Application Effect of WeChat Platform Continuity of Care Model Based on KAP Theory on Self-Management of Stroke Patients with Hypertension

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Abstract: *Objective:* To explore the impact of the WeChat platform continuity of care model based on the KAP (knowledge, attitudes, and practices) theory on the self-management of stroke patients with hypertension after discharge from the hospital. *Methods:* 62 stroke patients with hypertension discharged from the rehabilitation department of a tertiary A hospital in Nanning City, Guangxi Zhuang Autonomous Region, from October 2022 to April 2023 were sampled by convenience sampling method. Patients discharged from Rehabilitation I were included in the control group, and conventional nursing care was used; while patients discharged from Rehabilitation II were included in the observation group, and WeChat platform continuity of nursing care model based on the KAP theory was implemented. The intervention effect of the two groups was compared. *Results:* After 4 and 12 weeks of intervention, the diastolic and systolic blood pressure of the patients in the observation group were lower than those in the control group ($P < 0.05$); after 12 weeks of intervention, the rate of medication adherence and the score of adherence to hypertension treatment in the observation group were significantly higher than those in the control group ($P < 0.05$). *Conclusion:* The application of the WeChat platform continuity of care model based on KAP theory to stroke patients with hypertension can improve blood pressure, medication adherence rate, hypertension treatment adherence, and overall enhance the self-management level of these patients.

Keywords: WeChat platform; Stroke; Hypertension; Continuity of care; Self-management

1. Introduction

Stroke is a major chronic disease that endangers health and is the second leading cause of death worldwide, with five major characteristics: high morbidity, high disability, high mortality, high recurrence, and high economic burden [1], which brings a heavy burden to the patient's family and society. The World Health Organization pointed out that hypertension is the main cause of cardiovascular disease worldwide and an important cause of death in patients with cardiovascular disease, and hypertension is an independent risk factor for stroke [2-4]. According to statistics, 70% of stroke patients in China have hypertension, and the risk of disease recurrence in stroke patients with hypertension is as high as 30%, and the recurrence rate is closely related to the severity

of hypertension [5,6]. According to the literature, the blood pressure regulation function of stroke patients presents a low level, coupled with the lack of professional healthcare personnel to manage stroke patients with hypertension after discharge, the treatment and care continuity from hospitalization to discharge is interrupted, and the patients' adherence to the treatment of hypertension and medication, and the control of blood pressure are all at a low level [7,8]. In order to promote better recovery of stroke patients, it is important for stroke patients with hypertension to perform good self-management [9]. However, traditional post-discharge health education methods are often limited by time and space and are ineffective in improving the self-management ability of stroke patients with hypertension [10,11]. Therefore, this study aimed to use the WeChat platform continuity of care model based on the KAP (knowledge, attitudes, and practices) theory to educate stroke patients with hypertension about disease-related knowledge, reminders of medication taking, and monitoring of blood pressure to explore the effects of the KAP theory-based WeChat platform continuity of care model on these patients' self-management improvement effect.

2. General information and methods

2.1. General information

A purposive sampling method was used to select 62 stroke patients with hypertension discharged from the rehabilitation department of a tertiary A hospital in Nanning City, Guangxi Zhuang Autonomous Region, from October 2022 to April 2023. Patients discharged from Rehabilitation I were included in the control group, and patients discharged from Rehabilitation II were included in the observation group, with 31 cases in each group. The control group had routine discharge care and telephone follow-up, and the observation group implemented the KAP theory-based WeChat platform continuity of nursing care. Inclusion criteria: (1) age ≥ 18 years old, brain CT or MRI clearly indicated stroke patients; (2) the average blood pressure value during hospitalization was systolic blood pressure (SBP) ≥ 130 mmHg (1 mmHg = 0.133 kPa) and/or diastolic blood pressure (DBP) ≥ 80mmHg; (3) patients with informed consent, voluntarily participated in the study, and were conscious and cooperative; (4) patients with smartphones and a WeChat account and had not participated in other Internet health management programs. Exclusion criteria: (1) expected survival of less than 3 months; (2) patients with visual impairment; (3) patients who were readmitted to the hospital; (4) patients who withdrew from the study halfway; (5) patients who did not complete the observation due to other reasons.

2.2. Methods

In the control group, routine nursing care was conducted for patients during their hospitalization, the content of which included two times of stroke and hypertension-related knowledge education. Patients were gathered in the vacant room and provided knowledge in the form of PowerPoint presentation playback for 20–30 minutes each time, including medication guidance, psychological counseling, and so on. During hospitalization, patients and their families were taught the methods of blood pressure monitoring. Routine discharge guidance was conducted on the day of discharge, the patients' method of measuring blood pressure was checked and corrected if wrong; the patients were informed of regular monitoring of blood pressure and blood pressure control values according to the level of blood pressure when they are hospitalized; and telephone follow-up and related health guidance were provided to the patients every 2 weeks after discharge.

For the observation group, the team of the WeChat platform continuity of care model based on KAP theory consisted of six members, including the researcher, one chief physician, one attending physician, one rehabilitator, and two supervising nurses. The intervention content of the WeChat platform continuity of care model based on KAP theory is as follows.

(1) Knowledge (K): (a) Disease-related knowledge: The concept of stroke, classification, risk factors, clinical manifestations, common complications, prevention methods, misconceptions about stroke, grading of hypertension, monitoring of blood pressure, and dietary guidance for hypertension were provided. Disease-related knowledge was made into a QR code using Questionnaire Star and uploaded to the WeChat group in the form of a WeChat group announcement. The blood pressure measurement method was recorded as a video and uploaded to the group. (b) Functional exercise: According to the rehabilitation exercise program formulated for patients by doctors and rehabilitators at the time of discharge, the content was uploaded to the WeChat group in the form of pictures and videos. Patients were instructed to carry out daily training consciously, more than 3 times a week, 30 minutes each time.

(2) Attitudes (A): Case sharing and experience exchange among patients were organized every four weeks in the WeChat group to achieve mutual encouragement and enhance confidence in overcoming the disease. Healthcare workers actively guided patients to speak in the group, closely observed patients' language expression, discovered patients' negative emotions in time, gave patients detailed answers to their misperceptions of the disease and negative psychology, and provided patients with sufficient spiritual support.

(3) Practices (P): The intervention of the above two links laid the foundation for the patients' correct cognition of the disease and the enhancement of their self-beliefs, which prompted the patients to have a more positive compliance behavior, take medication on time, carry out functional exercises and blood pressure measurement, as well as urged the patients to take medication punch cards in the group, upload daily blood pressure records, etc.

The WeChat platform continuity of nursing care program based on the KAP theory was implemented on the basis of the routine care implemented in the control group. On the day of discharge, patients' WeChat were added to a WeChat group, medication punch cards were issued, and the patients' medication punch cards were formulated according to the discharge medical advice, with the contents of the medication punch cards as the name of the medication, time, and dosage, in order to remind the patients to take antihypertensive medication on time. Patients were taught to check the QR code of knowledge, pictures, and videos distributed in the group, and the patients' knowledge learning was assessed in the background. Patients were instructed to take medication punch cards and send the daily measured blood pressure values to the group in time, so that the researchers could promptly check the patients' blood pressure situation and provide feedback, and the patients could consult the healthcare personnel in time in the group if they had any questions. The patients were urged to complete the exercise punch card in the group, and the exercise videos of the patients were randomly checked from time to time. A patient case-sharing and experience exchange session was organized in the group every four weeks.

2.3. Observation indicators

The patients' blood pressure was measured 4 weeks and 12 weeks after the intervention, and the patients were asked to fill in the medication adherence scale and hypertension treatment adherence scale before and 12 weeks after the intervention.

2.3.1. Blood pressure measurement

Measurement of blood pressure was carried out with a calibrated mercury sphygmomanometer, and the patients were instructed to rest for more than 30 minutes before the measurement and to take a sitting position during the measurement. The first sound is the systolic blood pressure, and the disappearing sound is the diastolic blood pressure. The blood pressure of both upper arms was measured 3 times, 10 minutes between each measurement,

and the average value was taken as the result of the patient's blood pressure.

2.3.2. Medication adherence

The Chinese version of Morisky Medication Adherence Scale-8 (MMAS-8) was used, which consisted of eight questions and was scored out of 8. A total score of < 6 was classified as low adherence, ≥ 6 was classified as medium adherence, and 8 was classified as high adherence. The Cronbach's alpha coefficient for this questionnaire was 0.749 [12]. Medication adherence excellence rate = (Number of cases with high adherence + Number of cases with medium adherence) / Total number of cases × 100%.

2.3.3. Hypertension treatment adherence

The Hypertension Treatment Adherence Scale compiled by Hongying Tang was used [13], which consisted of 25 items in four dimensions, namely, medication compliance (items 1–5), medication malpractice (items 6–13), daily life management (items 14–17, 20–25), and tobacco and alcohol habit management (items 18 and 19). A 5-point Likert scale was used, with scores ranging from 1–5 for "no or very little time" to "all the time," and 5–1 for questions 1 and 6 to 13, which were reverse scoring questions, for a total score of 25–125. The higher the score, the better the compliance. According to the norm of the raw score, with 95 points as the cut-off value, the scale was divided into two levels of high (≥ 95 points) and low (< 95 points) adherence. The total Cronbach's alpha coefficient of the scale was 0.862, and the retest reliability was 0.958.

2.4. Statistical methods

Data were entered and statistically analyzed using SPSS26.0 software. Mean ± standard deviation (SD) was used to represent the measurement data of the two groups, and t-test was performed; n (%) was used to represent the count data, and a chi-square test was performed. The results showing statistically significant differences were expressed as $P < 0.05$.

3. Results

3.1. Comparison of general information

In the comparison of age, gender, education level, and duration of hypertension between the two groups of patients, the difference was not statistically significant ($P > 0.05$), as shown in **Table 1**.

Table 1. Comparison of general information between the two groups

Considerations		Control group [n (%)]	Observation group [n (%)]	χ^2/ t value	P value
Age	40–49 years	7 (22.6)	6 (19.4)	4.871	0.088
	50–59 years	11 (35.5)	11 (35.4)		
	60–69 years	13 (41.9)	14 (45.2)		
Gender	Male	14 (45.2)	15 (48.4)	0.258	0.611
	Female	17 (54.8)	16 (51.6)		
Education level	Primary school	12 (38.7)	11 (35.4)	1.000	0.607
	Junior high school	12 (38.7)	10 (32.3)		
	High school and above	7 (22.6)	10 (32.3)		
Duration of hypertension (mean ± SD, years)		14.0 ± 6.7	13.5 ± 6.9	0.279	0.781

3.2. Comparison of systolic blood pressure and diastolic blood pressure between the two groups before intervention, 4 weeks, and 12 weeks after intervention

Systolic blood pressure and diastolic blood pressure of patients in the observation group were significantly lower than those in the control group at 4 weeks and 12 weeks after intervention, and the difference was statistically significant ($P < 0.05$) (**Table 2**).

Table 2. Comparison of blood pressure between the two groups before intervention, 4 weeks, and 12 weeks after intervention (mean ± SD)

Time point of observation	Blood pressure (mmHg)	Control group	Observation group	t value	P value
Before intervention	Systolic blood pressure	151.7 ± 5.3	152.2 ± 6.6	0.378	0.707
	Diastolic blood pressure	93.5 ± 3.7	93.9 ± 3.6	0.446	0.657
After 4 weeks of intervention	Systolic blood pressure	149.71 ± 4.93	145.65 ± 4.62	3.347	0.001
	Diastolic blood pressure	93.23 ± 2.71	89.45 ± 3.64	4.626	0.000
After 12 weeks of intervention	Systolic blood pressure	143.35 ± 4.52	125.61 ± 5.89	13.286	0.000
	Diastolic blood pressure	86.87 ± 3.78	73.71 ± 4.42	12.580	0.000

3.3. Comparison of medication adherence rate between the two groups 12 weeks after intervention

The medication adherence rate of patients in the observation group 12 weeks after intervention was significantly higher than that of the control group, and the difference was statistically significant ($P < 0.05$), as presented in **Table 3**.

Table 3. Comparison of medication adherence between the two groups [n (%)]

Time point of observation	Groups	Adherence			Adherence rate	χ^2 value	P value
		Low	Medium	High			
Before intervention	Control group	13 (41.9)	10 (32.2)	8 (25.9)	58.1	8.839	0.116
	Observation group	11 (35.5)	11 (35.5)	9 (29.0)	64.5		
After 12 weeks of intervention	Control group	7 (22.6)	18 (58.0)	6 (19.4)	77.4	28.484	0.000
	Observation group	2 (6.5)	8 (25.8v	21 (67.7)	93.5		

3.4. Comparison of treatment adherence between the two groups after 12 weeks of intervention

The total score of treatment adherence scale of patients in the observation group after 12 weeks of intervention was significantly higher than that of the control group, and the difference was statistically significant ($P < 0.05$) (**Table 4**).

Table 4. Comparison of treatment adherence between the two groups (mean ± SD)

Time point of observation	Groups	Totals	t value	P value
Before intervention	Control group	89.77 ± 8.85	0.357	0.723
	Observation group	90.58 ± 8.95		
After 12 weeks of intervention	Control group	91.03 ± 7.91	8.766	0.000
	Observation group	107.45 ± 6.79		

4. Discussion

Studies have shown a continuous, independent, and direct positive correlation between hypertension and the risk of stroke [14]. Chronic poor management of hypertension in stroke patients with hypertension can lead to subsequent stroke events, which can result in stroke recurrence and increase the risk of death [15]. For stroke patients with hypertension, it is necessary to carry out effective and scientific care for the control of blood pressure levels, which is of great significance in the prevention of stroke recurrence and the promotion of rehabilitation [16]. It has been pointed out that stroke patients with hypertension can improve their self-management ability through targeted self-management, thus reducing the disease burden of stroke [17].

The KAP theoretical model is a nursing model that provides patients with appropriate care through three consecutive processes: knowledge, attitudes, and practices, and promotes disease recovery and enhances patients' self-management ability by educating them about the disease, cultivating their attitudes, and then adopting positive practices [18]. In this study, we improve patients' knowledge of the disease through knowledge education in the inpatient stage and knowledge sending in the WeChat group in the discharge stage and sending exercise pictures and videos in the group to urge patients to carry out functional exercises, so as to accelerate patients' recovery. Regular case sharing and experience exchange are organized within the WeChat group to make appropriate encouragement to patients' progress, enhance patients' attitudes, and motivate them to consciously comply with healthy practices.

Continuity of care is often considered to be the extension of nursing services from the hospital to the home or the community through different pathways, so as to continue to provide psychological and physiological health services for patients and to improve their self-management ability [19]. In traditional healthcare, the care and treatment received by patients during hospitalization are often interrupted after discharge, and consequently, patients lose dedicated supervision and have poor compliance; although the traditional post-discharge continuation of care can enhance patients' compliance behavior to a certain extent, it is limited by time and space, making it difficult to provide patients with continuous and timely care [20,21]. Therefore, this study utilized the WeChat platform to provide continuous care to patients discharged from the hospital, conveying disease health knowledge to the patients and improving the patients' understanding of the disease; in the WeChat group, there were case sharing, experience exchange, and actively taking medication punch card, functional exercise completion punch card, etc., so that the patients can more actively and positively participate in the self-management of the disease, and timely response and guidance were given to the problems encountered by patients in the process of self-management.

The results of this study show that the diastolic and systolic blood pressure of patients in the observation group were significantly lower than those of the control group, and the rate of medication adherence and the total score of treatment adherence were significantly better than those of the control group. It shows that active and effective interventions for post-discharge stroke patients with hypertension are very important to improve patients' self-management ability. In this study, KAP theory and the WeChat platform were combined to provide continuous nursing care for stroke patients with hypertension, and the WeChat platform was used to provide patients with disease knowledge and continuously strengthen their beliefs regardless of space and time, which prompted patients to change their poor life practices and form a healthy behavioral pattern, and effectively improved their self-management ability.

5. Summary

This study shows that the WeChat platform continuity of care model based on the KAP theory can effectively improve the blood pressure level, medication adherence, and treatment adherence of stroke patients with

hypertension. The study population, sample size, and observation time can be expanded in the later stage to further validate the findings and improve the protocol, with a view to further promoting its application in the clinic.

Disclosure statement

The authors declare no conflict of interest.

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