping them improve their health management abilities is an important part of current health promotion. However, the level of functional ability in many elderly patients after stroke is not encouraging. We considered multiple factors in this study, such as the level of medical services and patient motivation for health-promoting behaviors, psychological emotions, level of family support, and social-environmental factors.

After the acute treatment, most patients who have sustained a stroke exhibit a variety of functional disabilities. Therefore, rehabilitation is very important. During the rehabilitation period, a multidisciplinary team of doctors, physiotherapists, nurses, and psychologists can provide patients with comprehensive medical services, including targeted rehabilitation programs, exercise guidance, and psychological interventions, which have key roles in the recovery of patient function. The International Classification of Functioning, Disability, and Health emphasizes that all relevant disciplines of rehabilitation medicine should communicate through teamwork and provide high-quality health services through multidisciplinary integration and interaction.[24] The focus should be on maximizing the functional recovery of injured, ill, and disabled people as soon as possible.[25] Wood et al[26] has formed a collaborative team consisting of senior practice nurses and resident doctors to provide care for stroke patients, ensuring that patients receive adequate diagnosis, treatment, and follow-up. Certainly, other professionals in multidisciplinary team should be included according to the needs of patients, including but not limited to occupational therapists, physiotherapists, psychologists, social workers, speech therapists, etc. However, in this study, some medical staff interviewees indicated that they were busy with clinical work and had difficulty finding time to instruct patients in rehabilitation training, in addition to their regular treatment and nursing care. Baxter et al[27] suggested a lack of human resources among clinical staff, resulting in a lack of a supportive environment for patient rehabilitation treatment and care, which is a major obstacle in teamwork. Therefore, a prerequisite for multidisciplinary teamwork must be to address the shortage of personnel, strengthen the professional knowledge and skill training of medical staff to support teamwork, and achieve continuity of treatment and care from hospital to home. The internet could be used to facilitate networking and education among staff and patients. It is wonderful to the follow-up software for stroke patients can be developed, docking with hospital medical, laboratory and outpatient data, the patient information import is completed, and the interconnection and real-time sharing of patient health files and information are realized. At the same time, health guidance knowledge such as medication, diet, and rehabilitation exercise can be intelligently pushed by medical staff, and online consultation guidance and outpatient follow-up guidance can be carried out after the patient is discharged.

In this study, we found that some of the patients and their family members had low knowledge of strokes and health behaviors, which is consistent with the results of a study by Li et al.[28] This may be due to the fact that patients have insufficient knowledge about stroke and are prone to uncertainty about the effects of functional exercises, which leads to low motivation for health promotion behaviors and difficulty in changing previous lifestyles. Zhang et al[29] suggested that elderly stroke patients in particular may have decreased verbal communication skills, an inability to understand verbal and written information, and a lack of knowledge about stroke or an inability to realize the benefits of self-management, which in turn may affect their adherence to rehabilitation. Therefore, patients and their caregivers must have access to health knowledge, rehabilitation guidance, and rehabilitation information to increase their motivation to engage in health-promoting behaviors.

In this study, some patients wish to participate in the development of a personalized rehabilitation exercise program that could enhance their confidence and motivation for rehabilitation exercises. Therefore, healthcare professionals should adopt a multi-form health education approach. Such an approach may involve regular doctor-patient symposiums, group activities, and the creation of QR codes to send health education knowledge through a platform such as WeChat. Clinicians should also consider the patients' personal wishes and previous lifestyles when providing guidance on rehabilitation exercises, raise awareness of the risk of disability and stroke recurrence, and increase the patients' and their family members' understanding of stroke-related information. In addition, medical staff should not only guide patients in mastering functional exercise but also promote the participation of family members and provide timely feedback on the effectiveness of rehabilitation exercise. Such strategies serve to form a virtuous cycle which may ensure that the patients perform functional exercises correctly and regularly and inevitably will promote healthy behaviors.

This study found that some patients were anxious about their physical disabilities and future outcomes and required effective psychological counseling from healthcare professionals. The United Kingdom Stroke Guidelines recommend a stepwise approach for psychological care after stroke.[30] However, the lack of clinical psychological expertise to support patients at high risk of psychological disorders leads to a less effective approach to these psychological interventions. Therefore, training healthcare professionals on accessing post-stroke psychological assessments and psychological support is critical. A stroke-specific educational framework proposed by Watkins et al[31] provides information on the

competencies required for specific disciplines as well as training curricula and materials for psychological screening, assessment, and support. Clinical staff can learn and train from these resources to improve their ability to provide psychological support to stroke patients, thereby avoiding or reducing the development of psychological malaise in patients. Psychological support can facilitate treatment and rehabilitation coordination and improve treatment outcomes to improve patients' functional abilities. This study found that peer and social support enhanced the psychological adjustment of patients after stroke. Morris et al[32] have shown that hospital-based peer support groups for stroke patients and caregivers provide better therapeutic benefits and enable patients to access useful health information, provide rehabilitation advice, and establish good connections with fellow patients. Besides, Wan et al[33] also indicate that peer support can improve patients' quality of life, mental health, and rehabilitation efficacy. Therefore, the formation of peer support groups led by volunteers or family members should be encouraged to reduce patients' psychological barriers.

Higher social support positively impacts the quality of life of elderly stroke patients. Ji et al[34] have shown that social support from caregivers, family members, and friends can improve mental health, and is essential for improving treatment outcomes and adherence to rehabilitation training in stroke patients. This study found that most of the patients preferred to receive care and support from family members rather than from other sources of support. This may be due to traditional concepts, such as their unwillingness to increase the burden on other relatives and friends, coupled with insufficient social security resources for patients residing in rural areas where there may be low service capacity in primary healthcare organizations. This can result in a lack of social support other than that provided from family, which is not conducive to health recovery and may decrease quality of life. Therefore, the establishment of social support from outside the family should be advocated, including increasing volunteer medical and nursing service teams, accelerating the construction of social activities in rural areas, upgrading the level of primary medical care, and encouraging the social participation of elderly stroke patients to improve their quality of life in the short- and long-term.

Limitations

Despite the results elucidating the potential factors affecting the functional ability of elderly patients after stroke, this study had some limitations. First, the range of participants recruited for this qualitative interview study was limited to a single organization, thus limiting the applicability of the findings. Second, the researcher's perspectives may have influence on the results of the data analysis. We took this into account and therefore chose different interviewers and data analysers, possibly avoiding a certain amount of subjective influence. Finally, owing to the need for interviews, we selected patients who were conscious and able to communicate independently. We did not include patients with impaired consciousness, which may have led to a selection bias. For such patients, future studies can include caregivers as samples for further exploration. Further large-scale, multi-center studies incorporating many levels of patients, should be undertaken for more in depth analysis.

Conclusion

The varying degrees of functional ability in elderly stroke patients depend on the current stage of the disease, their health status, and their attitudes and acceptance of restoring health after stroke. A service model of multidisciplinary teamwork should be established to implement the whole process case management mode of "nutrition+psychology+rehabilitation" in the hospital, and the "Internet plus nursing service" mode of the whole course health platform can be implemented when discharged. Therefore, the continuity of in-hospital and home-based rehabilitation can be guaranteed and the patient's various functions can be maximally recovered. Additionally, the nursing team can assess the patient based on the ICF concept to enhance a comprehensive understanding of the patient, thus facilitating health education for the patient, which will improve patient knowledge of the disease. We encourage healthcare organisations at all levels to provide maximum psychological support for patients to alleviate negative emotions, which may improve compliance with rehabilitation, and promote the formation and maintenance of healthy behaviors.

Data Sharing Statement

The data relevant to this study will be made available by the corresponding author.

Ethics Approval Statement

This study was granted by the Ethics Committee of the First Affiliated Hospital of the Wannan Medical College, China.

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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 in 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 declare that they have no conflicts of interest in this work.

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