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Original Article

Evaluation of clinical efficacy of transitional care mode for patients with strokes

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Abstract: The aim of this study was to establish a transitional nursing care mode for stroke patients after hospital discharge and statistically compare the clinical efficacy between traditional and transitional nursing care services. From May 2010 to April 2011, 72 hospitalized patients with strokes from two grade-III class-A hospitals in Chongqing were selected by a convenient sampling method and randomly assigned into intervention and control groups. In the control group (n = 37), conventional nursing care was delivered. In the intervention group (n = 35), transitional nursing care was implemented. The total score of patient compliance in the intervention group was 9.71 ± 1.637, significantly higher compared with 7.22 ± 1.873 (t = 6.011, P < 0.001) in the control group. Sub-scores of rehabilitation training (t = 5.255, P < 0.001), lifestyle (t = 5.156, P < 0.001), and return-visit and follow-up (t = 3.476, P = 0.010) in the intervention group were considerably higher than those in the control group. SQOL and NHPT in the intervention group were significantly enhanced, compared with those in the control group (both P < 0.05). In the intervention group, the increase level of NHPT was calculated as (13.54 ± 16.145) seconds, compared with (6.19 ± 11.974) seconds in the control group (t = 2.185, P < 0.033). In the intervention group, degree of satisfaction with nursing care was calculated as (91.43 ± 8.921)% during hospitalization and (85.14 ± 11.212)% after hospital discharge, significantly higher than (82.43 ± 11.157)% and (56.49 ± 12.956)% in the control group (t = 4.135, P < 0.05; t = 10.010, P < 0.05). Transitional nursing intervention significantly improved patient compliance, SQOL, NHPT, degree of satisfaction, and outpatient visits during and after hospitalization, while exerting no significant effects upon BI index, re-hospitalization rates, and emergency visit rates.

Keywords: Transitional nursing care, clinical efficacy, hospital discharge, stroke

Introduction

Incidence of stroke is alarmingly high in the Chinese population. Epidemiological surveys [1] have demonstrated that the annual average incidence of stroke is approximately 280/10 million in urban areas and 185/10 million in rural regions. Strokes are predisposed in the middle-aged and elderly population and are correlated with poor lifestyle. Strokes are inclined to occur at a younger age. Despite persistent advancement in diagnosis and treatment techniques, a majority of stroke patients experience deterioration in quality of life and an increase in adverse events within 1 to 6 months after onset [2, 3]. In particular, the continuation of health care for patients after hospital discharge has lacked attention in China.

Previous studies [4, 5] have demonstrated that awareness of strokes by affected patients is relatively low in China. A previous study conducted a questionnaire survey evaluating patient awareness and knowledge of strokes in a grade-three class-A hospital in Chongqing. The average score was only (42.81 ± 10.81) points, far below the qualified score of 60 points [6]. Currently, stroke patients demonstrate low compliance to instructions after discharge [7, 8] and low satisfaction with the quality of nursing care after discharge [9]. Hospitalization education and guidance patterns after discharge are in urgent need of improvement and exploration. In China, relevant studies have primarily emphasized improving nursing care during hospitalization, lacking a focus on continuity and coordination of nursing mode. Transitional nursing care refers to the coordination and continuity of health care during the transfer from one health care setting to another or to home. Elderly adults suffering

Table 1. Comparison of baseline data between the two groups

Parameter		Intervention group (n = 35)	Control group (n = 37)	*T* value or x^2 value	*P* value
Age	Mean value	66.54 ± 10.16	64.8 ± 10.49	-0.692[a]	0.491
Gender distribution	Male	27	29	0.016[b]	0.900
	Female	8	8		
Years of education	≤ 12 years	23	26	0.172[b]	0.679
	> 12 years	12	11		
Marital status	Married	29	30	0.038[b]	0.845
	Single	6	7		
Occupation status	Unemployed	31	30	0.780[b]	0.377
	Employed	4	7		
Payment pattern of medical expanse	Full coverage by health insurance	2	4	2.051[b]	0.359
	Partial coverage by health insurance	31	28		
	Self-pay	2	5		
Degree of social support	Excellent	5	4	2.507[b]	0.474
	Good	24	21		
	Moderate	5	11		
	Poor	1	1		
	Extremely poor	0	0		
Diagnostic type	TIA	4	4	1.176[b]	0.555
	CT	21	18		
	CI	10	15		
Type of complications	None	7	10	1.050[b]	0.902
	1	15	17		
	2	9	7		
	3	3	2		
	≥ 4	1	1		

Note: a indicates *t* value, b represents x^2 value.

from a variety of health conditions constantly require health care services in different settings to satisfy individual needs. For younger patients, the focus is on moving successfully from child to adult health services. Nursing practitioners from the United States have achieved fruitful results in improving health outcomes of patients with chronic diseases, reducing health care utility, and enhancing patient satisfaction [10-15]. These have been rarely conducted in China. Patients with strokes will encounter lifestyle changes, decreased self-care capability, and increased safety risks, as well as characteristics of disease recovery after discharge. It was hypothesized that the continuation of the nursing mode may be applicable to stroke patients transferred from hospital to home stay during the transitional period. Reasonable continuation of nursing care contributes to elevated quality of life and lowered medical expenses. Therefore, exploring a transitional nursing mode for stroke patients not only improves the quality of nursing care, but also provides theoretical and practical reference for nursing care during and after hospitalization of over 7.5 million stroke patients in China.

This study aimed to establish a transitional nursing mode applicable to stroke patients in China. In addition, the clinical efficacy of this nursing mode was evaluated and statistically compared with that of conventional nursing care.

Materials and methods

Baseline data

From May 2010 to April 2011, 90 hospitalized patients with strokes from two grade-III class-A hospitals in Chongqing were selected by a convenient sampling method. Eighteen cases were lost to follow-up and 72 patients were eventually recruited for this investigation. All patients were randomly assigned into intervention and control groups. In the control group (n = 37), conventional nursing care was delivered. In the intervention group (n = 35), transitional nursing care was implemented. Independent sample *t*-test was utilized to statistically compare base-

Table 2. Comparison of scores of patient compliance to guidance after hospital discharge between the two groups

Group	Rehabilitation training	Balanced diet	Lifestyle	Rational use of medication	Return-visit and follow-up	Total score
Intervention group	1.83 ± 0.707	2.37 ± 0.547	2.29 ± 0.667	1.69 ± 0.530	1.69 ± 0.676	9.71 ± 1.637
Control group	0.92 ± 0.759	2.22 ± 0.787	1.46 ± 0.691	1.57 ± 0.647	1.08 ± 0.795	7.22 ± 1.873
t-value	5.255	0.967	5.156	0.845	3.476	6.011
P value	< 0.001	0.337	< 0.001	0.401	0.010	< 0.001

Table 3. Comparison of BI index between the two groups

Group	3 days before hospital discharge	12 weeks after hospital discharge	Increase level
Intervention group (n = 35)	75.57 ± 17.772	91.29 ± 8.689	15.71 ± 11.704
Control group (n = 37)	72.97 ± 16.602	86.08 ± 12.368	13.78 ± 7.674
T value	0.641	2.055	0.823
P value	0.523	0.044	0.414

line data between two groups. Chi-squared test was adopted to statistically compare other parameters between the two groups. A *P* value of less than 0.05 indicates statistical significance, as illustrated in **Table 1**.

Inclusion criteria

Patients initially diagnosed with ischemic strokes, those with transient ischemic attacks (TIA), those with cerebral thrombosis (CT) and cerebral infarction (CI), those with slight neurological deficits with a National Institutes of Health Stroke Scale (NIHSS) scores less than 15, patients/caregivers with basic literacy and writing ability, and those living in urban areas adjacent to the hospital were included.

Exclusion criteria

Patients hospitalized for less than 1 week, those that died during the study, those complicated with critical illnesses, such as malignant tumors, heart failure, renal failure, those with a medical history of cognitive disorders or mental illnesses, those that failed to complete nursing interventions and data collection, and those voluntarily withdrawing from the study were excluded.

Intervention regime

The 5-week intervention regime was divided into before and after hospital discharge. Before hospital discharge, health education and nursing evaluations were delivered. At 1 week before hospital discharge, a small-class health education curriculum was implemented to provide guidance for stroke patients after hospital discharge. Additionally, relevant instructions on patient compliance were administered and a self-designed diary was distributed, including rehabilitation training, diet adjustment, lifestyle, rational use of medication, and regular follow-up. A nursing evaluation sheet based on the Omaha questionnaire was distributed to enhance the knowledge and self-nursing skills of stroke patients. Following hospital discharge, telephone follow-ups and home visits were administered. At 1 week after hospital discharge, telephone follow-ups were conducted to understand the implementation of the health goals of stroke patients. Patients were encouraged to write and fill out the diary. Understanding patient compliance with discharge guidance, providing appropriate health instructions/counseling to screen risk factors of stroke, and assistance regarding rehabilitation training methods and referrals to physicians and nurses was recommended when necessary. At 4 weeks after discharge, family visits were performed with the same content as the third nursing activity. Home rehabilitation exercises were emphasized. Burnnstom staging was adopted to examine the recovery degree to provide rehabilitation training instructions for patients during home stay.

Patient compliance

Compliance was mainly measured by direct observational and self-reporting methods.

Table 4. Comparison of NHPT between the two groups

Group	3 days before hospital discharge	12-week end after hospital discharge	Increase level (second)
Intervention group (n = 35)	86.31 ± 33.322	72.71 ± 29.925	13.54 ± 16.145
Control group (n = 37)	92.73 ± 36.435	84.65 ± 32.842	6.19 ± 11.974
t-value	-0.778	-1.609	2.185
P value	0.439	0.112	0.033

Table 5. Comparison of SQOL scores between the two groups

Group	3 days before hospital discharge	12 weeks after hospital discharge	Increase level
Intervention group (n = 35)	1.37 ± 0.877	2.63 ± 0.690	1.23 ± 0.877
Control group (n = 37)	1.49 ± 0.804	2.11 ± 0.774	0.62 ± 1.010
T value	-0.581	3.006	2.716
P value	0.563	0.004	0.008

Patient compliance was assessed by self-designed compliance questionnaires. Referring to guidance after discharge, patients were required to self-report the implementation of 5 items related to compliance behavior, including rehabilitation training, a balanced diet, lifestyle, regular medication, return-visits, and follow-ups, on a scale of 0-3 points. The total score was 15 points, with 15 to 10 points prompting a high degree of compliance guidance, 9 to 5 points indicating a moderate degree of compliance, and 4 to 0 points representing a low degree of compliance.

Quality of life

Assessment of activities of daily living scale (ADL) and the Barthel Index (BI) are well-established and validated measurement tools of ADL. This consisted of excrement control, urine control, washing and make-up, eating, use of the toilet, bed transfer, dressing, walking on the ground, up and down the stairs, and bathing, on a scale of 0 to 100 points. Higher scores indicated higher independence and less dependence. According to BI scores, ADL can be divided into good (100-61), moderate (60-41), and poor (40-0) levels.

Hand operation ability

In 1971, Kell first reported the Nine Hole Peg test (NHPT). Previous studies have shown that NHPT can reflect hand flexibility and hand operation ability. This is an effective, simple, and inexpensive evaluation tool for upper limb function in patients with strokes.

Subjective quality of life

Subjective quality of life (SQOL) refers to the patient's self-perceived health status. Patients self-report their knowledge and feelings of all aspects of health, reflecting patient satisfaction and acceptability to the health status. The latest research has suggested that SQOL is of significant reference value for mortality. It is reflected by a question "How you rate your health experience in the past week?" Scores range from 0-4 points, which correspond to excellent, good, moderate, poor, and extremely poor. Higher scores indicate better SQOL.

Utilization of health service

This item contains three commonly used parameters, including frequency of hospitalization health service, frequency of emergency health service, and frequency of outpatient health service. In this study, these three parameters were recorded and analyzed within 12 weeks after hospital discharge.

Patient satisfaction with nursing care

Transitional care mode is a continuous and comprehensive intervention for nursing care during and after hospital discharge. Consequently, patient satisfaction with nursing care was evaluated by patient satisfaction with hospital care (PSHC) and patient satisfaction with discharge care (PSHC). Two questions "Are you satisfied with this inpatient nursing service?" and "How satisfied are you with this outpatient care service?" were designed. Scores were on

Table 6. Comparison of the utilization of health service between the two groups (unit: %)

Frequency	Re-hospitalization		Emergency care		Outpatient visit	
	Intervention group	Control group	Intervention group	Control group	Intervention group	Control group
0	29 (82.86)	29 (18.38)	30 (85.71)	30 (81.08)	7 (20.00)	19 (51.35)
1	5 (14.29)	7 (18.92)	5 (14.29)	6 (16.22)	17 (48.57)	14 (37.84)
2	1 (2.86)	1 (2.70)	0 (0.00)	1 (2.70)	8 (22.86)	3 (8.10)
≥ 3	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	3 (8.57)	1 (2.70)
x^2 value	0.278		1.036		9.053	
P value	0.870		0.596		0.029	

Table 7. Comparison of degree of satisfaction with nursing care between the two groups

Group	Degree of satisfaction with hospital nursing care	Degree of satisfaction with nursing care after hospital discharge
Intervention group (n = 35)	91.43 ± 8.921	85.14 ± 11.212
Control group (n = 37)	82.43 ± 11.157	56.49 ± 12.956
T value	4.135	10.010
P value	< 0.001	< 0.001

a scale of 0-100 with a score interval of 10. Higher scores indicate higher patient satisfaction with nursing service.

Statistical analysis

Relevant data at 3 days before discharge and 12 weeks after discharge were collected. SPSS19.0 statistical software package was utilized for data analysis. Obtained data were encoded and entered into the database. Missing data were substituted by the average or mode value. Quantitative data between two groups were statistically compared using independent sample *t*-test. The ratio comparison was performed by using Chi-squared test between the two groups. A *P* value of less than 0.05 indicates statistical significance.

Results

Effects of transitional nursing intervention on patient compliance to guidance after discharge

Independent sample *t*-test was utilized to compare the total score and sub-score of each parameter of patient compliance. The total score of patient compliance in the intervention group was 9.71 ± 1.637, significantly higher than 7.22 ± 1.873 ($t = 6.011$, $P < 0.001$) of the control group. Sub-scores of rehabilitation training ($t = 5.255$, $P < 0.001$), lifestyle ($t = 5.156$, $P < 0.001$), and return-visit and follow-up ($t = 3.476$, $P = 0.010$) in the intervention group were considerably higher than those in the control group. No statistical significance was observed in sub-scores of a balanced diet ($t = 0.967$, P = 0.337) and rational use of medication ($t = 0.845$, $P = 0.401$) between the two groups, as demonstrated in **Table 2**.

Effects of transitional nursing intervention on quality of life

Quality of life was assessed at 3 days before discharge and 12 weeks after discharge. Comparative analysis revealed that SQOL and NHPT in the intervention group were significantly enhanced, compared to the control group (both $P < 0.05$). No statistical significance was observed in the increase of BI index between intervention and control groups ($t = 0.823$, $P > 0.05$), as illustrated in **Table 3**.

In the intervention group, the increase level of NHPT in the intervention group was calculated as (13.54 ± 16.145) seconds, which was significantly higher compared with (6.19 ± 11.974) seconds in the control group ($t = 2.185$, $P < 0.033$). However, no statistical significance was noted in NHPT at 3 days before hospital discharge ($t = -0.778$, $P < 0.439$) and 12 weeks following hospital discharge ($t = -1.609$, $P < 0.112$), as illustrated in **Table 4**.

In the intervention group, the increase level of SQOL in the intervention group was 1.23 ±

0.877, which was significantly higher compared 0.62 ± 1.010 in the control group (t = 2.716, P = 0.008). In the intervention group, the SQOL score at 12 weeks after hospital was considerably higher (t = 3.006, P = 0.004), whereas the SQOL score at 3 days before discharge did not differ from those in the control group (t = -50.581, P = 0.563), as demonstrated in **Table 5**.

Effects of transitional nursing intervention on utilization of health service

No statistical significance was documented in terms of the re-hospitalization rates and frequency of emergency care service (x^2 = 0.278, P > 0.05; x^2 = 1.036, P > 0.05). However, the frequency of outpatient visits in the intervention group was significantly higher than the control group (x^2 = 9.053, P < 0.05), as illustrated in **Table 6**.

Effects of transitional nursing intervention on patient satisfaction with nursing care

In the intervention group, degrees of satisfaction with nursing care were calculated as (91.43 ± 8.921)% and (85.14 ± 11.212)% during hospitalization and after hospital discharge, significantly higher than (82.43 ± 11.157)% and (56.49 ± 12.956)% in the control group (t = 4.135, P < 0.05; t = 10.010, P < 0.05), as demonstrated in **Table 7**.

Discussion

Findings of the present investigation demonstrated that the total compliance score in the intervention group was significantly higher than the control group at 12 weeks after discharge, suggesting that combined application of compliance diary and transitional nursing care can significantly improve compliance of patients to instructions and guidance after hospital discharge. The diary is a self-reminder and self-expression of self-compliance behaviors of the patients. Specialist nurses encourage and urge patients to record in the diary twice, during nursing activities after hospital discharge. Encouragement and supervision from physicians and nurses are vital factors leading to increased patient compliance. Approximately half of the patients, especially elderly patients and those with low levels of education, were prone to delay or forget writing in the diary in the first week after hospital discharge. Therefore, it is of great significance for nurses to remind the patients of writing during the first telephone follow-up.

The total score in the intervention group was increased mainly from the three sub-scores of rehabilitation training, daily life, and follow-up visits. Of these, two items of rehabilitation training and daily life were significantly increased. Stroke patients delivered feedback that the training of upper limbs and fingers was safe, simple, and easy to learn. This consisted of exercising the joints and corresponding muscle groups of upper extremities and fingers, suitable for repeated practice during home stay. Patients reported a high level of acceptance and satisfaction with these exercises, which may be the reason why the degree of patient compliance in the intervention group was significantly higher than the control group. There were no significant differences in the scores of a balanced diet between the two groups. Stroke patients had a higher baseline level of compliance with diet, probably because of the concept of dietary therapy trusted by traditional Chinese values. Most stroke patients tended to pay intensive attention to maintaining a balanced and healthy diet. Stroke patients were routinely instructed to attend follow-up visits at 4 and 12 weeks after hospital discharge. Since stroke patients enrolled in this study presenting with mild neurological deficits, relevant symptoms were significantly alleviated at 12 weeks after discharge. They were subsequently transferred to a community care center or private out-patient for medicine prescriptions, thereby leading to less compliance with return-visits and follow-ups in the control group than the intervention group.

Moreover, quality of life of the patients experienced a period of self-adaptation and rehabilitation. Therefore, BI index, SQOL, and NHPT suggested that quality of life was elevated to varying degrees in both the intervention and control groups. Changes in these three parameters were statistically compared between the two groups, demonstrating that SQOL and NHPT in the intervention group were considerably enhanced compared with those in the control group. No statistical significance was observed in terms of the BI index between two groups. In this investigation, no significant

increase was noted in terms of the ADL, consistent with findings previously reported [16]. This study evaluated the effects of a comprehensive nursing regime after hospital discharge upon stroke patients diagnosed with mild neurological defects, finding no statistical significance in terms of NIHSS scores and quality of life (stroke-specific quality of life scale, SS-QOL) among different groups. Results suggest that slight neurological defects might limit improvement levels of nerve function, directly decreasing the increase in quality of life. Possible causes for insignificant changes in the BI index were analyzed in this study, as follows. First, all enrolled patients with mild neurological impairment had baseline BI data of 75 points, classified as mild dyskinesia, in both groups. At 12 weeks after discharge, daily living ability had a self-recovery process. BI index in both the control and intervention groups was significantly increased at 12 weeks after hospital discharge. Second, although the reliability and validity of the BI index scores have been widely confirmed, previous studies [17-19] have found that, in the evaluation of stroke patients, BI index merely comprised 10 items of basic daily activities. This index lacked the evaluation of middle-to-high levels of daily living activities. Therefore, its sensitivity was limited. In addition, a 4-point scale cannot reflect small changes in function. Independent living ability depends on the recovery of neurological deficits. Rehabilitation of stroke patients is a long process and is subject to various factors, such as the type of disease, complications, and social support. The design of nursing activities may also lack of certain interventions which can promote the recovery of neurological function.

Transitional nursing interventions have failed to reduce re-hospitalization rates and emergency visit rates, but increased the frequency of outpatient visits at 12 weeks after hospital discharge. After hospital discharge, doctors required the stroke patients to attend follow-up visits at 1 and 3 months after discharge. Some patients, especially those who self-paid for medical expenses and were diagnosed with mild neurological deficits, were inclined to ignore the importance of return-visits. Two follow-up visits promoted and enhanced their awareness of the importance of follow-up visits, probably because the transitional nursing interventions significantly increased the frequency of outpatient visits. This is also consistent with the findings of increased patient compliance during return-visits and follow-ups. Previous studies have demonstrated that nursing intervention regimes after hospital discharge enhanced the utilization rate of health care resources, probably because the health demand of patients was activated by intervention measures or poor health status of the patients was identified early [20]. In alternative research, follow-ups after hospital discharge could significantly enhance re-hospitalization rates.

Transitional nursing intervention can significantly improve the degree of satisfaction with nursing care during hospitalization and after hospital discharge. This was consistent with the findings of previous investigations [13, 16-18]. Notably, the degree of satisfaction in the control group was relatively low, indicating that conventional nursing care after discharge was not qualified for the clinical requirements of stroke patients discharged. This was in line with findings reported by Boter et al. [21] suggesting that approximately 50% of the patients are dissatisfied with conventional nursing care after discharge.

Conclusion

Results of the present study have demonstrated that application of conventional nursing intervention considerably enhances patient compliance with nursing instructions and guidance from nurses and physicians. It elevates SQOL, NHPT, degree of patient satisfaction, and outpatient visits, while exerting no significant effects upon BI index, re-hospitalization rates, and emergency visit rates.

Study limitations

There were several limitations to the present study. The effects of transitional nursing upon long-term quality of life of stroke patients was not evaluated and remains to be elucidated by subsequent research. Moreover, the sample size was relatively limited. Findings in the current study should be further validated by large sample size investigations.

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Disclosure of conflict of interest

None.

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