MEDS Public Health and Preventive Medicine (2024)
Clausius Scientific Press, Canada
DOI: 10.23977/phpm.2024.040106
ISSN 2616-1915 Vol. 4 Num. 1

Study on the Effect of Distance Teaching Combined with the IMB on the Self-Management Ability of Community Stroke Patients

Fangfang Zheng[1,a], Yuanyuan Cui[1], Wenxiu Liu[2], Meijie Zheng[2], Wei Li[2], Ziye Chen[2], Qiong Meng[2], Xian Li[1,b,*]

[1]School of Nursing and Rehabilitation, North China University of Science and Technology, Tangshan City, Hebei Province, China
[2]Hebei Provincial People's Hospital, Shijiazhuang, Hebei, China
[a]zhengfangfang116@126.com, [b]lixian1966@126.com
[*]Corresponding author

Keywords: Stroke, self-management ability, IMB model, distance teaching

Abstract: The study aims to investigate the impact of distance teaching combined with the IMB model on the self-management ability of stroke patients in the community. The method applied in this paper is that a total of 86 stroke patients from Yinghua Community and Dongjiao Community in Shijiazhuang City were randomly assigned to two groups. The control group consisted of 43 patients from Dongjiao Community who received routine community health education and telephone follow-up. The experimental group included 43 patients from Yinghua Community who received a distance teaching intervention using the information-motivation-behavior skills model in addition to the routine care. The self-management ability of the patients was assessed before the intervention, 1 month after the intervention, and 3 months after the intervention. The results of this paper are the implementation of the distance teaching intervention model based on the information-motivation-behavior skills model significantly improved the self-management ability of stroke patients in the community.

Stroke, also known as 'cerebrovascular accident', refers to a collection of diseases that occur due to the sudden blockage or rupture of blood vessels in the brain. This obstruction or rupture hinders the flow of blood to the brain, leading to damage of brain tissue. Stroke can be categorized into two types: ischemic stroke and hemorrhagic stroke. It is a significant public health concern in my country, representing one of the major health issues [1], the incidence of stroke in my country is increasing at an annual rate of 8.7% [2]. Some scholars have confirmed that after acute treatment, more than 80% of stroke patients will return to their homes for training and rehabilitation.[3] Many patients have poor self-management ability, which increases the possibility of disease recurrence and repeated hospitalization. The patient's life the quality is seriously affected, putting great pressure on families and society [4]. At the same time, the health education that patients receive

during hospitalization is often difficult to continue after discharge due to objective factors such as family, transportation, and geographical location.

The Information-Motivation-Behavioral Skills Model was proposed by Fisher [5].This model is more easily accepted by patients, applied and practiced, and is effective in improving long-term prognosis. In recent years, with the continuous development of social economy, telemedicine service platforms have been widely used in the health management of patients with chronic diseases, allowing medical resources to be fully and reasonably used [6]. At present, the IMB model has been applied to intervention studies on the emotional life of newlyweds [7], vaccination [8], and AIDS prevention and control [9], and has achieved good results.

Therefore, this study explores the effect of remote teaching combined with the IMB model on the self-management ability of stroke patients in the community, and provides a reference for continued care of patients after discharge.

1. Objects and methods

1.1 Objects of study

This study adopted a completely random method and selected stroke patients from Yinghua Community and Dongjiao Community in Shijiazhuang City, Hebei Province from December 2022 to February 2023 as experimental subjects. Inclusion criteria: ① Community patients diagnosed with stroke by CT, MRI and other imaging examinations; ②Age≥18 years old; ③Clear consciousness, no cognitive, audio-visual and communication disorders; ④ Voluntary participation, approved by the ethics committee. Exclusion criteria: ① Those who suffer from acute myocardial infarction, severe craniocerebral trauma surgery, or arrhythmia; ② Those who are combined with severe dysfunction of important organs such as heart, kidney, lung, etc.; ③ Those who are combined with malignant tumor lesions; dropout criteria: ① For any reason Those who are unable to cooperate with the investigation and propose termination; ② Those who fill out the questionnaire incompletely or invalidly. This study was approved by the Ethics Committee of Hebei Provincial People's Hospital, and informed consent was obtained from stroke patients and their primary caregivers.

1.2 Grouping methodology

A completely random method was used to select the experimental group and the control group from Yinghua Community and Dongjiao Community in Shijiazhuang City, Hebei Province.

1.3 General Information of Patients Experimental group

General information of the patients in the experimental group: 25 males and 15 females; age (66.77±9.93) years old; education level: 15 primary school and below, 11 junior high school, 8 high school, 6 university and above; Marital status: married 35 people, 5 people are divorced/widowed; Living style: 6 people live alone, 34 people live with family; Occupation: 5 employees, 33 farmers,

2 others; Payment method: 7 people have employee medical insurance, 33 people have resident medical insurance; family Per capita monthly income: 20 people had <1,000 yuan, 13 people had 1,000-1,999 yuan, 4 people had 2,000-3,000 yuan, and 3 people had<3,000 yuan ; risk factors: 5 people had no risk factors, 1 type 14 people had risk factors, 11 people had 2 risk factors, 10 people had 3 or more risk factors; stroke type: 28 people were ischemic stroke, 12 people had hemorrhagic stroke; family history: 29 people had no family history, 11 people had family history people; control group: 24 males and 14 females; age (67.76±9.76) years old; education level: 13 primary school and below, 11 junior high school, 9 high school, 5 university and above; Marital status:30 married people and 8 divorced/widowed people; living style: 5 people living alone, 33 people living with family; occupation: 5 employees, 28 farmers, 5 others; payment method: 8 people with employee medical insurance, 30 people with resident medical insurance; per capita of the family Monthly income: 24 people have<1,000 yuan, 5 people have 1,000-1,999 yuan, 3 people have 2,000-3,000 yuan, and 6 people have<3,000 yuan;1.2 Methods of intervention.

1.3.1 Control group Community routine health education + telephone follow up mission

1.3.2 Experimental group Implement remote mission + IMB modeling intervention on the basis of conventional group

1.3.2.1 Establishment of the research team

The research team consists of 8 people, including 1 master's tutor, 2 community nurses, 2 rehabilitation therapists, 1 engineer, 1 nursing graduate student and the researcher himself. The master's tutor is responsible for controlling and guiding the entire project design; the nursing graduate student is responsible for assisting the researcher in formulating intervention plans and remote teaching content; the community nurse is responsible for implementing the intervention plan; the neurologist is responsible for educating and guiding theoretical knowledge about the disease; rehabilitation Therapists are responsible for the implementation and guidance of rehabilitation skills knowledge and exercise programs, and engineers are responsible for the design and maintenance of the telemedicine platform and training team members on how to use the platform for 30 to 45 minutes to ensure the normal use of telemedicine equipment. Researchers Responsible for training team members on the theoretical connotation of the IMB model and domestic and foreign research progress. All team members can join the team only after passing the training.

1.3.2.2 Develop an intervention plan for distance teaching combined with IMB model to improve the self-management ability of community stroke patients

Table 1: Intervention plan for distance teaching combined with IMB model to improve the self-management ability of community stroke patients

Theme of intervention	Specific measures
Information interventions	1. Collect patients' general demographic information and disease-related information, establish stroke patients' information assessment files, understand patients' disease needs, and sort them out. 2. Explain stroke-related knowledge to patients with the help of PPTs, pictures, videos, etc., The contents include: introduction of stroke disease, causes, clinical manifestations, medication guidance, dietary care, care of complications, rehabilitation exercises and psychological care. 3. According to the results of the questionnaire, in the next mission, based on the different needs of the patients, to provide targeted health education.
Motivational interventions	1. Intentionless period: guide the patient to say what he/she knows about stroke disease and his/her views and concerns about rehabilitation exercises, 2. Intention period: Emphasize to patients and their families the importance of early rehabilitation exercise to the patients' prognosis, and convey to the patients the message that they can get better physical and mental recovery through early rehabilitation exercise. 3. Preparation period: according to the physical condition of each patient, the joint community, the development of rehabilitation exercise plan, the development of rehabilitation goals. 4. Change period: assist the patient to review the rehabilitation training program that has been implemented, and make a reasonable assessment of the current stage of rehabilitation training. 5. Maintenance period: continue to keep in touch with the patient's family and obtain the understanding and support of the family, encourage the patient's family to give the patient more understanding and encouragement.
Behavioral Skills Intervention	At this stage, patients are mainly taught to master the limb function exercise skills, ① the placement of the lying good limb position and the sitting anti-spasmodic position; ② passive movement training of the affected side of the trunk; ③ the healthy side and the affected side of the bi-directional turning training methods; ④ bridge exercises; ⑤ bedside sitting balance training, including seated balance training; ⑥ standing balance training; ⑦ walking on the ground training.

By reviewing domestic and foreign literature, consulting with experts, etc., an intervention plan for distance teaching combined with the IMB model on the self-management ability of community stroke patients was formulated, as shown in Table 1.

1.4 Evaluation indicators

Self-management ability: Before the intervention, 1 month after the intervention, and 3 months after the intervention, the Stroke Self-Management Behavior Scale was used to evaluate the stroke self-management ability. This scale was developed by Yanjiao Wang et al. for stroke patients in the recovery period. The management behavior rating scale includes 7 dimensions and a total of 50 items. The calculation formula is: score index = (actual score/highest score) × 100%. The higher the score, the higher the self-management behavior. The scores are divided into three levels, < 60% means poor self-management behavior, 60% to 80% means moderate, and > 80% means good. Factor score (factor score = mean of dimension/number of items) If the score is less than 3, it means that the self-management of this dimension is poor. Relevant studies have verified that this scale has good reliability and validity, with Cronbach's alpha coefficient being 0.821.

1.5 Statistical methods

Statistical analysis was performed using SPSS22.0. Measurement data were descriptively analyzed using means and standard deviations, and count data were descriptively analyzed using frequencies and percentages. The independent sample t test was used to compare two sets of measurement data that conformed to the normal distribution, and the non-parametric rank sum was used to compare the two groups of measurement data that did not conform to the normal distribution test. Count data were analyzed using $\chi 2$ test, and $P<0.05$ indicated that the difference was statistically significant.

2. Results

2.1 Comparison of self-management scores between the two groups before and after the intervention (Table 2)

(1)Comparison of within-group scores of self-management before and after the intervention in the control group of patients.

In the control group, 3 months after the intervention, the dimensions and total scores improved, and the difference was statistically significant ($P<0.05$), Table 2.

Table 2: Within-group comparison of self-management scores before and after intervention in control group patients (n=42, $\bar{x} \pm s$)

self-management	pre-intervention	1 month post-intervention	3 months post-intervention	F-value	P-value

Disease management	22.05±5.81	22.39±5.63	24.78±5.69#	26.068	<0.001
medication management	17.10±2.63	17.36±2.79	18.44±2.65#	21.484	<0.001
Dietary management	26.60±4.19	26.86±3.49	29.36±3.55#*	26.618	<0.001
everyday life	31.36±3.89	31.18±3.39	31.94±3.14	5.042	0.009
emotional management	19.28±3.40	19.44±3.35	20.07±3.49	3.886	0.025
Social functioning and interpersonal management	19.05±5.23	19.52±4.84	20.21±4.30	5.208	0.008
Disease Exercise Management	18.78±5.90	19.34±5.67	20.15±5.74	6.723	0.002
totals	154.26±15.22	156.13±13.62	165.00±12.84#*	76.533	<0.001

Note: # is p<0.05 for comparison with our pre-intervention group;* is p<0.05 for comparison with our 4-week intervention group.

(2) Comparison of self-management scores of patients in the experimental group before and after intervention. The total self-management score and each dimension score of the patients in the experimental group were significantly improved 1 month after the intervention compared with before the intervention (P<0.05). The total self-management score and each dimension score were significantly improved 3 months after the intervention compared with before the intervention and 1 month after the intervention. (P<0.05). Table 3.

Table 3: Within-group comparison of self-management scores of patients in the experimental group before and after the intervention (n=41, x±s)

self-management	pre-intervention	1 month post-intervention	3 months post-intervention	F-value	P-value
Disease management	23.85±4.95	25.95±4.15#	28.40±4.49#*	60.126	<0.001
medication management	18.00±2.98	18.62±2.37	20.95±2.77#*	76.233	<0.001
Dietary management	27.65±2.76	29.00±2.02#	32.12±2.59#*	56.378	<0.001
Everyday life	30.32±3.09	32.55±2.43#	35.92±1.09#*	132.318	<0.001
Emotional management	20.00±2.55	21.12±1.89#	22.80±1.77#*	40.532	<0.001

Social functioning and interpersonal management	18.45±4.56	21.30±2.70#	24.42±2.01#*	119.866	<0.001
Disease Exercise Management	18.12±6.86	22.12±4.46#	25.65±4.20#*	44.359	<0.001
totals	156.40±12.49	171.45±9.12#	190.27±9.93#*	546.419	<0.001

Note: # is p<0.05 for comparison with our pre-intervention group;* is p<0.05 for comparison with our 4-week intervention group.

(3) Comparison of the self-management scores between the two groups of patients before the intervention, one month after the intervention, and three months after the intervention. There was no statistical difference between the total self-management scores and each dimension score of the two groups of patients before the intervention (P>0.05) ; 1 month after the intervention, the total self-management score and each dimension of the patients in the experimental group were higher than those in the control group, and the difference was statistically significant (P<0.05); 3 months after the intervention, the total self-management score and each dimension of the patients in the two groups were compared. Comparing between groups, the self-management scores of patients in the experimental group were higher than those in the control group, and the difference was statistically significant (P< 0.05), see Table 4.

Table 4: Comparison of self-management scores between the two groups of patients before intervention, 1 month after intervention, and 3 months after intervention ($\bar{x}\pm s$)

self-management	pre-intervention				1 month post-intervention				3 months post-intervention			
	Control group (n=38)	Experimental group (n=40)	*t*	*P*	Control group (n=38)	Experimental group (n=40)	*t*	*P*	Control group (n=42)	Experimental group (n=41)	*t*	*P*
Disease management	22.05±5.81	23.85±4.95	-1.471	0.145	22.39±5.63	25.95±4.15	-3.251	0.002	24.78±5.69	28.40±4.49	-3.116	0.003
medication management	17.10±2.63	18.00±2.98	-1.399	0.166	17.36±2.79	18.62±2.37	-3.377	0.001	18.44±2.65	20.95±2.77	-4.065	<0.001
Dietary management	26.60±4.19	27.65±2.76	-1.306	0.196	26.86±3.49	29.00±2.02	-3.315	0.001	29.36±3.55	32.12±2.59	-3.923	<0.001
everyday life	31.36±3.89	30.32±3.09	1.314	0.193	31.18±3.39	32.55±2.43	-2.047	0.044	31.94±3.14	35.92±1.09	-7.535	<0.001
emotional management	19.28±3.40	20.00±2.55	-1.046	0.299	19.44±3.35	21.12±1.89	-2.734	0.008	20.07±3.49	22.80±1.77	-4.366	<0.001
Social functioning and interpersonal management	19.05±5.23	18.45±4.56	0.542	0.589	19.52±4.84	21.30±2.70	-2.009	0.048	20.21±4.30	24.42±2.01	-5.589	<0.001
Disease Exercise Management	18.78±5.90	18.12±6.86	0.457	0.649	19.34±5.67	22.12±4.46	-2.412	0.018	20.15±5.74	25.65±4.20	-4.833	<0.001
totals	154.26±15.22	156.40±12.49	-0.679	0.494	156.13±13.6	171.45±9.12	-5.862	<0.001	165.00±12.84	190.27±9.93	-9.748	<0.001

3. Discussion

The use of distance teaching combined with the IMB model can improve the disease management, medication management, and disease exercise management capabilities of community stroke patients. The results of this study show that the disease management, medication management, and disease exercise dimension scores of the two groups of patients 3 months after the intervention were higher than those before the intervention and 1 month after the intervention ($P<0.05$); Medication management and disease exercise dimension scores were higher than before intervention ($P<0.05$). It shows that the intervention measures of distance teaching combined with the IMB model can improve the disease management, medication management, and disease exercise management capabilities of community stroke patients.Yake Li [10] and others used the IMB model to study patients after surgery for hypertensive cerebral hemorrhage. The results showed that nursing intervention based on the IMB model can effectively improve the postoperative self-care ability and disease management ability of patients after surgery for hypertensive cerebral hemorrhage.Yuan Zhao [11]. used the IMB model as the theoretical basis to develop early rehabilitation training intervention measures for patients undergoing total hip replacement. The research results show that intervention based on the IMB model can improve rehabilitation exercise compliance, promote the recovery of joint function, and improve the patient's postoperative quality of life.

The use of distance teaching combined with the IMB model can improve the diet and daily life management capabilities of community stroke patients. The results of this study show that the scores of the two groups of patients in the diet and daily life management dimensions 3 months after the intervention were higher than those before the intervention and 1 month after the intervention ($P<0.05$); 1 month after the intervention, the scores in the disease management and medication management dimensions were higher. The score was higher than before intervention ($P<0.05$). Research by JingTang[12] and others has proven that nursing intervention guided by IMB theory has better blood sugar control in patients with gestational diabetes and can effectively improve maternal and infant outcomes. Research by Cuiyun Bai [13] and others has shown that nursing intervention based on the information-motivation-behavior skills model combined with knowledge, belief, and action intervention can improve the living habits, health behaviors, and knowledge, belief, and action levels of patients after radical gastrectomy for gastric cancer.

The use of distance teaching combined with the IMB model can improve the emotional management, social function and interpersonal management abilities of community stroke patients. The results of this study show that the emotional management, social function and interpersonal management dimension scores of the two groups of patients 3 months after the intervention were higher than those before the intervention and 1 month after the intervention ($P<0.05$); The scores of social function and interpersonal management dimensions were higher than before intervention ($P<0.05$). Research by Yaqiang Lian [14] and others has shown that nursing intervention based on IMB as a theoretical model can effectively improve the anxiety and depression of patients with advanced liver cancer, improve social functions and interpersonal relationships, and improve the quality of life.

The remote teaching model is more used for students in classes and less for clinical patients. This nursing model combines remote operation technology with nursing operations, making up for the inconvenience of conventional telephone follow-up and home visits, and is not restricted by geography. Realize the dissemination of health education knowledge across time and space [15]. Patient self-management ability is an important factor influencing disease treatment and body recovery. The higher the patient's self-management ability, the higher the compliance with disease treatment and the better the physical recovery [16].Therefore, improving the self-management ability of stroke patients has important guiding significance for the prognosis and rehabilitation of stroke patients.

Acknowledgement

Hebei Provincial Government-Sponsored Training Program for Excellent Talents in Clinical Medicine (ZF2024006); Hebei Provincial Medical Science Research Project Program (20240083)

References

[1] Wang Y. Analysis of the current situation and influencing factors of self-management of high-risk groups for stroke in the community [D]. Shandong University, 2021.
[2] Wang Liping. Data analysis of screening data of high-risk stroke population in rural areas of six provinces and cities in China [D]. Chinese People's Liberation Army Medical College, 2017.
[3] Xu Zhang, Ren Weihong, Pan Yanhong. A study of the impact of a family empowerment program on primary caregivers of first-ever stroke patients [J]. Chinese Journal of Nursing, 2018, 53(02):133-138.
[4] Xijuan Zhao, Mingying Yang, Yangfeng Qian, et al. Current status of research on influencing factors and nursing intervention of self-management in stroke patients[J]. Tianjin Nursing, 2019, 27(05):624-627.
[5] Tang Manli, Zhang Xiaoling, Hu Qian, Lv Shaomin, Wang Jun. Influencing factors of post-traumatic stress disorder and early nursing intervention [J]. Journal of Nursing, 2008(22):76-79.
[6] Han Ling, Xie Lijuan, Lu Tingting, et al. Application practice of internet technology in nursing care of patients in breast tumor day ward[J]. China Nursing Management, 2020, 20(2):253-258.
[7] Moeini B, Merghati Khoei E, Barati M, et al. Randomizedcontrolled trial protocol to evaluate the effect of an educationalintervention using information, motivation and behavioral skillsmodel on sexual satisfaction of new couples in Iran [J]. ReprodHealth, 2019, 16(1):168.
[8] Si M, Su X, Jiang Y, et al. Interventions to improve humanpapillomavirus vaccination among Chinese female college students: study protocol for a randomized controlled trial [J]. BMC Public Health, 2019, 19(1):1546.
[9] Wainberg M L, Mann C G, Norcini-Pala A, et al. Challenges and opportunities in the science of research to practice: lessons learned from a randomized controlled trial of a sexual risk-reduction intervention for psychiatric patients in a public mental health system [J]. Braz J Psychiatry, 2020, 42(4). 349-353.
[10] Li Yake, Gao Hongli. Effects of IMB model-based continuity of care intervention on self-care ability and neurological function of postoperative patients with hypertensive cerebral hemorrhage [J]. Clinical Medical Engineering, 2023, 30(11):1591-1592.
[11] Zhao Yana, Xie Xianping, Li Jieting et al. Application of Internet+IMB model in primary caregiver care for ischemic stroke patients [J]. Nursing Research, 2021, 35(22):4114-4118.
[12] Tang J, Wang J. Individualized nursing care program oriented by IMB theoretical model in gestational diabetes mellitus An applied study in at-risk populations [J]. Diabetes New World, 2023, 26(07): 123-126. DOI:10. 16658/j. cnki. 1672-4062. 2023. 07. 123.
[13] Bai Cuiyun, Wang Xiyan. Effects of nursing intervention based on information-motivation-behavioral skill model combined with know-trust-behavior intervention on health behaviors, know-trust-behavior level, and gastrointestinal function of patients after radical gastric cancer surgery [J]. Clinical Medicine Research and Practice, 2022, 7(36): 172-174. DOI:10. 19347/j. cnki. 2096-1413. 202236042.
[14] Ling Yaqiang, Zhang Fangping, Liu Linmei et al. Effects of information-motivation-behavioral skills model nursing intervention on psychology, self-efficacy and quality of life of patients with advanced hepatocellular carcinoma [J]. Nursing Research, 2022, 36(19):3566-3570.
[15] Yue Chunhui, Wang Yanli. Effect of "Internet+" continuity of care on self-management behavior of acute ischemic

stroke patients during recovery [J]. Clinical Medical Engineering, 2023, 30(10):1429-1430.
[16] Song Xinxuan, Hao Jie, Xiao Li, et al. Study on the application of nursing special case improvement in improving self-management ability of outpatient chronic kidney disease patients [J]. Chinese Journal of Nursing, 2017, 52(6): 692-697.