Journal of Clinical and Nursing Research, 2024, Volume 8, Issue 11
http://ojs.bbwpublisher.com/index.php/JCNR
Online ISSN: 2208-3693
Print ISSN: 2208-3685

Application of Multidisciplinary Collaborative Interventions in the Early Rehabilitation of Patients with Hemorrhagic Stroke and Kinesiophobia

Lihua Zhang*, Yuping Jiang, Wei Zhang

Affiliated Second Hospital of Nantong University, Nantong First People's Hospital, Nantong 226000, Jiangsu Province, China

Corresponding author: Lihua Zhang, 2570354542@qq.com

Abstract: *Objective:* This study aims to explore the role of multidisciplinary collaborative interventions in the early rehabilitation of patients with hemorrhagic stroke and kinesiophobia. *Methods:* Using a convenience sampling method, 100 patients with hemorrhagic stroke and kinesiophobia admitted to the Department of Neurology at Nantong First People's Hospital between January 2022 and December 2023 were selected as subjects. Fifty patients admitted between January 2022 and January 2023 were assigned to the control group, while 50 patients admitted between February 2023 and December 2023 were assigned to the experimental group. The control group received conventional care, while the experimental group received multidisciplinary collaborative interventions provided by a team consisting of neurologists, rehabilitation therapists, psychological counselors, and nurses. The study evaluated the differences in emotional state (using the Hospital Anxiety and Depression Scale, HAD), kinesiophobia level (using the Tampa Scale for Kinesiophobia, TSK), functional recovery (using the modified Rankin Scale, mRS), and daily living abilities (using the Barthel Index, BI) before and after intervention. *Results:* After the intervention, the HAD scores in the experimental group were significantly lower than those in the control group ($P < 0.05$). The TSK scores in the experimental group were also significantly lower than in the control group ($P < 0.05$), while mRS and BI scores showed significant improvement compared to the control group ($P < 0.05$). *Conclusion:* Multidisciplinary collaborative interventions have significant effects in reducing kinesiophobia, promoting functional recovery, and improving the quality of life in patients with hemorrhagic stroke.

Keywords: Hemorrhagic stroke; Kinesiophobia; Multidisciplinary collaborative interventions; Early rehabilitation

Online publication: November 28, 2024

1. Introduction

Hemorrhagic stroke refers to non-traumatic bleeding caused by ruptured cerebral blood vessels, including intracerebral hemorrhage and subarachnoid hemorrhage, accounting for 20%–40% of all strokes [1]. In China, the proportion of hemorrhagic strokes reaches as high as 47.6% [2]. Stroke often leaves varying degrees of neurological deficits, and early rehabilitation has been evidence-based as the most effective method to reduce disability rates, making it the preferred rehabilitation approach for stroke patients [3]. Due to pain, fear of rebleeding, anxiety, and other reasons, stroke patients often avoid turning over, coughing, early mobilization, rehabilitation therapy, and exercise [4], which subsequently affects their recovery.

Kinesiophobia refers to a specific psychological phenomenon characterized by marked resistance and fear of movement due to fear of activity [5]. This concept was first applied to pain patients [6], and it has been shown that kinesiophobia is a more critical factor than pain in determining physical activity levels [7]. Research on kinesiophobia has been more extensive in postoperative patients, and in recent years, it has also been studied in other diseases. However, there is limited research on hemorrhagic stroke. Building on research from other disciplines, this study implemented multidisciplinary interventions for patients with hemorrhagic stroke and kinesiophobia, achieving favorable results.

2. Materials and methods

2.1. General information

Using a convenience sampling method, 100 patients with hemorrhagic stroke and kinesiophobia who met the inclusion criteria and were admitted to the Department of Neurology at Nantong First People's Hospital between January 2022 and December 2023 were selected as study subjects. General information is shown in **Table 1**.

Table 1. Comparison of general information between the two groups

Group	*n*	Gender		Age				Education level			Occupation		
		M	F	< 45	45–65	66–85	> 85	< PS	SS	> U	Unempl	Retd	Employ
Control	45	30	15	5	12	18	10	8	25	12	7	23	15
Experimental	45	28	17	6	14	14	11	6	22	17	6	25	14
χ^2 / Z	-	0.312		0.275				1.003			0.835		
P	-	0.652		0.863				0.825			0.785		

Abbreviations: M, male; F, female; PS, primary school; SS, secondary school; U, university; Unempl, unemployed; Retd, retired; Employ, employed.

Inclusion criteria: (1) Confirmed diagnosis of intracerebral hemorrhage or subarachnoid hemorrhage; (2) Presence of neurological deficits; (3) TSK-11 score indicating kinesiophobia [8]; (4) Informed consent provided and voluntary participation in the study.

Exclusion criteria: (1) Patients with impaired consciousness unable to cooperate; (2) Patients with severe organic diseases.

Informed consent forms were signed by all participants who met the inclusion and exclusion criteria.

2.2. Study methods

2.2.1. Formation of a multidisciplinary collaborative team

The multidisciplinary intervention team for kinesiophobia was led by the department chief and head nurse and included: one chief neurologist, one attending physician, one resident physician, one rehabilitation therapist (mid-level or above), one psychological counselor (mid-level or above), and 2–3 nurses (senior nurses with over five years of experience in neurology).

2.2.2. Development of the preliminary intervention plan

2.2.2.1. Literature review

Keywords such as "hemorrhagic stroke," "stroke rehabilitation," "TSK-11 scale," "kinesiophobia," "Hemorrhagic Stroke," "Kinesiophobia," and "Stroke Rehabilitation" were searched in major domestic and international databases. Filters included studies published in the past five years, in Chinese or English, and categorized as journal articles, theses, conference papers, guidelines, or consensus documents. Relevant information was extracted based on the objectives, methods, results, and conclusions of the literature to provide a theoretical basis for this study's plan design.

2.2.2.2. Joint plan development

(1) Neurologists: Develop treatment and pain/sedation (if necessary) protocols.

(2) Neurologists and rehabilitation therapists: Jointly develop early rehabilitation plans.

(3) Psychological counselors: Conduct psychological evaluations and interventions.

(4) Rehabilitation therapists and nurses: Guide and assess rehabilitation exercises.

(5) Nurses: Provide health education, collect and analyze data, and support intervention implementation.

(6) Head nurse: Coordinate the implementation of the plan and oversee progress.

A detailed diagram of the intervention process is shown in **Table 2** below.

Table 2. Intervention responsibilities and measures

Interveners	Intervention measures	Timing and frequency
Nurses	Use the TSK-11 scale to evaluate kinesiophobia, provide routine health education on diet and sleep, show educational videos, and guide family members in supporting and encouraging the patient. Collect all assessment scores and scales, collaborating with doctors, counselors, and therapists.	Post-48 hours after hemorrhage onset, once neurological deficits stabilize
Psychological counselors	Assess the patient's psychological state and understanding of early rehabilitation. Identify the causes of kinesiophobia, provide positive psychological support, and intervene in negative mindsets.	Within 24 hours of admission, 3 times per week
Ward doctors	Manage pain based on the underlying causes of headaches, such as elevated intracranial pressure or blood-induced meningeal irritation. Administer appropriate analgesics and, if necessary, combine sedatives and analgesics per physician orders.	From admission, throughout hospitalization
Rehabilitation therapists	Implement early bedside rehabilitation, including aerobic breathing exercises, proper limb positioning, bed mobility, sitting/standing balance training, gait training, and sit-to-stand transitions.	Gradual increase from small sessions, up to twice daily, 30 minutes per session

2.2.3. Training and evaluation

The intervention plan underwent team-wide training, conducted 1–2 times weekly for 45 minutes per session. A

post-training evaluation was conducted, requiring a passing score of 80 or higher. After two weeks of training, all team members passed the assessment and were familiarized with the intervention plan.

2.2.4. Implementation of the plan

2.2.4.1. Control group intervention methods

The control group received routine neurological care for hemorrhagic stroke, including bed rest, functional limb positioning, distribution of stroke rehabilitation manuals, and explanations of early rehabilitation significance and methods using visual aids (posters, videos). Patients and families were guided in performing active and passive limb exercises daily, 20–30 minutes per session, progressing gradually until discharge.

2.2.4.2. Experimental group intervention methods

(1) Post-48 hours of admission: Once neurological deficits stabilized, bedside rehabilitation began. Responsibility nurses scored patients on the TSK-11 scale. A score >26 indicated kinesiophobia [9], and the results were shared with the multidisciplinary team.

(2) Psychological support: Counselors assessed patients' psychological states and knowledge of early rehabilitation, identified causes of kinesiophobia, and provided psychological support to address negative mindsets.

(3) Pain management: For severe headaches, appropriate analgesics were administered per the underlying cause, such as diuretics for intracranial pressure reduction or sedative-analgesic combinations per physician orders [10].

(4) Rehabilitation training: Therapists guided progressive bedside rehabilitation exercises, starting with low-intensity activities and gradually increasing to twice daily, 30 minutes per session, as tolerated [11,12].

(5) Routine education: Nurses provided daily health education, played videos in wards, guided families on supportive care, and collected evaluation scores while collaborating with other team members.

2.3. Evaluation tools

(1) Hospital Anxiety and Depression Scale (HAD): A 14-item scale with two dimensions (anxiety and depression). Each item is scored from 0–3, with a total score of 42. Higher scores indicate greater severity.

(2) Tampa Scale for Kinesiophobia (TSK): The TSK-11 scale is a simplified 11-item version of the original TSK, scored from 11 to 44. Higher scores indicate greater kinesiophobia [13].

(3) Modified Rankin Scale (mRS): A clinical tool to assess disability and quality of life in stroke patients. Scores ≤ 2 indicate functional independence, while scores ≥ 3 indicate some level of disability.

(4) Barthel Index (BI): Measures daily living abilities with 10 items scored from 0–10, for a total score of 100. Higher scores reflect greater independence.

2.4. Data collection methods

Before the study, multidisciplinary team members were trained on scoring scales and assessment methods. Responsibility nurses completed HAD, TSK-11, mRS, and BI assessments within 48 hours of admission and on the day before discharge. Assessments were conducted face-to-face, with patients completing the scales independently or assisted by nurses for illiterate or physically impaired individuals. The response rate was 100%.

2.5. Statistical methods

SPSS 22.0 software was used for analysis. Statistical methods included chi-squared tests, *t*-tests, and normality tests. The significance level was set at $\alpha = 0.05$.

3. Results

There were no statistically significant differences between the two groups in gender, age, occupation, or education level ($P > 0.05$), as shown in **Table 1**. Scores for HAD, TSK-11, mRS, and BI before and after the intervention are presented in **Table 2**.

Table 2. Comparison of HAD, TSK-11, mRS, and BI scores between the two groups before and after the intervention

Group	n	HAD score		TSK-11 score		mRS score		BI score	
		Before	After	Before	After	Before	After	Before	After
Control	45	36.02 ± 2.17	23.11 ± 1.87	38.05 ± 3.08	30.02 ± 4.23	3.02 ± 0.24	2.58 ± 0.12	50.29 ± 2.21	70.23 ± 3.01
Experimental	45	36.11 ± 2.15	15.32 ± 1.05	37.23 ± 4.02	23.12 ± 5.02	3.09 ± 0.32	2.01 ± 0.04	50.11 ± 2.24	80.11 ± 3.35
t	-	2.353	1.023	-1.315	-5.672	0.382	1.041	4.367	5.765
P	-	0.065	< 0.001	0.176	< 0.001	0.625	< 0.001	0.189	< 0.001

4. Discussion

4.1. The significance of multidisciplinary team collaboration in early rehabilitation of hemorrhagic stroke patients with kinesiophobia

Patients with kinesiophobia following hemorrhagic stroke often exhibit avoidance behaviors towards rehabilitation exercises and daily activities due to pain and fear of recurrent bleeding, which hinders early rehabilitation. A multidisciplinary team, comprising doctors, nurses, and rehabilitation therapists, provides patients with positive emotional support, personalized rehabilitation plans, and detailed health guidance. This collaborative approach encourages active participation in early rehabilitation, thereby reducing the degree of disability and improving patients' self-care abilities.

4.2. Analysis of the multidisciplinary team intervention content

4.2.1. Multidisciplinary team collaboration improves emotional well-being of hemorrhagic stroke patients

It is widely acknowledged that there is a critical period after stroke during which rehabilitation can promote favorable neuroplasticity and suppress maladaptive neuroplasticity in the infarct area. However, this rehabilitation effect diminishes significantly over time [14]. Stroke patients often experience negative emotions such as anxiety and depression due to pain and hemiplegia. Studies have shown that post-stroke anxiety occurs in up to 50.1% of patients, while depression affects as many as 56.6%. These negative emotions reduce treatment adherence and cooperation, thereby hindering recovery progress [15]. Early intervention by psychologists and attending doctors can promptly identify and address these negative emotions, alleviating tension and fear, reducing kinesiophobia, and enhancing motivation for rehabilitation exercises.

4.2.2. Multidisciplinary team collaboration monitors kinesiophobia throughout the rehabilitation process

Multidisciplinary team collaboration enhances the continuity and comprehensiveness of healthcare services [16]. From the moment patients are admitted, psychologists and rehabilitation therapists are involved in the entire rehabilitation process. This ensures that patients receive timely support and solutions to any issues that arise, maximizing their active participation [17]. This integrated approach significantly boosts patients' confidence and determination to engage in rehabilitation.

4.2.3. Multidisciplinary collaboration as a key measure to improve self-care abilities

A multidisciplinary team provides thorough evaluations of patients' conditions, promptly intervenes in negative emotions, and offers guidance and support. Rehabilitation therapists develop individualized rehabilitation plans and implement exercises tailored to patients' needs. By maintaining patient dignity and encouraging them to utilize their residual abilities, the team helps improve patients' self-care capacities.

5. Conclusion

Multidisciplinary team collaboration effectively reduces kinesiophobia in hemorrhagic stroke patients, fosters early and active participation in rehabilitation exercises, shortens hospital stays, decreases disability, and enhances self-care abilities. This approach offers comprehensive and professional care for patients with hemorrhagic stroke and kinesiophobia. However, due to the lack of long-term follow-up results and the study's single-center design, future studies should include multi-center research and extended follow-up periods to evaluate long-term outcomes.

Funding

Nantong First People's Hospital "Care for Love" Fund Nursing Innovation Support Project – Nursing Research Topic "Development and Evaluation of an Internet-Based Continuing Care Program Incorporating Self-Management Guided by the Theory of Planned Behavior for Elderly Stroke Patients" (Project No. HLCXKT-20240104)

Disclosure statement

The authors declare no conflict of interest.

References

[1] Su Y, Tang J, 2021, Construction and Application of Discharge Plan for Hemorrhagic Stroke Patients in Sequela Period. Chinese Nursing Research, 35(9): 1667–1669.

[2] Chinese Society of Neurology, Stroke Group of the Chinese Society of Neurology, 2019, Chinese Guidelines for Diagnosis and Treatment of Intracerebral Hemorrhage (2019). Chinese Journal of Neurology, 52(12): 994–1005.

[3] Zhu J, Cai W, Tao Z, et al., 2023, Analysis of Rehabilitation Exercise Compliance and Its Influencing Factors in Young and Middle-aged Patients with Hemorrhagic Stroke. Chinese Journal of Nursing, 58(5): 580–586.

[4] Han H, Fu S, Fan C, et al., 2021, Analysis of the Status and Influencing Factors of Agoraphobia in Postoperative Patients with Intracerebral Hemorrhage. Journal of Neuroscience and Mental Health, 21(9): 652–657.

[5] Liu Y, Cai L, Xu Q, et al., 2017, Advances in the Study of Kinesiophobia in Patients with Chronic Pain. Chinese Journal of Nursing, 52(2): 234–239.

[6] Liu H, Huang L, Yang Z, et al., 2023, Research Progress on Commonly Used Assessment Scales for Kinesiophobia. Chinese Journal of Rehabilitation Medicine, 38(9): 1305–1310.

[7] Alpalhão V, Cordeiro N, Pezarat-Correia P, 2022, Kinesiophobia and Fear Avoidance in Older Adults: A Scoping Review on the State of Research Activity. J Aging Phys Act, 30(6): 1075–1084. https://doi.org/10.1123/japa.2021-0409

[8] Tkachuk GA, Harris CA, 2012, Psychometric Properties of the Tampa Scale for Kinesiophobia-11 (TSK-11). J Pain, 13(10): 970–977. https://doi.org/10.1016/j.jpain.2012.07.001

[9] Cai L, Liu Y, Li Y, et al., 2020, The Effects of Multidisciplinary Teamwork Intervention for Total Knee Arthroplasty Patients with Kinesiophobia. Chinese Journal of Nursing, 55(4): 494–499.

[10] Zhang B, Hou S, 2021, Application of MDT Diagnosis and Treatment Mode in Cognitive Dysfunction Patients after Aneurysm Subarachnoid Hemorrhage. Chinese Nursing Research, 35(22): 4089–4092.

[11] Tang X, Hong Y, Mao J, 2022, Influence of Different Early Rehabilitation Strategies on Affected Upper Limb Function in Hemiplegic Patients of Stroke. Chinese Journal of Rehabilitation Medicine, 37(6): 779–783.

[12] Jin J, Li M, Chen Y, et al., 2020, Construction of Early Motor Rehabilitation Nursing Program Based on Modified Barthel Index Grading for Stroke Patients. Chinese Journal of Nursing, 55(8): 1360–1365.

[13] Bordeleau M, Vincenot M, Lefevre S, et al., 2022, Treatments for Kinesiophobia in People with Chronic Pain: A Scoping Review. Front Behav Neurosci, 16: 933483. https://doi.org/10.3389/fnbeh.2022.933483

[14] Song Y, Yang H, 2021, Research Progress on Timing of Rehabilitation Nursing Intervention for Stroke Patients. Chinese Nursing Research, 35(3): 451–453.

[15] Lu J, Liu X, Xue F, 2021, Effect of Intensive Cognitive Intervention on Cognitive Function and Negative Emotions of Stroke Patients with Depression and Anxiety. China Journal of Health Psychology, 29(11): 1631–1636.

[16] Report on Stroke Center in China Writing Group, 2021, Brief Report on Stroke Center in China, 2019. Chinese Journal of Cerebrovascular Diseases, 18(5): 355–360.

[17] Fang Y, Qin W, Wang X, et al., 2023, Evaluation of the Impact of the MDT Combined with a Comprehensive Health Education Model on Elderly Diabetic Patients Using the Propensity Score Matching Method. Chinese Journal of Gerontology, 43(17): 4339–4342.