Current status and factors influencing readiness to return to work among young and middle-aged stroke patients in China

Ziwei Liu
Institute of Nursing and Health, Henan University
Jiaxin Li
Institute of Nursing and Health, Henan University
Fangli Liu
Institute of Nursing and Health, Henan University
Ningxiao Guan
Institute of Nursing and Health, Henan University
Ye Li
Institute of Nursing and Health, Henan University
Yu Zhang
Institute of Nursing and Health, Henan University
Linlin Hou
Institute of Nursing and Health, Henan University
Qiuhuan Jiang (qiuhuan1890@126.com)
Henan Provincial People's Hospital

Article

Keywords: young and middle-aged people, stroke, return to work, readiness, influencing factors

Posted Date: December 2nd, 2022

DOI: https://doi.org/10.21203/rs.3.rs-2311998/v1

Additional Declarations: No competing interests reported.

Version of Record: A version of this preprint was published at Scientific Reports on February 3rd, 2024.
See the published version at https://doi.org/10.1038/s41598-024-53262-2.

Abstract

Objectives: Stroke is affecting an increasing number of individuals of working age, and accurate assessment of the readiness to return to work can help to determine the timing of return to work and facilitate an early return to society. The objective of this study was to investigate the current state of readiness to return to work and the factors influencing it among young and middle-aged stroke patients in China.

Materials & Methods: A sample of young and middle-aged stroke patients hospitalized in a tertiary hospital in Henan Province between December 2021 and May 2022 were included in this study. A general information questionnaire and the Readiness to Return to Work Scale, Social Support Rating Scale, Stroke Rehabilitation Self-Efficacy Scale, and Fatigue Severity Scale were administered to the patients.

Results: Of the 203 patients successfully surveyed, 60 (29.6%) were in the pre-intention stage, 35 (17.2%) in the intention stage, 81 (39.9%) in the action-readiness-self-assessment stage, and 27 (13.3%) in the action-readiness-action stage. A logistic regression analysis showed that education level, monthly income, time to start rehabilitation exercise, social support, rehabilitation self-efficacy, and fatigue severity were the main factors affecting the readiness of young and middle-aged stroke patients to return to work.

Conclusion: The readiness of young and middle-aged stroke patients to return to work needs to be increased further. Healthcare professionals should consider the influencing factors of readiness to return to work and design targeted intervention programmes to facilitate successful return to work and normal life.

1 Introduction

Stroke is a group of acute cerebrovascular diseases characterized by cerebral blood flow interruption due to cerebral vascular rupture or obstruction, leading to loss of neurological function as the main clinical manifestation.[1] It is characterized by high morbidity, mortality, and recurrence rates,[2] and it is affecting an increasingly younger population, particularly in developing countries.[3,4] According to global statistics, about 31% of patients with stroke have an onset age of < 65 years, and patients aged under 35 years account for 9.77% of the total number of patients.[5,6] Data show that young and middle-aged patients in China account for 33% of all stroke patients and this proportion is gradually trending upwards, indicating that an increasing number of individuals of working age are affected by stroke.[7] Young and middle-aged people are the main constituents of the social labour force and are at an important stage of their career. They are unable to return to work due to illness and disability, which has a great impact on their quality of life and self-esteem.[8] At the same time, the loss of productivity of patients is associated with heavy economic burden to the family and wider society.[9]

Work is an important way for individuals to realize their value and meet their economic needs. It can help individuals participate in more social activities, establish interpersonal relationships, develop skills, find the meaning of life, meet social needs, and promote physical and mental health.[10] Studies have found that returning to work can also improve patients' physical function and quality of life, and the initial step of returning to work is to determine patients' psychological readiness for returning to work.[11]

Readiness to return to work refers to the readiness of patients to return to work after leaving due to illness, and it is a key indicator of the level of rehabilitation and recovery after stroke.[12] The level of readiness to return to work can predict the work participation status of patients after recovery, and accurate measurement of the readiness to return to work can help patients gain an appreciation of the timing of their return to work; this can help avoid the negative impact of a late return to work on their own professional role and economic recovery.[13] Existing studies on stroke patients have mainly focused on patients' self-reported return-to-work status, and there are few reports on the level of preparation for return to work and related influencing factors. Thus, this study aimed to investigate the current situation regarding return-to-work readiness of young and middle-aged stroke patients and analyse the influencing factors, in order to provide a reference for the development of intervention programs to promote return to work and return to society in young and middle-aged stroke patients.

2 Materials & Methods

2.1 Participants and study design

This cross-sectional descriptive correlational study was conducted between December 2021 and May 2022 in a tertiary care hospital in Henan, China. Participants were recruited through convenience sampling. The inclusion criteria were patients who: (i) Met the World Health Organization's definition of young and middle-aged people aged 18–59 years[14]; (ii) Were diagnosed with stroke on imaging; (iii) Did not have mental illness or cognitive impairment; (iv) Were involved in work before the illness and have not retired. Patients with a combination of other serious illnesses or other cerebrovascular disease and the presence of severely impaired vision and hearing were excluded from this study. Subjects provided written informed consent.

According to the cross-sectional sample size survey formula, $N=(Z_{1-\alpha/2}+Z_{\beta})^2/[P_1(1-P_1)]b^2$,[15] $Z_{1-\alpha/2}=1.96$ and $Z_{\beta}=1.28$; furthermore, the literature review yielded P_1 0.507 and b 0.51,[16] which when incorporated into the formula yielded: N =162. In total, 203 young and middle-aged stroke patients were included in this study.

2.2 Research instruments

2.2.1 Self-generated general information questionnaire

This scale was designed by the researcher and covered socio-demographic information such as age, gender, place of residence, housing status, education level, marital status, monthly income, and mode of payment for medical care. Disease-related information included the type of stroke, whether it was the first-onset stroke, the timeframe of the diagnosis, at what point rehabilitation exercises were started, and whether any residual functional impairment existed. Work-related information collected included the type of occupation and nature of work prior to illness.

2.2.2 Return to Work Readiness Scale (RRTW)

Developed by Franche et al.[17] and translated and revised by Cao,[18] the RRTW is mainly used to evaluate the level of a patient's readiness to return to work. The scale includes 6 dimensions and 22 items and is divided into two parts. The first part comprises 4 dimensions (13 items in total) for patients who have not returned to work, including a pre-intention dimension, intention dimension, action preparation-self-assessment, and action preparation-behaviour. In the second part, there are two dimensions (9 items in total) for patients who have returned to work, namely, uncertain maintenance and active maintenance. Each item is scored by on a five-point Likert scale. The total score is not set in the scale, and the sum of items in each dimension is the score of this dimension. The dimension with the highest score represents the preparation stage of the patient; the higher the stage, the higher the level of readiness of a patient to return to work, and the more fully prepared they are to return to work. If the final score of the two dimensions is the same, the respondent will be classified as the stage at a low level in the two dimensions according to the patient's filling results. If three or more dimensions with the same score are obtained simultaneously, the questionnaire will be deemed invalid. This study targeted patients who did not return to work by using only the first part of the scale. The Cronbach's α coefficient of the questionnaire in the formal investigation of this study was 0.728.

2.2.3 Social Support Rate Scale (SSRS)

Formulated by Xiao[19] in 1994, the SSRS includes 10 items spread across three dimensions: objective support (items 2, 6, and 7), subjective support (items 1, 3, 4, and 5), and utilization of social support (items 8, 9, and 10). The total score ranged from 22–66, with higher scores indicating higher levels of social support. Since its establishment, the SSRS has been widely used in 20 disciplines and majors in China, and the associated Cronbach's α coefficient was 0.941.

2.2.4 Stroke Self-Efficacy Questionnaire (SSEQ)

Developed by Jones et al.,[20] Li et al.[21] translated the SSEQ into Chinese and applied it to patients with first-episode stroke to measure functional performance and self-management confidence levels during the recovery period of stroke. The Cronbach's α coefficient of the scale was 0.969. The scale has 13 items in total, divided into two dimensions: activity function (8 items) and self-management (5 items). A Likert 10-level scoring method is used. The higher the total score, the higher the rehabilitation self-efficacy of the tested patients. The Cronbach's α coefficient of the questionnaire in the formal investigation of this study was 0.947.

2.2.5 Fatigue Severity Scale (FSS)

Compiled by Krupp et al.[22] in 1989, Wu and Wang[23] translated the FSS into Chinese and applied it to evaluate the fatigue severity of stroke patients. The scale is a single dimension including 9 items, all of which are scored using a Likert 7-level score. The total score is the average or sum of the 9 items. A FSS score of ≥4 or ≥36 indicates fatigue, and the higher the value, the more serious the degree of fatigue. The Chinese version has good reliability and validity, with a Cronbach's α coefficient of 0.932 and intra-group correlation coefficient of 0.742,[24] indicating that the FSS is a reliable and effective tool for measuring post-stroke fatigue. In this study, the Cronbach's α coefficient of the questionnaire was 0.938.

2.3 Data collection procedure

Regarding the pre-designed questionnaire, Questionnaire Star software was used to fill in the questionnaire online or distribute the questionnaire in person to collect data. The purpose and benefits of the study were explained to the patients before filling in the questionnaire, and the patients were asked to complete in the questionnaire themselves as much as possible. If the patient's education level, physical function, and other aspects could not be filled in by the patient, the patient's family members or researchers were allowed to assist them to complete the questionnaire. All questionnaires were collected and checked by researchers, and those with incomplete information were excluded. A total of 218 questionnaires were distributed and 203 were recovered, with an effective recovery rate of 93.1%.

2.4 Statistical analysis

SPSS 26.0 software (IBM Corp, Armonk, NY, USA) was used for the statistical analysis and processing of all data. Means ± standard deviations were used to describe the measures, and counts were expressed as number of cases and rates (%); univariate analyses were conducted using rank sum tests such as the Mann-Whitney U test or the Kruskal-Wallis H test: Spearman's correlation analysis was used to explore the relationship between readiness to return to work and self-efficacy, social support, and fatigue severity scales and the dimensions. Ordered multiple logistic regression was used for multifactor analysis, with $P<0.05$ being considered a statistically significant difference.

2.5 Ethical approval

The study was approved by Ethics Committee of the College of Nursing and Health of Henan University (HUSOM2021-288), all methods were carried out in accordance with relevant guidelines and regulations. All patients in the study gave informed consent before the questionnaire began

3 Results

3.1 Sociodemographic characteristics of the participants

Of the 203 patients surveyed, more than half were male (60.1%), most were aged 50–59 years (42.4%), and 29.6% had a secondary school level of education. In terms of monthly income, 39.9% of the patients

had a monthly income of RMB 3,000–4,999. The majority of patients had an ischaemic-type stroke, 54.7% had experienced their first stroke, and only 7.4% had a history of stroke longer than 3 years. In addition, more than half of the patients (n=128, 63.1%) had the occupation type of knowledge worker. The socio-demographic characteristics of the participants are shown in Table 1.

Table 1. Sociodemographic characteristics of the participants (n = 203)

Variables		n (%)
Gender	Male	122 (60.1%)
	Female	81 (39.9%)
Age (years)	18–29	16 (7.9%)
	30–39	45 (22.2%)
	40–49	56 (27.6%)
	50–59	86 (42.4%)
Habitation	Town	111 (54.7%)
	Rural	92 (45.3%)
Living alone	Yes	36 (17.7%)
	No	167 (82.3%)
Educational level	Primary and below	11 (5.4%)
	Middle school	60 (29.6%)
	High school	35 (17.2%)
	Associate College	41 (20.2%)
	Bachelor and above	56 (27.6%)
Marital status	Married	162 (79.8%)
	Unmarried	24 (11.8%)
	Other situations	17 (8.4%)
Monthly income (RMB)	1,000	10 (4.9%)
	1,000–2,999	66 (32.5%)
	3,000–4,999	81 (39.9%)
	5,000	46 (22.7%)
Types of medical payments	Town/employee medical insurance	91 (44.8%)
	New rural cooperative insurance	102 (50.2%)
	Self-financing	10 (4.9%)

Stroke type	Ischaemic stroke	94 (46.3%)
	Intracerebral haemorrhage	68 (33.5%)
	Mixed type	41 (20.2%)
First attack	Yes	111 (54.7%)
	No	92 (45.3%)
Years since stroke	≤1 year	158 (77.8%)
	1–3 years	30 (14.8%)
	>3 years	15 (7.4%)
Time to start rehabilitation exercises	<7 days	92 (45.3%)
	7–15 days	56 (27.6%)
	>15 days	55 (27.1%)
Functional impairment	Yes	75 (36.9%)
	No	128 (63.1%)
Occupation type	knowledge worker	128 (63.1%)
	Manual worker	75 (36.9%)
Nature of occupation	Individual farmers	102 (50.2%)
	Administrative, corporate, and institutional units	101 (49.8%)

3.2 Distribution of the dimensions of readiness to return to work among young and middle-aged stroke patients

The results showed that 60 patients (29.6%) in this group were in the pre-intention stage, 35 (17.2%) in the intention stage, 81 (39.9%) in the action readiness-self-evaluation stage, and 27 (13.3%) in the action readiness-behaviour stage (Table 2).

Table 2. Distribution by dimension (n=203)

Dimension	n (%)	Sequence
Pre-intention	60 (29.6%)	2
Intention	35 (17.2%)	3
Action readiness-self-evaluation	81 (39.9%)	1
Action readiness-behaviour	27 (13.3%)	4

3.3 Demographic univariate analysis of influences on readiness to return to work in young and middle-aged stroke patients

The results of the univariate analysis showed that place of residence, education level, monthly income, mode of payment of medical expenses, year of diagnosis, time of starting rehabilitation exercises, type of occupation, and nature of occupation had an impact on the readiness to return to work of young and middle-aged stroke patients, with statistically significant differences (p<0.05), as shown in Table 3.

Table 3. Univariate analysis

Variables		P	I	E	B	H/Z	*P*
Gender	Male	32	23	45	22	-1.607	0.108
	Female	28	12	36	5		
Age (years)	18–29	8	1	7	0	3.197	0.362
	30–39	12	5	24	4		
	40–49	12	17	16	11		
	50–59	28	12	34	12		
Habitation	Town	41	14	47	9	-2.216	0.027
	Rural	19	21	34	18		
Living alone	Yes	6	5	21	4	-1.702	0.089
	No	54	30	60	23		
Educational level	Primary and below	5	5	0	0	35.589	0.01
	Middle school	8	16	22	14		
	High school	6	4	21	4		
	Associate College	9	4	20	8		
	Bachelor and above	32	5	18	1		
Marital status	Married	50	28	60	24	0.399	0.819
	Unmarried	7	3	13	1		
	Other situations	3	4	8	2		
Monthly income (RMB)	1,000	5	0	5	0	14.688	0.002
	1,000-2,999	13	19	23	11		
	3,000-4,999	17	11	41	12		
	5,000	25	5	12	4		
Types of medical payments	Town/employee medical insurance	41	9	33	8	12.061	0.002
	New rural cooperative insurance	19	24	41	18		
	Self-financing	0	2	7	1		
Stroke type	Ischaemic stroke	34	17	32	11	3.917	0.141
	Intracerebral haemorrhage	17	11	28	12		
	Mixed type	9	7	21	4		

First attack	Yes	35	14	45	17	-0.474	0.636
	No	25	21	36	10		
Years since stroke	≤1 year	46	29	64	19	8.397	0.015
	1–3 years	14	3	9	4		
	>3 years	0	3	8	4		
Time to start rehabilitation exercises	<7 days	45	8	36	3	23.602	0.01
	7–15 days	5	17	22	12		
	>15 days	10	10	23	12		
Functional impairment	Yes	23	13	29	10	-2.360	0.814
	No	37	22	52	17		
Occupation type	knowledge worker	34	8	69	17	-3.175	0.001
	Manual worker	26	27	12	10		
Nature of occupation	Individual farmers	22	25	37	18	-1.682	0.093
	Administrative, corporate, and institutional units	38	10	44	9		

Note: P = Pre-intention dimension; I = Intention dimension; E = Action readiness-self-evaluation dimension; B = Action readiness-behaviour dimension

3.4 Correlation between readiness to return to work and social support, stroke rehabilitation self-efficacy, and fatigue severity in young and middle-aged stroke patients

The results of the study showed that readiness to return to work among young and middle-aged stroke patients was positively correlated with social support and all dimensions, and positively correlated with mobility and self-management in stroke rehabilitation self-efficacy, and negatively correlated with severity of fatigue, all with statistically significant differences ($p< 0.01$; see Table 4 for details).

Table 4. Relevance analysis

Variables	Readiness to return to work (r)	*P*
Social support	0.837	0.001
Objective support dimension	0.672	0.001
Subjective support dimension	0.742	0.001
Support utilization dimension	0.742	0.001
Recovery self-efficacy	0.760	0.001
Event function dimension	0.706	0.001
Self-management dimension	0.657	0.001
Fatigue severity	-0.554	0.001

3.5 Multifactorial analysis of readiness to return to work in young and middle-aged people with stroke

The stage of readiness to return to work in young and middle-aged stroke patients was used as the dependent variable (pre-intentional stage = 1, intentional stage = 2, behavioural readiness-assessment stage = 3, behavioural readiness-action stage = 4, with behavioural readiness-action stage as the reference), and the statistically significant individual variables in the univariate analysis and social support, rehabilitation self-efficacy and fatigue severity as independent variables were used in a multivariate logistic regression analysis. The type of health insurance was transformed into a dummy variable as it was an unordered multicategorical variable. In this study, the parallel line test P > 0.05 and the parallel line hypothesis was valid for the use of ordered multicategorical logistic regression analysis. The results of the regression analysis showed that education level, monthly income, time to start rehabilitation exercises, social support, rehabilitation self-efficacy, and severity of fatigue were the main factors affecting the readiness to return to work of young and middle-aged stroke patients (Table 5).

Table 5. Multifactor analysis

Variables	*B*	*S.E.*	*Wald*	*P*	*OR*	95% CI	
						Low	Top
Educational level	1.564	0.660	5.618	0.018	4.778	0.271	2.857
Monthly income	1.349	0.645	4.373	0.037	3.854	0.085	2.613
Time to start rehabilitation exercises	-1.387	0.659	4.43	0.035	0.250	-2.679	-0.095
Social support	0.285	0.037	59.310	0.001	1.330	0.212	0.358
Recovery self-efficacy	0.050	0.013	15.590	0.001	1.051	0.025	0.075
Fatigue severity	-0.111	0.036	9.510	0.002	0.895	-0.182	-0.040

4 Discussion

The results of this study showed that there were 95 patients in the pre-intention and intention stages, accounting for 46.8% of the total number of patients, which is similar to the research results reported by Zhao and Wang[25] (52.9%) and Chen et al.[26] (47.06%), indicating that most patients did not have the intention of returning to work at the time of the survey. Patients in the pre-intention stage do not perceive the benefits of returning to society and work, are satisfied with the status quo, do not want to make any changes, are unable to perceive the barriers to returning to work, and have very low self-efficacy. Although patients in the intention stage have somewhat realized the benefits of returning to work, they have also begun to perceive the obstacles encountered in the process of this behaviour, and are in the ambivalent psychology of weighing the obstacles and benefits of returning to work. Behavioural change can only occur when the patient believes that the barriers to re-entry are offset by the benefits of returning to work. Based on this, medical staff should first increase patients' understanding of their own disease and analyse the possible problems and benefits of not returning to work for patients. Secondly, examples of successful return to work should be described to patients; through this, the power of example is used to strengthen self-worth, improve self-efficacy and confidence in returning to work, so as to help patients return to work smoothly.

The survey shows that education level is the main influencing factor of the readiness of young and middle-aged stroke patients to return to work. This may be because well-educated people have higher expectations for disease rehabilitation, are more able to express their needs for medical care and subsequent rehabilitation, and have better compliance behaviour.[27] In addition, patients with higher education levels are more likely to engage in mental work and jobs with higher pay, thus having stable job security.[28] However, patients with low education are mainly engaged in manual labour, and their income is not fixed. Therefore, they cannot return to work smoothly after stroke. Patients with a higher monthly income (RMB >5,000) have higher readiness to return to work, which is consistent with previous research results[27] and is possibly because those with a higher income have higher socioeconomic status, greater job security, and better welfare security as well as employment terms and conditions. Moreover, people with higher incomes have a better economic foundation and can afford expensive medical expenses and enjoy more elaborate rehabilitation services. Patients who started rehabilitation exercise earlier (<7 days) had higher levels of readiness to return to work. The reason may be that early rehabilitation is a critical period for promoting plasticity of neural function, and early rehabilitation exercise is conducive to improving the cerebral blood supply of patients and the compensatory repair of tissues around lesions, thus promoting the recovery of the limb motor function of patients.[29] A retrospective investigation showed that the professional support and participation of occupational physicians in the early stages of stroke were positive prognostic factors for patients to return to work,[30] indicating that the timing and timeliness of rehabilitation exercise are also important factors to ensure that patients can return to work earlier. Therefore, medical staff should pay particular attention to the needs of stroke patients with low income and low education levels to facilitate their return to work, and provide them with guidance in terms of re-employment, medical security, and welfare policies in an easy-to-understand way. In addition,

when formulating intervention measures, it is necessary to intervene in the rehabilitation exercise of stroke patients as early as possible. Seizing the opportunity during the optimal time window will facilitate the recovery of physical function.

The results of this study indicate that the higher the amount of social support, the higher the stage of a patient's readiness to return to work. Young and middle-aged stroke patients of working age mainly need support from their families, work units, and medical institutions.[31] Emotional support from relatives can avoid the breeding of patients' negative emotions, reduce the internal emotional damage caused by the disease, promote the evolution of the disease in a good direction, and then improve the level of returning to work.[32] Given that social support is a controllable influencing factor, clinical medical staff should pay attention to mobilizing a patient's social support system, strengthen the interaction and cooperation between the medical system, community, work unit, and patient's family, and help patients to achieve their own work value to the maximum extent through multi-disciplinary cooperation and efforts.

Our results showed that the level of a patient's self-efficacy was positively correlated with the readiness of the patient to return to work; that is, the higher the level of self-efficacy, the stronger the willingness of the patient to return to work, and the higher the readiness of the patient to return to work. The overall score (77.20±22.53)among the 203 patients in this study was at a low level, which was consistent with the investigation results of Liang et al.[33] This indicates that patients generally lack confidence in their own rehabilitation and do not perceive the benefits of returning to work and the seriousness of non-compliance. It is difficult to keep a positive attitude towards one's own condition after illness, and it is easier to escape from the difficulties and obstacles encountered in the preparation process of returning to work, leading to further obstruction to returning to work. Good self-efficacy can improve a patient's exercise compliance, self-management ability, daily activity ability, and memory level, and then improve the rehabilitation outcome.[34] Studies have shown that encouragement from others, the experience of patients who have returned to work, and the sharing of social welfare policies can all help to promote a change in a patient's current state, improve a patient's positive beliefs, and arouse the determination of positive behaviour change.[35] Therefore, when formulating intervention measures, it is necessary to pay attention to the psychological intervention of patients and correct erroneous disease cognition. Nurses should carry out targeted health education for patients at all stages of rehabilitation treatment, enhance disease knowledge, let patients face their disease and future life with dignity and optimism, and help improve their confidence about returning to work.

Post-stroke fatigue is a common and long-term complication after stroke, and its prevalence ranges from 25–85%.[36] The results of this study showed that 59.6% of patients had post-stroke fatigue, which was a moderately high level compared with the above-reported prevalence in the literature.[37] Studies have shown that patients with post-stroke fatigue have a lower chance of returning to paid work and have a significantly reduced workload after returning to work.[38,39] On the one hand, after fatigue symptoms occur, patients will continue to feel inadequate physical strength, burnout, or difficulty in maintaining daily activities, thus hindering the rehabilitation process of patients.[40] On the other hand, fatigue can

cause anxiety, depression, anger, and other negative emotions, further reducing the ability to return to work, prolong the return to work time, or reduce the return-to-work rate.[41] In addition, a survey found that 30% of patients' relatives regarded fatigue after stroke as a manifestation of patients' laziness, which led to family conflicts and aggravated patients' negative emotions.[42] This indicates that the influence of fatigue on patients after stroke is not only limited to the ability to work, but it also affects the mental health of patients and hinders the process of returning to society and work. Therefore, medical staff should add strategies to cope with post-stroke fatigue into the content about returning to work, carry out fatigue management for patients after stroke in the recovery period, and give interventions such as mindfulness-based stress reduction, sleep management, and exercise to improve fatigue, so as to improve the level of patients' readiness to return to work.

Our study has some limitations. First, the convenience sample was only recruited from a single tertiary hospital in Zhengzhou, China. Therefore, our study does not represent the various ethnic and racial populations in China. Second, we used a cross-sectional study design that could not establish a causal relationship between potential risk factors and readiness to return to work. In the future, the relationship between the readiness to return to work and other factors of young and middle-aged stroke patients can be further explored by increasing the sample size, expanding the survey area, and combining qualitative and quantitative methodologies.

Conclusion

The return-to-work level of young and middle-aged stroke patients needs to be further improved, and is affected by the patients' self-efficacy, social support, degree of fatigue, education level, monthly income, and the time taken to start rehabilitation exercises. It is suggested that primary health care institutions and rehabilitation service institutions should pay more attention to young and middle-aged stroke patients, improve the assessment, and discover the needs of patients in a timely manner during the process of returning to work. It is important to fully mobilize patients' families, colleagues, employers, society, and medical and healthcare personnel from both a holistic and systematic perspective, in order to construct a multi-dimensional intervention strategy, so as to achieve the goal of a healthy and high-quality return to work for stroke patients.

Declarations

Funding information

Scientific and technological key project in Henan Province, Grant/Award Number: SBGJ202102001.

Acknowledgment

The authors thank all the patients for participating in the study. This work was supported by the Scientific and Technological Key Project in Henan Province [SBGJ202102001].

Conflict of interest

The authors have declared no conflict of interest for this article.

Author contributions

ZL contributed to manuscript writing. ZL and JL were involved in the conception of the research project. NG and YL collected the data. JL and LH,YZ performed the statistical analysis. LF and QJ revised the manuscript, and all other authors reviewed and commented on the manuscript.

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

References

1. Schulz CH, Godwin KM, Hersch GI, et al.Return to work predictors of stroke survivors and their spousal caregivers. Work. 2017;57(1):1–14. doi:10.3233/WOR-172544
2. Xie W, Zhou P, Sun Y, et al.Protective Effects and Target Network Analysis of Ginsenoside Rg1 in Cerebral Ischemia and Reperfusion Injury: A Comprehensive Overview of Experimental Studies. Cells. 2018;7(12):270. doi:10.3390/cells7120270
3. Sun X,Wang W.A nationwide epidemiological sample survey on cerebrovascular disease in China. Chin J Contemp Neurol Neurosurg. 2018;18(02):83–88.
4. Maigeng Z, Haidong W, Xinying Z, et al.Mortality, morbidity, and risk factors in China and its provinces, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet. 2020;394(10204):1145–1158. doi:10.1016/S0140-6736(19)30427-1
5. Feigin VL, Forouzanfar MH, Krishnamurthi R, et al.Global and regional burden of stroke during 1990–2010: findings from the Global Burden of Disease Study 2010. Lancet. 2014;383 (9913):245–255. doi:10.1016/s0140-6736(13)61953-4
6. Kisa A, Kisa S, Collaborators G S.Global, regional, and national burden of stroke and its risk factors, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. Lancet Neurol. 2021;20(26):795–820. doi:10.1016/S1474-4422(21)00252-0
7. Ning X, Sun J, Jiang R, et al.Increased Stroke Burdens Among the Low-Income Young and Middle Aged in Rural China. Stroke. 2016;48(1):77–83. doi:10.1161/STROKEAHA.116.014897
8. Chen M, Wang S, Feng X, et al. Risk factors for stroke in high-risk populations of different ages and genders. Pract Prevent Med. 2020;27(04):451–454.
9. Brannigan CG, R;Walsh, Me; Horgan, Nf;.Barriers and facilitators associated with return to work after stroke: a qualitative meta-synthesis. Disabil Rehabil. 2017; 39(3):211–222. doi:10.3109/09638288.2016.1141242

10. Braathen TN, Brage S, Tellnes G, et al.A Prospective Study of the Association Between the Readiness for Return to Work Scale and Future Work Participation in Norway. J Occup Rehabil. 2014;24(4):650–657. Doi:10.1007/s10926-013-9497-y
11. Bonner B, Pillai R, Sarma PS, et al.Factors predictive of return to work after stroke in patients with mildmoderate disability in India. Eur J Neurol. 2016;23(3):548–553. doi:10.1111/ene.12887
12. Hartke RJ, Trierweiler R, Bode R.Critical Factors Related to Return to Work After Stroke: A Qualitative Study. Top Stroke Rehabil. doi:2011;18(4):341–351. 10.1310/tsr1804-341
13. Mansfield E, Stergiou-Kita M, Cassidy JD, et al.Return-to-work challenges following a work-related mild TBI: The injured worker perspective. Brain Injury. 2015;29(11):1362–1369. doi:10.3109/02699052.2015.1053524
14. Xiao L, Gao Y, Zeng K, et al.Perceived participation and its determinants among young and middle-aged stroke survivors following acute care one month after discharge.Disabil Rehabil. 2021;43(5):648–656. doi:10.1080/09638288.2019.1636314
15. Gao Y, Zhang J.Determination of Sample Size in Logistic Regression Analysis. J Evid Based Med. 2018;18(2):122–124.
16. Zhao M.Study on readiness and maintenance for return-to-work and construction of predication model among young and middle-age patients after stroke. Qingdao University. 2021.
17. Franche RL, Corbière M, Lee H, et al.The Readiness for Return-To-Work (RRTW) scale: Development and Validation of a Self-report Staging Scale in Lost-time Claimants with Musculoskeletal Disorders. J Occup Rehabil. 2007;17(3):450–472. doi:10.1007/s10926-007-9097-9
18. Cao HL.The Chinese Localization of the Readiness for Return to work Scale and the Application in Breast Cancer Patients. Zhengzhou University. 2018.
19. Xiao S. Theoretical basis and research application of Social Support Rating Scale. Clin Psychol Med. 1994;(02):98–100.
20. Jones F, Partridge C, Reid F.The Stroke Self-Efficacy Questionnaire: measuring individual confidence in functional performance after stroke.J Clin Nurs. 2010;17(7):244–252. doi:10.1111/j.1365-2702.2008.02333.x
21. Li H, Fang L, Bi R, et al.The Reliability and validity of chinese version of Stroke Self-Efficacy Questionnaire. Chin J Nurs. 2015;50(07):790–794.
22. Krupp LB, Larocca NG, Muir-Nash J, et al.The fatigue severity scale. Application to patients with multiple sclerosis and systemic lupus erythematosus. Arch Neurol. 1989;46(10):1121–1123. doi:10.1001/archneur.1989.00520460115022
23. Wu C, Wang D. Clinical application and assessment of the Chinese version of Fatigue Severity Scale in stroke patients. Chin J Phys Med Rehabil. 2007;29(09):608–611.
24. Ozyemisci-Taskiran O, Batur EB, Yuksel S. et al.Validity and reliability of fatigue severity scale in stroke. Top Stroke Rehabil. 2019;26(2):122–127. doi:10.1080/10749357.2018.1550957

25. Zhao ML, Wang AM.The Readiness for Return-to-work and Its Associated Factors of Young and Middle-age Non-returned Patients after Stroke[J].Chinese And Foreign Medical Research,2021, 19 (15): 150–153.
26. Chen Q, Guo Y, Zhou J.Current status of returning to work and its influencing factors among young and middle-aged patients with stroke. Pract Prevent Med. 2021;28(06):699–702.
27. Trygged S, Ahacic K, Kåreholt I.Income and education as predictors of return to working life among younger stroke patients. BMC Public Health. 2011;11(1):742–745. doi:10.1186/1471-2458-11-742
28. Edwards JD, Kapoor A, Linkewich E, et al.Return to work after young stroke: A systematic review. Int J Stroke. 2018;13(3):243–256. doi:10.1177/1747493017743059
29. Yen HC, Jeng JS, Chen WS, et al.Early mobilization of mild-moderate intracerebral hemorrhage patients in a stroke center: a randomized controlled trial. Neuroreha Neural Re. 2020;34(1):72–81. doi:10.1177/1545968319893294
30. Doucet T, Muller F, Verdun-Esquer C.Returning to work after a stroke: a retrospective study at the Physical and Rehabilitation Medicine Center La Tour de Gassies.Ann Phys Rehabil Med. 2012;55(2):112–127. doi:10.1016/j.rehab.2012.01.007
31. Arwert HJ, Schults M, Meesters J, et al.Return to Work 2–5Years After Stroke: A Cross Sectional Study in a Hospital-Based Population. J Occup Rehabil. 2017;27(2):239–246. doi:10.1007/s10926-016-9651-4
32. White C, Green RA, Ferguson S, et al.The Influence of Social Support and Social Integration Factors on Return to Work Outcomes for Individuals with Work-Related Injuries: A Systematic Review. J Occup Rehabil. 2019;29(1):636–659. doi:10.1007/s10926-018-09826-x
33. Liang LL, Xu MY, Wang LJ, et al.Correlation between rehabilitation self-efficacy and activities of daily living, post traumatic growth in middle and young-age patients with stroke. Chongqing Med J ,2018;47(30):3928–3932.
34. Lo SHS, Chang AM, Chau JPC.Stroke Self-Management Support Improves Survivors' Self-Efficacy and Outcome Expectation of Self-Management Behaviors. Stroke. 2018;49(3):758–760. doi:10.1161/STROKEAHA.117.019437
35. Schwarz B, Claros-Salinas D, Streibelt M.Meta-Synthesis of Qualitative Research on Facilitators and Barriers of Return to Work After Stroke. J Occup Rehabil. 2018;28(1):28–44. doi:10.1007/s10926-017-9713-2
36. Aali G, Drummond A, Nair RD, et al.Post-stroke fatigue: A scoping review. F1000 Res. 2020;9(2):1–24. doi:10.12688/f1000research.22880.2
37. Etuknwa A, Daniels K, Eib C.Sustainable Return to Work: A Systematic Review Focusing on Personal and Social Factors. J Occup Rehabil. 2019;29(4):679–700. doi:10.1007/s10926-019-09832-7
38. Andersen G, Christensen D, Kirkevold M, et al.Post-stroke fatigue and return to work: a 2-year follow-up[J].Acta Neurol Scand. 2012;125(4):248–253. doi:10.1111/j.1600-0404.2011.01557.x
39. Pihlaja R, Uimonen J, Mustanoja S, et al.Post-stroke fatigue is associated with impaired processing speed and memory functions in first-ever stroke patients. J Psychosom Res. 2014;77(5):380–384.

doi:10.1016/j.jpsychores.2014.08.011

40. Monica M, Acciarresi M.Poststroke Fatigue. Stroke. 2019;50(2):1927–1933. doi:10.1161/STROKEAHA.119.023552
41. Rutkowski NA, Sabri E, Yang C.Post-stroke fatigue: A factor associated with inability to return to work in patients < 60 years-A 1-year follow-up. PLoS One. 2021;16(8):e0255538. doi:10.1371/journal.pone.0255538
42. Norrie J, Heitger M, Leathem J, et al.Mild traumatic brain injury and fatigue: A prospective longitudinal study. Brain Injury. 2010;24(13):1528–1538. doi:10.3109/02699052.2010.531687