

## Application of Transitional Care in Hemiplegia Patients During Recovery of Ischemic Stroke Via Cloud Follow-up System

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### Abstract

To investigate the effect of transitional care via cloud follow-up system on self-efficacy and living quality of hemiplegia patients during recovery of ischemic stroke. Methods 110 discharged patients from our hospital dating between September 2017 to May 2019 were selected and divided into the treatment group and the control group with 55 patients in either, by random numbered tabs. The control group was given routine discharge guidance, and the treatment group was provided transitional care via cloud follow-up system. The scores of self-efficacy and living quality of two groups are compared before treatment, 1 month, 3 months and 6 months after treatment. Results After treatment, the scores of self-efficacy and living quality of the treatment group are both higher than those in the control group, with statistically significant results ( $P < 0.05$ ). Conclusion Transitional care via cloud follow-up system can improve the self-efficacy and living quality of hemiplegia patients during recovery of ischemic stroke.

### Keywords

Ischemic stroke; Recovery; Transitional care; Cloud follow-up system.

### 1. Introduction

Stroke is a kind of common refractory disease, with high morbidity, mortality, recurrence rate and disability rate, which is the second leading cause of death and the first general cause of disability in the world[1]. As the most common type of stroke, ischemic stroke accounts for 69.6%-70.8% of total stroke in China[2]. Patients with hemiplegia which is one of the serious complications after stroke often face the problems of limb motor dysfunction and low ability of daily life causing serious burden on family and society. Relevant researches point out that[3, 4] the recovery period is from 2 weeks to 6 months after the onset of stroke, during which providing professional guidance for patients can effectively reduce the disability and improve the living quality of patients. However, due to the limitation of nurse resource and other resources from the hospital, most of the patients are unable to receive continuous guidance after discharge, resulting in treatment interruption. Transitional care can provide medical services and health guidance for patients and ensure that patients receive cooperative and continuous guidance from the hospital to family or different departments of the hospital[5]. This mode has been proved to be effective in improving the living quality of hemiplegia patients after stroke[6]. In recent years, with the rapid development of technology, more and more medical staff have applied new Internet technology to transitional care[7]. Based on the "Internet + medical treatments", this study used the "BIHUYIHU" system to carry out transitional care for patients who were suffering from hemiplegia during recovery of ischemic stroke and achieved satisfactory results. The report is as follows.

## 2. Objects and methods

### 2.1 Research object

Based on data availability, between September 2017 and May 2019, 110 hemiplegia patients during recovery of ischemic stroke in Xi'an hospital of TCM were included in the present study with convenient sampling. According to random number tabs, they were divided into the treatment group and the control group, with 55 patients in either. Shown in Table 1, the difference between gender, age, and side of hemiplegia of the two groups are not significant ( $P > 0.05$ ). This study was approved by the ethics committee of Xi'an hospital of TCM. Informed consent was obtained from all participants.

Table 1 General information

Group	Number	Gender		Age	Hemiplegia side	
		Male	Female		Left	Right
Treatment	54	31	23	68.56±6.629	30	24
Control	49	31	18	68.24±6.591	28	21
$t/\chi^2$		0.368		0.238	0.026	
P		0.544		0.812	0.871	

### 2.2 Inclusion and exclusion criteria

Inclusion criteria: patients meet the diagnostic criteria of ischemic stroke[2], which was confirmed by neuroimaging such as CT or MRI, with paralysis; The onset time was 2 weeks to 6 months; Patients had stable condition and clear consciousness; Patients or caregivers can operate smartphones. Exclusion criteria: It was confirmed that there was a history of transient ischemic attack, multiple sclerosis, systemic lupus erythematosus, Parkinson's disease, brain injury, malignant tumor, and other diseases.

### 2.3 Research methods

The control group received routine discharge guidance and telephone follow-up. The treatment group was carried out transitional care on the basis of the control group. The treatment time was 6 months.

#### 2.3.1 Routine guidance of the control group

Before discharge, the primary nurse distributed the knowledge manual to patients and instructed them or their caregivers in the aspects of lifestyle, diet, and medication, recovery exercise, self-inspection when palindromic. The time of telephone follow-up was conducted at 1 month, 3 months and 6 months after discharge.

#### 2.3.2 Transitional care for the treatment group

##### 2.3.2.1 Form the transitional care group

There were 10 members in the group, including 1 supervisor of nursing postgraduate students, 2 brain branch doctors, 1 physical therapist, 1 psychological consultant, 3 brain branch nurses, and 2 nursing postgraduate students. All of them were in rich knowledge of stroke, which allows them to provide professional guidance for patients or their caregivers. The specific functional division is shown in Table 2.

Table 2 Functional division

Role	Duty
Supervisor of nursing postgraduate students	Develop transitional care plans and supervise the quality of the follow-up process.
Doctors	Answer questions online, solve professional problems, check the content of documents.
Therapists	Develop individualized recovery plans.

Psychologists	Psychological guidance.
Nurse	Develop push content, supervise patients, answer questions online, follow up by phone.
Postgraduate	Develop push content, collect and process data

### 2.3.2.2 Treatment measures

①Taking into account demands of hemiplegia patients[8, 9] and consulting relevant literature, we designed the contents of articles to be pushed, which included what to do from aspects of life guidance, rehabilitation guidance, complications nursing, health education, diet and medication, psychological guidance, etc.; ②Patients or their caregivers followed “BIHUYIHU” system before discharge, and were instructed how to use it, which ensured that they were able to send and receive text, voice, pictures; ③The system recorded patients’ discharge time, pushed an article to the designated patient every 3 days. The content of all pushed articles is approved by experts; ④Patients who have browsed the article will be advised to give feedback to the system through text, voice, pictures or other forms. Those who did not reply for 24 hours would be contacted by the group members separately to ensure that each patient in the treatment group could browse the pushed articles. The caregivers of the patients were required to upload the rehabilitation photos to the system every day to ensure the continuous rehabilitation; ⑤Patients were followed up through telephone one month, three months and six months after discharge. Before each follow-up, patients were asked about the situation and the follow-up effect was evaluated. The areas of the patient did not understand was emphasized again. Record the effect results, so as to know the rehabilitation situation of patients after discharge in time; ⑥For the consultation of patients, the team members responded within 24 hours, most of the response were arranged at 18:00-20:00 every day. Collect the problems with more consultation, and make popular science articles to push; ⑦Team members paid attention to the continuous improvement of the system, maintenance and sending more proper content for patients’ daily life and requirements.

## 2.4 Observation index

### 2.4.1 Self-efficacy index

Self-efficacy refers to an individual's self-confidence in the ability to perform a specific behavior and achieves the expected results. In this study, the Chinese version of general self-efficacy scale (GSEs) was used to evaluate the patients' self-efficacy. The scale is composed of 10 items and takes the form of a Likert 4 subscale. The scores of each item are 1-4 points[10], corresponding to “totally incorrect”, “a little correct”, “most correct” or “completely correct”, which were answered by patients according to their own actual situation. The higher the total score, the higher the self-efficacy of the patients. The GSEs has good reliability and validity, whose internal consistency coefficient is 0.87and the retest reliability of one-week interval is 0.83. In terms of validity, the correlation coefficient between 10 items of GSEs and the total scale score is between 0.60 and 0.77.

### 2.4.2 Ability of daily life activities index

The ability of daily living activities was assessed with the modified Barthel Index scale (MBIs)[11]. The scale can effectively reflect the disease progress and functional changes of patients. It is mainly used to evaluate the ability of the daily life of patients, including eating, dressing, and other items. Each item is set with 0, 5, 10 points. The full score is 100 points, 0-20 points for extremely serious self-care functional defects, 25-45 points for serious functional defects, 50-70 points for moderate dysfunction, 75-95 points for mild functional defects, and 100 points for daily life self-care. The scale has good reliability and validity in the evaluation of stroke and can reflect the changes in patients' condition and functional progress comprehensively.

## 2.5 Data collection method

Two groups were collected from questionnaire data before discharge. The investigators receiving unified training pushed questionnaire through telephone follow-up at 1 month, 3 months, 6 months

after discharge, who were concealed information of the grouping. The investigators used unified guidance to explain the questionnaire to patients or their caregivers, guided them to fill in.

## 2.6 Statistical methods

SPSS 25.0 statistical software was used for statistical analysis. The measurement data is represented by  $\bar{x} \pm s$ , and further, the data is tested for normality. If the normal distribution is satisfied, the multiple repeated measurements are used for comparison between the treatment group and the control group in the whole process (before discharge, 1 month, 3 months, 6 months after discharge). The independent sample *t*-test is used for comparison between the groups at each time point, and the rank-sum test is used if it is not satisfied; the  $\chi^2$  test was used for the comparison of the rate,  $P < 0.05$  for the difference.

## 3. Results

### 3.1 Comparison of GSEs score

A total of 110 questionnaires were sent to the patients before discharge, and all of them were effectively collected. As a result of follow-up, 7 patients (1 patient from the treatment group and 6 from the control group) lost their contacts or quitted during the follow-up process, a total of 103 effective questionnaires were collected in consequence. The GSEs score of the treatment group and the control group were compared, which was found that in the whole treatment process, different treatment methods and different time points had different GSEs score, and there was interaction between treatment methods and time on GSEs score. The statistical differences were statistically significant ( $P < 0.05$ ), and the GSEs score of the treatment group was higher than those in the control group at 1, 3 and 6 months after discharge ( $P < 0.05$ ). The GSEs score of the treatment group was higher than those in the control group at different time points ( $P < 0.05$ ). It was found that the GSEs score of the treatment group and the control group increased gradually with the extension of the treatment time, but the increasing trend of the treatment group was better than that of the control group, indicating that in the whole follow-up process The GSEs score of the treatment group was better than that of the control group.

Table 3 Comparison of GSEs score of two groups

Group	Number	Before discharge	1 month	3 month	6 month	Ftime	Finteraction	Fgroup
Treatment	54	19.61 ± 1.92	25.19 ± 2.16	27.56 ± 2.27	29.80 ± 2.55	808.977	5.804	16.292
Control	49	18.94 ± 2.30	23.82 ± 2.17	26.10 ± 2.03	27.45 ± 2.31			
t		1.619	3.211	3.409	4.878			
p		0.109	0.002	0.001	0.000	<0.001	0.002	<0.001

### 3.2 Comparison of MBIs score

The MBIs score of the treatment group and the control group were different in different treatment methods and different time points during the whole follow-up process, and there was interaction between treatment methods and time on MBIs score. The statistical differences were statistically significant ( $P < 0.05$ ). Comparison between groups at different time points showed that there was no statistically significant difference in MBIs score between groups before treatment ( $P > 0.05$ ). The MBIs score of the treatment group were higher than those of the control group at 1, 3 and 6 months with significant differences ( $P < 0.05$ ). Pairwise comparison at different time points showed that both the treatment group and the control group showed a trend of increasing MBIs score with the extension of treatment time, but the increase trend of MBIs score in the treatment group was better than that in the control group, indicating that the MBIs score in the treatment group was better than those in the control group during the whole follow-up process.

Table 4 Comparison of MBIs score of two groups

Group	Number	Before discharge	1 month	3 month	6 month	Ftime	Finteraction	Fgroup
Treatment	54	40.46±6.54	54.91±10.30	69.17±11.23	75.74±10.88	12.226	4.195	461.535
Control	49	39.29±8.10	49.69±8.25	62.24±8.42	68.67±10.55			
t		0.815	2.816	3.510	3.341			
p		0.417	0.006	0.001	0.001	0.001	0.011	<0.001

#### 4. Discussion

The results show that: There was no significant difference in GSEs score and MBIs score between the two groups before treatment ( $P > 0.05$ ); GSEs score and MBIs score of the treatment group were significantly higher than those of the control group ( $P < 0.05$ ) at 1, 3 and 6 months after the treatment. It can be seen that the implementation of transitional care is helpful to improve patients' self-efficacy and living quality, which is consistent with most studies<sup>[12-16]</sup>.

Traditional nursing after discharge is mainly provided guidance by medical staff to patients unilaterally, with a single form and poor timelines. Moreover, they only pay attention to the patient's disease, but not to the patient's psychological conditions. Most of the patients included in this study are the elderly than 60 years old. The elderly often lack energy and physical strength and are prone to fatigue. And 80% of the discharged patients will return to their previous unhealthy life style<sup>[17]</sup> and are unable to implement a rehabilitation plan strictly, which leads to a slow recovery process, and further to inferiority, resistance and other emotions resulting in poor prognosis.

Taking patients as the cores, this study used "BIHUYIHU" as the cloud follow-up system to carry out transitional care, and fully considered the characteristics of the patients and their demands. After the discharges, we designed relevant content according to the actual situation of patients pushed the relevant knowledge in forms of text, pictures, and videos, etc., as well as asked patients to interact in time to ensure the effectiveness of communication, and. This method is helpful for patients to understand the relevant knowledge of stroke. And the real-time exchange of one-to-one in the system helps medical staff fully understand the patients' condition changes so that they can provide the most direct guidance for specific situations. Patients also can get health guidance from medical staff without leaving home.

Compared with the traditional nursing after discharge, the transitional care mode is richer in forms and contents, avoiding the monotony of traditional follow-up, encouraging patients to self-regulation, forming good living habits, and helping patients to deal with diseases with a positive and optimistic attitude. At the same time, it deepens patients' recognition of the role of medical staff and harmonizes the relationship between doctors and patients. In addition, as the main participants of transitional care, the professional level of medical staff has been further improved through systematic learning.

#### 5. Conclusion

Transitional care is the extension of inpatient nursing service. Via "BIHUYIHU" system, the traditional nursing service platform is formed, which makes the relationship between patients and medical staff closer, ensures the implementation of continuous nursing, and plays an active role in promoting the recovery of patients. However, due to the limitation of resources, this study only included about 100 patients, all of them were hemiplegia patients after stroke, and the follow-up time was within 6 months after discharge. In the future, it is suggested to expand the sample size and increase the duration of transitional care treatment to explore the long-term impact of transitional care mode on patients.

## References

- [1] Zhang MQ, Lu JF, Chen CH. Progress in the therapeutic use of methylene blue in ischemic stroke. *Acta Anatomica Sinica* 2019; 50(05):677-683.
- [2] Chinese Society of Neurology; Chinese Stroke Society. Chinese guidelines for diagnosis and treatment of acute ischemic stroke 2018. *Chinese Society of Neurology* 2018; 51(9):666-682.
- [3] Gao CY, Wu CH, Zhao JG, et al. Chinese guidelines for diagnosis and treatment of cerebral infarction by integrated Chinese and western medicine 2017. *Chinese Journal of Integrated Traditional and Western Medicine* 2018; 38(02):136-144.
- [4] Hayward K S, Kramer S F, Thijs V, et al. A systematic review protocol of timing, efficacy and cost effectiveness of upper limb therapy for motor recovery post-stroke. *Systematic reviews* 2019; 8(1): 187.
- [5] Hirschman K B, Shaid E, McCauley K, et al. Continuity of care: The transitional care model. *Online J Issues Nurs* 2015; 20(3).
- [6] Zhang HX. Application of Continuity Nursing in Rehabilitation Nursing of Stroke Patients with Hemiplegia. *Inner Mongolia Medical Journal* 2018; 50(04):481-483.
- [7] Tian L, Chen Y. Research progress on Internet + transitional care. *Journal of Nursing Science* 2019; 34(17):17-20.
- [8] Tang S, Li L, Yan CX, et al. Investigation on continuing nursing needs of stroke patients. *Chinese Nursing Research* 2018; 32(19):3103-3106.
- [9] Padberg I, Knispel P, Zöllner S, et al. Social work after stroke: identifying demand for support by recording stroke patients' and carers' needs in different phases after stroke. *BMC neurology* 2016; 16(1): 111.
- [10] Volz M, Voelkle M C, Werheid K. General self-efficacy as a driving factor of post-stroke depression: a longitudinal study. *Neuropsychological rehabilitation* 2019; 29(9): 1426-1438.
- [11] Geng G, He W, Ding L, et al. Impact of transitional care for discharged elderly stroke patients in China: an application of the Integrated Behavioral Model. *Topics in stroke rehabilitation* 2019; 1-9.
- [12] Zhang ZT, Chen L, Zhang TT. Impact of Continuous Psychological Nursing Care on Negative Emotion in Patients with Stroke Sequela. *Chinese General Practice* 2018; 21(S2):227-228.
- [13] Wang Y, Yang F, Shi H, et al. What type of transitional care effectively reduced mortality and improved ADL of stroke patients? A meta-analysis. *International journal of environmental research and public health* 2017;14(5): 510.
- [14] Yao H, Chang H, Wang XJ. The study of improving patients' quality of life with mild to moderate stroke by mobile phone APP. *Chinese Nursing Management* 2017;17(01):103-107.
- [15] Zhang M, Wang YL, Liu L, et al. Assessing the effect of continuing nursing care for patients with stroke. *Journal of Nursing Science* 2015; 30(05):30-32.
- [16] Li Q, Li CH, Sun L, et al. Impact of continuous nursing on the activity of daily living in stroke patients: a meta-analysis. *Chinese Nursing Research* 2018; 32(13):2075-2083.
- [17] Gao J, ZhuanSun CC, Li F, et al. The impact of transitional care based on the WeChat platform on the rehabilitation of patients with chronic heart failure. *Chinese Journal of Prevention and Control of Chronic Diseases* 2018; 26(11):861-863.