

Analysis on effect of evidence-based nursing intervention on limb function and complications of patients with hemiplegia after stroke

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Abstract:

Objective: To seek the influence of evidence-based nursing intervention on limb function and complications of patients with hemiplegia after stroke. **Methods:** From January 2015 to November 2019, a total of 122 patients with hemiplegia after stroke treated in our hospital were collected as the research participants, of which 55 patients received routine nursing (control group, CG) and other 67 patients received evidence-based nursing (experimental group, EG). The changes of swallowing function, limb function and daily living ability, complications, changes of negative emotions, quality of life and nursing satisfaction were compared in both groups. **Results:** After nursing, the swallowing function, limb function and daily living ability in EG were obviously better than those in CG ($P < 0.05$). The incidence of complications in EG was obviously lower than that in CG ($P < 0.05$). The quality of life and nursing satisfaction in EG were higher than those in CG ($P < 0.05$). **Conclusion:** Evidence-based nursing can effectually ameliorate the limb function, lessen the incidence of complications and enhance the quality of life of sufferers with hemiplegia after stroke, which is worthy of clinical promotion.

Keywords: evidence-based nursing, hemiplegia after stroke, limb function, complications

Introduction

Stroke is the second primary cause of death and main reason of physical disability in the world, and its incidence is increasing due to the aging of the population (Katan and Luft, 2018). Although 80% of the survivors can be discharged after experiencing the acute phase of stroke and their condition is stable (Schure et al., 2006), there are still 77% of stroke patients with hemiplegia and 28.6% of patients with language dysfunction and other complications, which seriously affect the patients' movement and quality of life (Diwan, 2018). Therefore, the high-quality, scientific and effective nursing for patients with hemiplegia after stroke is of great significance to reduce the incidence of complications and improve the quality of life.

With the continuous improvement of people's standard of living, the demand for medical standards and services is also increasing, so the routine nursing mode has been unable to meet the needs of most patients (Nilsson et al., 2016). High-quality nursing model is proposed and recognized by both doctors and nurses, which can improve the patients' quality

of life and their satisfaction with nursing work (Al-Hussami, 2017). Evidence-based nursing is a new nursing model, which takes the specific condition and needs of patients as the main scientific basis, collects clinical evidence by consulting literature to formulate a scientific and reasonable nursing plan, and adjusts it in time according to the effectiveness of nursing measures to achieve the best nursing effect (Mackey and Sandra, 2017). Evidence-based nursing is considered as the basis of nursing practice, which is challenging to implement. However, it can encourage nurses to deepen their understanding of evidence-based nursing, thus improving the quality of nursing work (Karlsson, 2019). At present, there have been many researches on evidence-based nursing in clinic, and this nursing mode has achieved better benefits. Some studies have shown that (Avşar and Ayiße, 2018) the cost of evidence-based nursing intervention is higher than that of conventional nursing methods, but evidence-based nursing can maintain the tissue integrity of severe patients to improve tolerance and reduce the incidence of tissue deterioration. Another study has shown that (McNeill, 2017) evidence-based nursing can reduce catheter-related urinary tract infection in

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patients. However, some researches on the application of evidence-based nursing in stroke patients have shown that nurses have some problems in nursing process, such as insufficient cognition of nursing methods, heavy workload and lack of confidence (Baatiema, 2017), and the application of evidence-based nursing in patients hemiplegia after stroke is less clinically. Therefore, a specialized group of evidence-based nursing was set up in this study to train nurses on relevant nursing knowledge and quality education, and analyze its application value in patients hemiplegia after stroke.

To sum up, this study was designed to discuss the application effect of evidence-based nursing on limb function and prevention of complications in sufferers with hemiplegia after stroke.

1. Materials and methods

1.1 Collection of patients' clinical data

From January 2015 to November 2019, a total of 122 patients with hemiplegia after stroke treated in our hospital were collected as the research participants, of which 55 patients received routine nursing (CG) and other 67 patients received evidence-based nursing (EG). Inclusion criteria: All patients were diagnosed as stroke hemiplegia by clinical symptoms, CT/MRI for the first time (Baatiema, 2017). Ashworth grade was ≥ 1 (Govaert et al., 2009). The clinical data were complete. The patient cooperated with the treatment. The patient and their families were informed and affixed the informed consent. Exclusion criteria were as below: comorbid with neuromuscular junction disease, communication disorder, comorbid with mental illness, infection, severe liver and kidney dysfunction and coagulation dysfunction.

1.2 Nursing methods

In both groups, patients were given corresponding treatment. In CG, patients were given routine nursing intervention, including disease monitoring, medication and diet guidance, basic rehabilitation training guidance, etc. In EG, patients were given evidence-based nursing on the basis of the CG, including: (1) An evidence-based nursing group was set up, whose members included head nurses, responsible nurses and rehabilitation nurses. The nursing staff received relevant nursing knowledge training to work out a scientific and effective nursing plan. (2) Searching for evidence of evidence-based nursing: The nursing staff searched the relevant literature, evaluated the authenticity, reliability and clinical practicality of the evidence, and determined the nursing plan according to the specific situation of the patient. (3) Health education: The nursing staff explained the principle,

complications and therapeutic effects of invasive ventilation to patients and guardians in detail through books, videos and other means, and issued pamphlets on matters needing attention to patients and their families. (4) Prevention of complications: The nurses learned the characteristics of the patient's illness such as long-term bedridden. Long-term bedridden will lead to multiple organ and body dysfunction, and even lead to disability. Therefore, nursing staff timely found the health problems of patients and formulated the individualized rehabilitation training and other programs. (5) Rehabilitation training: Rehabilitation training was carried out according to the specific condition of patients. The patients received knuckles activity training within 7 days of onset and functional training after 7 days, including upper limb functional training, oral and facial functional training, balance training from supine position, standing and sitting training, walking training, etc. twice /d, 30 min/ time. At the same time, nursing staff paid attention to monitoring patients' vital signs and patients conducted individualized and step-by-step training. (6) Psychological nursing: According to the different conditions of patients, the nursing staff worked out scientific and effective psychological counseling programs, such as music therapy and massage, so as to dispel the patients' uneasy emotions, build up the confidence that they could recover smoothly and improve their own initiative and treatment compliance. (7) Discharge guidance: According to the patient's age, educational background, family status, etc., a set of perfect out-of-hospital rehabilitation training program was tailored before discharge, and a nursing hotline was opened for patients to master the out-of-hospital rehabilitation of patients, so as to increase their rehabilitation confidence and improve their rehabilitation level.

1.3 Outcome measures

Main outcome measures: The swallowing function of sufferers was evaluated by Anderson Dysphagia Scale (MDADI) (Charalambous, 2014), with a total score of 100 points. The higher the score was, the better the swallowing function was. Fugl-Meyer assessment (FMA) (Zhang, 2017) was applied to evaluate the limb function of patients, with a total score of 100 points. The higher the score was, the better the limb function was. The modified Barthel score (Kim, 2016) was used to assess the activities of daily living before and after nursing, with a total score of 100 points. The higher the score, the stronger the activities of daily living. The complications of patients were compared between the two groups during nursing.

Secondary outcome measures: The Self-rating

Anxiety Scale (SAS) (Takahashi et al., 2016) was used to evaluate patients' anxiety before and after nursing, with a total score of 100 points. The higher the score, the more serious the anxiety. The Self-rating Depression Scale (SDS) (Takahashi et al., 2016) was applied to assess patients' depression before and after nursing, with a total score of 100 points. The higher the score, the more severe the depression. The quality of life of patients was assessed by the Quality of Life questionnaire (QOL) of the University of Washington (Chen et al., 2017), with a total score of 1200. The content included 12 items: chewing, swallowing, language, taste, saliva, pain, shoulder function, appearance, activity, mood, anxiety and entertainment, with a total score of 100 for each item. The higher the score, the better the patient's quality of life. The self-made Nursing Satisfaction Questionnaire was applied to evaluate the nursing satisfaction in the two groups. The total satisfaction = (satisfactory+basically satisfaction)/the total number of cases ×100%.

1.4 Statistical analysis

In this study, the collected data were

statistically analyzed using the medical statistical analysis software--SPSS20.0 (SPSS Inc., Chicago, USA). The graphpad Prism 7 (GraphPad Software Co., Ltd., San Diego, USA) was applied to draw pictures of the collected data. The counting data were represented as percentage (%) and tested by chi-square test, which was represented by χ^2 . The measurement data were represented by mean number \pm standard deviation (Meas \pm SD). The independent sample T test was applied for comparison between the two groups. The paired T test was applied for comparison within the group, all of which were expressed by t. $P < 0.05$ was regarded as statistically significant.

2 Results

2.1 Comparison of patients' clinical data

By comparing the baseline clinical data in both groups, it was found that there was no obvious difference in age, body mass index (BMI), gender, disease type, Ashworth grade, hemiplegic position, course of disease, educational level, smoking history, alcoholism history, place of residence, etc. ($P > 0.05$) (Table 1).

Table 1 Comparison of general clinical data between the two groups

Factors	CG (n=55)	EG (n=67)	t/ χ^2	P
Age (years old)	57.2 \pm 8.1	59.4 \pm 7.3	1.576	0.118
BMI(kg/m ²)	21.82 \pm 1.92	22.04 \pm 2.11	0.597	0.552
Gender				
Male	31(56.36)	32(47.76)	0.895	0.344
Female	24(43.64)	35(52.24)		
Disease types				
Hemorrhage	25(45.45)	34(50.75)	0.339	0.561
Infarct	30(54.55)	33(49.25)		
Ashworth grade				
Level 1	17(30.91)	15(22.39)	1.256	0.534
Level 2	28(50.91)	40(59.70)		
Level 3	10(18.18)	12(17.91)		
Hemiplegic part				
Left	26(47.27)	38(56.72)	1.080	0.299
Right	29(52.73)	29(43.28)		
Course of disease (months)	3.21 \pm 1.26	3.16 \pm 1.31	0.213	0.831
Education level				
Below high school	30(54.55)	41(61.19)	0.549	0.459
High school and above	25(45.45)	26(38.81)		
Smoking history				
Yes	22(40.00)	31(46.27)	0.483	0.487
No	33(60.00)	36(53.73)		
Alcoholism history				
Yes	24(43.64)	34(50.75)	0.612	0.434
No	31(56.36)	32(49.25)		

Place of residence	City	28(50.91)	30(44.78)	0.456	0.500
	Rural		27(49.09)		

2.2 Comparison of the recovery of swallowing dysfunction between the two groups

MDADI scores were used to evaluate swallowing function before and after nursing. The results revealed that there was no obvious difference in MDADI scores in both groups before

nursing ($P>0.05$), but the MDADI scores in both groups after nursing were obviously higher than those before nursing ($P<0.001$), and the scores in EG were obviously higher than those in CG ($P<0.001$), as shown in Figure 1.

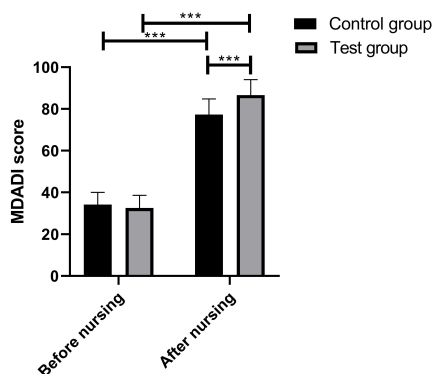


Figure 1 Comparison of MDADI scores between the two groups before and after nursing. There was no significant difference in MDADI scores between the two groups before nursing, but MDADI scores in the two groups after nursing were significantly higher than those before nursing, and the scores in EG were significantly higher than those in CG. *** means $P<0.001$.

2.3 Comparison of limb function between the two groups

In this study, the FMA scores were applied to assess the limb function of patients before and after nursing. The results revealed that there was no obvious difference in FMA scores in both groups

before nursing ($P>0.05$), but the FMA scores in both groups after nursing were significantly higher than those before nursing ($P<0.001$), and the scores in EG were obviously higher than those in CG ($P<0.001$), as shown in Figure 2.

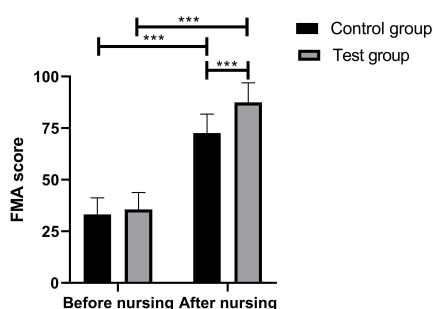


Figure 2 Comparison of FMA scores between the two groups before and after nursing. There was no significant difference in FMA scores between the two groups before nursing, but FMA scores in the two groups after nursing were significantly higher than those before nursing, and the scores in EG were significantly higher than those in CG. *** means $P<0.001$.

2.4 Comparison of activities of daily living in both groups

Barthel scores were used to assess the activities of daily living in both groups before and after treatment. The results revealed that there was no statistical difference in Barthel scores in both

groups before nursing ($P>0.05$), while Barthel scores in both groups after nursing were obviously higher than those before nursing ($P<0.001$), and the scores in EG were obviously higher than those in CG ($P<0.001$), as shown in Figure 3.

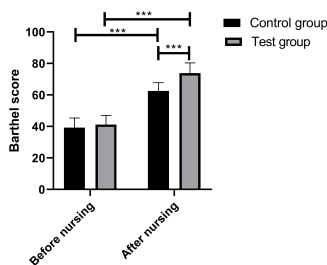


Figure 3 Comparison of Barthel scores before and after nursing. Before nursing, there was no statistical difference in Barthel scores between the two groups, but the Barthel scores of the two groups after nursing were significantly higher than those before nursing, and the scores in EG were significantly higher than those in CG. *** means $P < 0.001$.

2.5 Complications in both groups

By counting the complications in the two groups before and after nursing, it was found that the incidence of shoulder pain, foot drop,

strephenopodia, muscle spasticity and joint spasm in EG were obviously lower than those in CG ($P < 0.001$) (Table 2).

Table 2 Complications in both groups

Grouping	Shoulder pain	Foot drop	Strephenopodia	Muscle spasticity	Joint spasm
CG (n=55)	28(50.91)	13(23.64)	12(21.82)	18(32.73)	19(34.55)
EG (n=67)	12(17.91)	5(7.46)	4(5.97)	5(7.46)	6(8.96)
χ^2 value	14.93	6.282	6.658	12.600	12.14
P value	<0.001	0.012	0.010	<0.001	<0.001

2.6 Comparison of SAS and SDS scores in both groups

By evaluating the SAS and SDS scores before and after nursing, it was found that there was no significant difference in both groups before nursing

($P > 0.05$). After nursing, SAS and SDS scores in both groups were obviously lower than those before nursing ($P < 0.001$), and the SAS and SDS scores in EG were obviously lower than those in CG ($P < 0.001$), as shown in Figure 4.

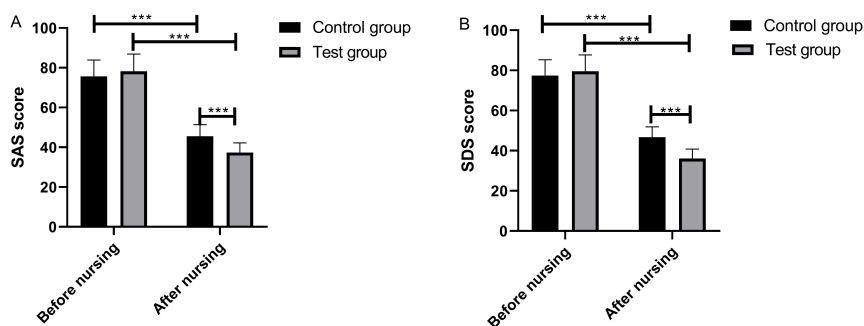


Figure 4 Comparison of SAS and SDS scores. There was no significant difference in SAS and SDS scores between the two groups before nursing, but the scores of SAS and SDS in the two groups after nursing were significantly lower than those before nursing ($P < 0.001$), and the scores of SAS and SDS in EG were significantly lower than those in CG. *** means $P < 0.001$.

2.7 Comparison of quality of life in both groups

By comparing the QOL scores in the two groups, it was found that there was no obvious difference in both groups before nursing ($P > 0.05$), but the QOL

scores in both groups after nursing were obviously higher than those before nursing ($P < 0.001$), and the QOL scores in EG were obviously higher than those in CG ($P < 0.001$) (Table 3).

Table 3 Comparison of QOL scores between the two groups

Grouping	Before nursing	After nursing
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CG (n=55)	325.34±30.52	774.65±45.57*
EG (n=67)	318.57±28.85	889.36±47.85*
t value	1.256	13.46
P value	0.211	<0.001

* means P<0.05

2.8 Comparison of nursing satisfaction in both groups

By comparing patients' satisfaction with nursing

work in the two groups, we found that the total satisfaction with nursing in EG was significantly higher than that in CG (P<0.05) (Table 4).

Table 4 Comparison of nursing satisfaction between the two groups

Grouping	Satisfactory	Basically satisfaction	Dissatisfaction	Total satisfaction
CG (n=55)	17(38.64)	22(50.00)	11(11.36)	44(80.00)
EG (n=67)	9(22.50)	18(45.00)	4(32.50)	63(94.03)
χ^2 value	-	-	-	5.514
P value	-	-	-	0.019

Discussion

Stroke is a familiar chronic disease with the characteristics of high morbidity, mortality and disability rate, which poses a great threat to human life and health (Liu et al., 2018). It is approximated that 15 million people suffer from stroke worldwide every year, and more than 60,000 people die and 5 million people are disabled by hemiplegia, which causes great mental and economic burden to patients and their families (LEE et al., 2018). Besides clinical treatment, nursing intervention is particularly important for stroke patients(Hu et al., 2018).

With the development of society, nursing service is gradually recognized by the public. In order to improve people's healthy life and patient satisfaction, nursing methods need to be constantly innovated and improved in quality (Sivertsen et al., 2017). Evidence-based nursing is a new nursing model. Some studies (Middleton et al., 2015) have reported that the application of evidence-based nursing in Alzheimer's patients can improve their psychology and quality of life and reduce the unnecessary use of psychotropic drugs, and the knowledge level and nursing quality of nursing staff for senile dementia are also improved. Therefore, this study was designed to implement evidence-based nursing for patients with hemiplegia after stroke, so as to explore the application value of evidence-based nursing. Swallow dysfunction is one of the familiar complications of stroke (Bleijenberg et al., 2018). About 50% of patients with acute stroke have swallow dysfunction (Al-Hussami, 2020), and the risk of death is 8.5 times higher than that of patients with normal swallowing function (Takahashi et al., 2016). Therefore, we counted the changes of swallowing function before and after nursing in the two groups, and the results showed that the

swallowing function of patients receiving evidence-based nursing improved significantly after nursing compared with routine nursing. The research results of Middleton et al. have shown that evidence-based nursing can improve the swallowing function and prognosis of patients with acute stroke. This is semblable to our research findings. Swallowing is the first stage of digestion. The quality of life of sufferers with dysphagia is seriously affected because they can't eat normally. The dysphagia can also cause complications such as malnutrition, dehydration and aspiration pneumonia, which will increase more medical care costs (Charalambous, 2014). However, this study revealed that evidence-based nursing played an important role in improving swallowing dysfunction. Limb dysfunction is a common complication of stroke, which adversely affects the rehabilitation, prognosis and reduces the quality of life of patients (Nilsson et al., 2016). Therefore, we evaluated the influence of evidence-based nursing on improving limb function of sufferers with hemiplegia after stroke. The results showed that evidence-based nursing could effectively improve limb function of patients, and the improvement degree was better than routine nursing. Researches have shown that, compared with conventional standard rehabilitation training, the finger perception training can ameliorate the upper limb function and sensory function of patients with hemiplegia after stroke. Researches by Zhu et al. (Nilsson et al., 2016) have shown that the improved exercise therapy can effectively improve the function of the upper limbs in sufferers with hemiplegia after stroke. This is semblable to our research findings. Then, we evaluated the daily living ability of sufferers in both groups, and the findings showed that the daily living ability of patients receiving

evidence-based nursing was significantly higher than that of routine nursing. For the research of evidence-based nursing, nursing staff first consulted a large number of literature, understood the patient's specific condition, summed up a set of scientific, effective and more suitable rehabilitation training for patients with hemiplegia, made adjustments according to the illness, helped patients to carry out rehabilitation training on a regular basis and effectively improved the limb function of patients, so it also got better benefits in ameliorating the daily living ability of patients.

Shoulder pain, spasm and strephenopodia are common complications of stroke hemiplegia, which seriously influence the limb function and quality of life of sufferers. Therefore, we counted the complications in the two groups, and found that the incidence of shoulder pain, spasm, strephenopodia and foot drop in patients receiving evidence-based nursing was obviously lower than that in routine nursing group. This showed that evidence-based nursing could effectually reduce the incidence of complications of sufferers with hemiplegia after stroke, and alleviate the economic burden and disease burden of patients. The incidence of shoulder pain in sufferers with hemiplegia after stroke is approximately 12%-58%, which causes limb dysfunction and is difficult to treat because of the complex etiology. In this study, the prevention measures of complications were taken. Medical staff provided timely nursing according to the specific characteristics of patients' conditions and explained the knowledge related to the disease to patients, so that patients increased the cognition of the disease and improved the treatment compliance. Therefore, evidence-based nursing had achieved better results in preventing complications. Patients with hemiplegia after stroke usually have poor psychological quality due to limb dysfunction, and the effective psychological intervention can accelerate the recovery of patients (Avşar and Ayiße, 2018; McNeill, 2017). This study revealed that the depression and anxiety of patients receiving evidence-based nursing were significantly improved compared with routine nursing. We evaluated the quality of life in both groups and found that the quality of life of cases receiving evidence-based nursing was significantly higher than that of routine nursing. At the end of the study, we evaluated the satisfaction with nursing work of patients in both groups, and found that the patients who received evidence-based nursing had higher nursing satisfaction, which indicated that the evidence-based nursing was recognized by patients in this study. Therefore, it is worthy of clinical

promotion. Researches by Greenlee et al. have shown that music, yoga, massage and other psychological related evidence-based nursing can improve negative emotions in breast cancer patients. Studies by Pang et al. have reported that evidence-based nursing can effectually ameliorate the quality of life of stroke patients. This is similar to our research results.

The above research results confirm the better benefits of evidence-based nursing in patients with hemiplegia after stroke, but there are still shortcomings. We have not followed up the patients after discharge. It is not known whether evidence-based nursing will affect the prognosis of patients, and the compliance of patients has not been evaluated in the two groups, which may have a certain influence on the research findings. Therefore, we will supplement this part to improve this research in future research.

To sum up, this study has revealed that evidence-based nursing can effectively ameliorate the limb function, lessen the incidence of complications and enhance the quality of life of patients with hemiplegia after stroke, so it is worthy of clinical promotion.

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