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ORIGINAL RESEARCH

Nursing Future Horizon: Simultaneous Continual Nursing Model and Homemade Dialogue Tool for Controlling Cardiac Function and Blood Pressure in Hypertensive Heart Diseases

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Background: Hypertension (HTN) is a chronic condition that requires ongoing management to maintain health and prevent organ damage. Skilled nurses are essential in promoting lifestyle changes and personalizing medications, especially for patients in cardiac rehabilitation, which can lead to better cardiac function and manageable blood pressure.

Purpose: To examine the effects of a continuous nursing model merged with homemade dialogue tools on cardiac function and blood pressure control in patients with HTN and heart disease.

Methodology: From March 2019 to June 2021, a compelling study involved 82 patients randomly assigned to either a control or experiment group. The control group received routine health education and follow-up calls as standard care. However, the experiment group benefited from an innovative pictorial dialogue tool designed under the Cardiac Rehabilitation and Secondary Prevention Chinese guidelines to enhance understanding and adherence to crucial health practices, potentially leading to better cardiac function and boosting blood pressure control in patients.

Results: Considering the designed nursing model, satisfaction with care increased from 48 to 63%. The systolic and diastolic blood pressures were also reduced from 144.45 ± 3.27 to 129.63 ± 3.06 mmHg and 89.46 ± 4.57 to 79.51 ± 3.53 mmHg, respectively. Furthermore, an appropriate cardiac function was approached in the research category by inclining the left ventricular ejection fraction and cardiac index up to 77.43 ± 4.17% and 19.25 ± 1.56 L/min/m^2, respectively.

Conclusion: The simultaneous nursing model combined with a self-developed picture-viewing tool effectively improved cardiac rehabilitation, blood pressure control, patient satisfaction, care coordination, treatment compliance, and quality of life in patients with hypertension and heart disease.

Implications: The combined continuous nursing model and homemade dialogue tools led to higher patient satisfaction and lower blood pressure compared to standard nursing care after three months. This approach improved cardiac rehabilitation and overall patient satisfaction.

Keywords: self-made picture-reading dialogue tool, continuous nursing, HTN, heart disease, cardiac function, blood pressure control

Introduction

Hypertension (HTN), or high blood pressure, is a prevalent chronic condition globally, putting strain on the heart and other organs.[1] HTN is closely linked to cardiovascular disease and poses social, familial, and financial challenges.[2,3] It is significant both as a separate health condition and as a major risk factor for cardiovascular diseases. In another word, HTN can directly influence blood pressure, damage blood vessels and other organs, and thicken and enlarge the left ventricle. Besides, it is considered one of the most modifiable risk factors for cardiovascular diseases, leading to chest

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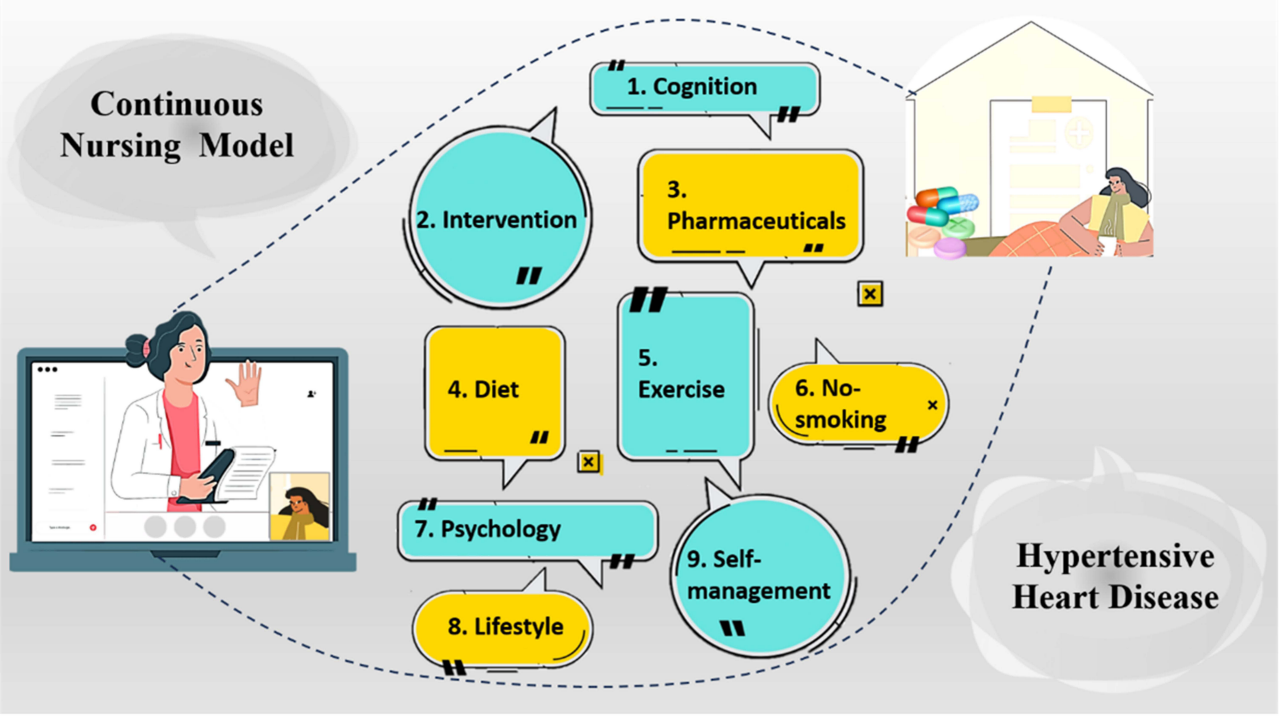
Graphical Abstract



pain, heart attacks, and sudden cardiac death. The uncontrolled HTN could result in myocardial hypertrophy and cardiac failure. It is widely indicated that almost all patients with cerebral hemorrhage suffer from HTN, and about 4% of patients with cerebral infarction have HTN. Additionally, HTN has been reported in patients with coronary heart disease, causing 1% of deaths in the patients.[4] Based on the reports, the prevalence of HTN has been considered a severe issue in China. Accordingly, there has been a gradual increase in the number of surveys on HTN throughout the country.[2,5] In 2021, a report on cardiovascular health and diseases revealed 245 million HTN cases among 330 million individuals with cardiovascular disease in China, with increasing rates among different age groups and genders.[6]

Treatment for high blood pressure (HTN) typically involves lifestyle changes and, when necessary, medication. Lifestyle changes include dietary adjustments, weight management, physical activity, and reducing alcohol and tobacco use.[7,8] Healthcare professionals may prescribe antihypertensive medications if lifestyle changes do not sufficiently control blood pressure. It is crucial to regularly monitor blood pressure to assess the effectiveness of lifestyle changes and medications. HTN is a chronic condition, so patients should have regular follow-up appointments with their healthcare providers to monitor blood pressure, adjust medications if needed, and address any concerns.[9,10] Accordingly, a conventional nursing model, including delivery system, decision support, clinical information, and self-management, is commonly employed for patients with HTN disorder. However, this basic nursing approach often falls short.[11] Based on the statistics, partial and complete medication non-adherence rates of 27 and 14% have been reported for patients with HTN.[12] Therefore, various studies have shown that implementing effective strategies can significantly combat the side effects of HTN. For example, research by Ashraf et al[13] highlights that educational interventions aimed at general physicians can boost blood pressure control and improve patient outcomes. This compelling evidence suggests that integrating such educational initiatives is beneficial and essential for the successful management of HTN patients. In another study, Kordvarkane et al[14] declared that systolic blood pressure and arterial pressure could significantly decrease from 128.62 ± 16.88 to 116.21 ± 14.52 mmHg and 98.11 ± 11.69 to 88.03 ± 8.47 mmHg through using a Common-Sense model on HTN patients, theoretically making patients aware of their health threat.

Also, it has been widely reported that visual appeal through the strategic use of images and infographics could significantly improve patient experiences and outcomes.[15] In this era, self-made picture-reading dialogue is a key tool providing an opportunity for reading and speaking practices. These are essentially custom-designed visual aids created by nurses to enhance patient education. These images are tailored to meet each individual's unique needs, considering their health conditions, language, and learning preferences. The visuals are locally relevant, incorporating imagery and contexts familiar to the patient's living situation. In addition to being visually simple, these tools are designed to encourage dialogue between nurses and patients rather than just presenting information passively. The dialogue tool has been previously employed in the health management of patients with diabetes, which could effectively control the blood glucose level and self-management ability of patients.[16] It is hypothesized that improving patient education about their conditions and health by using visual aids, along with the standard nursing model, will lead to better health outcomes and increased adherence to treatment plans. This area has not been explored well, according to our knowledge. Therefore, this study aims to explore the impact of a nurse-led visual conversation method comprising the conventional nursing model and a picture dialogue tool on blood pressure control and cardiac rehabilitation in patients with HTN.

Methods

General Information

In this study, we conducted a retrospective analysis to examine the impact of a combined nursing model and the picture dialogue tool on controlling blood pressure and cardiac function in patients with hypertension (HTN). This approach allowed us to save time and resources while evaluating these important outcomes. Accordingly, 82 patients with HTN complicated heart disease cured from March 2019 to June 2021 in Beijing Tongren Hospital were considered for evaluation. In this evaluation, a total of 256 participants were assessed for eligibility. However, 98 cases did not meet the inclusion criteria, and 76 individuals declined to participate. Therefore, 82 patients remained for the analysis, which is sufficient for the initial trials, as reported by Pourhoseingholi et al.[17] The patients were randomly classified into two control and research classes to reduce potential biases in the performed analysis. The randomized selection process utilized patient record numbers, designating odd numbers for the control group while assigning even numbers to the experiment group. The control group (n=41) adopted the routine nursing method, containing oral and written education, along with oral feedback evaluation, while the experiment group (n=41) assumed continuous nursing services based on a self-made dialogue tool. The control group comprised 23 males and 18 females with an average age of 60.33 ± 3.25 years. The disease history in this class was from 1 to 11 years (5.14 ± 1.13 years). Meanwhile, the experiment group contained 24 males and 17 females with an average age of 60.14 ± 3.38 years and a mean disease course of 5.16±1.09 years, ranging from 1 to 10 years. This study was permitted by the Medical Ethics Association of Beijing Tongren Hospital, and all patients declared their consent. The clinical data of patients in this study were complete. The inclusion and exclusion criteria in this evaluation are based on the following:

Inclusion criteria: Patients were selected independently from their gender. They met the relevant diagnostic criteria of HTN and heart disease in the National guidelines for HTN prevention and treatment at the primary level. In addition, they received 2020 ESC guidelines for managing congenital heart disease for adults. Additionally, the considered patients had essential reading and writing ability with no cognitive, language, and intellectual impairment. The systolic blood pressure and diastolic blood pressure were above 180 mmHg (1 mmHg = 0.133 kPa) and 110 mmHg, respectively. Moreover, the cases agreed to be followed up for 3 months and answered telephone followers. Furthermore, electrocardiogram examination indicated left ventricular hypertrophy and even ischemia with interventricular septum above 13 mm in the involved patients.

Exclusion criteria: Patients with severe heart, liver, renal insufficiency, malignant tumors, and other diseases were excluded from this investigation. Also, the cases with serious disturbance of consciousness and mental illness were not considered. Moreover, patients with no consent or compliance were not involved. Finally, the cases of those who were not able to follow treatment or initiated late rehabilitation physiotherapy were not assumed.

Treatment Methods

Based on the abovementioned examination, the control group adopted routine health education and telephone follow-up. The small prescription for HTN and heart disease discharge guidance was issued by the responsible nurse 1–2 days before discharge, focusing on the knowledge of medication and lifestyle. Also, a survey was conducted on the patients' mastery of health education knowledge and nursing service satisfaction on the day of discharge. Additionally, full-time researchers conducted a detailed investigation of the cardiac rehabilitation and blood pressure control of the patients three months after discharge.

In the case of the experiment group, the picture dialogue tool was developed according to the interpretation of Chinese guidelines for cardiac rehabilitation and secondary prevention[18] to train patients, in addition to employing a common nursing route. It is important to highlight that a comprehensive review of existing literature on hypertension (HTN) management, patient education, and effective communication strategies was conducted to ensure the validity and reliability of these instruments. Additionally, consultations with healthcare professionals who specialize in HTN management, patient training, and visual communication were carried out to gather feedback on the content, clarity, and relevance of the pictures and dialogues. Furthermore, some patients were asked for their feedback regarding whether the tools were relevant, clear, and easy to understand. Accordingly, 34 items of health education on HTN and heart disease were sorted out, and the educational framework of dialogue tools for looking at pictures was determined after two rounds of letters from 10 cardiovascular experts from 4 third-class hospitals in the province. Then, the "Look at the Picture Dialogue Tool Education Manual" method was designed and completed, comprising 9 chapters with distinct, colorful pictures to explain the important points.

In the first step, the importance of blood pressure control was illustrated using an intuitive image analogy. In the second phase, the methods of interventional therapy and key points of cooperation were explained. Then, the basic medication types and main points of observation were described in the pharmaceutical step. The fourth phase of the model was diet, which introduced the dietary principles for effective prevention and gave interactive illustrations. Next, exercise was considered as another phase. The sixth step was linked with quitting smoking to prevent recurrence was clarified. Regarding the psychology guidance, the patients were guided to manage self-sleep and regulate psychological stress. In the 8th step, the patients understood whether the current lifestyle was beneficial, along with the justification methods. Finally, self-management was trained to monitor blood pressure and blood sugar, in addition to self-rescue approaches for acute chest pain, preventing constipation, etc. The special education group of picture-viewing dialogue tools comprised responsible nurses with more than 5 years of seniority.

The implementation method of the nursing intervention included several steps linked with the times of hospitalization, discharge, and post-discharge points. During hospitalization, the group members used the Picture Dialogue Tool Handbook to conduct one-to-one bedside dialogue interactive health education, two days after observing stable vital signs in the patients. This process was carried out through the six steps of looking at the picture-dialogue-listening-nurse-patient-communication. Then, the contents that had not reached a consensus were recorded, the plan was discussed with the experiment group, and the time to strengthen the propaganda and education was selected. In the discharge step, the survey of patients' mastery of health education knowledge and nursing service satisfaction was completed. Finally, in the post-discharge process, the follow-up schedule was drawn up, and the patients were contacted by telephone once a week for one month, followed by three, two, and one time in successive months. The nursing intervention was continued for three months by sharing the following information:

- Dietary guidance: Considering the patients' conditions, they were administrated to intake suitable sodium salt and liquid volume;
- Medication instruction: The types and dosage of drugs were listed using videos and pictures and explained in detail to inform patients. In addition, the family members were advised to urge the patients to take the medicine on time;
- Symptom identification and self-management: The patients and their families were trained to monitor their blood pressure, psychology, and physical symptoms. Additionally, they learned to detect the worsening of disease via shortness of breath, increased fatigue, edema, etc.;

- Sports director: The patients were guided to choose appropriate exercise to avoid exercise overload;
- Psychological intervention: It was assumed vital to understand the difficulties encountered by the patients in the treatment process, answer their questions, and actively publicize the patients with significant therapeutic effects.

Observation Index

Satisfaction Score

To analyze patients' satisfaction with the considered intervention, a satisfaction questionnaire was provided, including service attitude, medication nursing, health education, and inspection attitude. This variable is a type of patient-reported outcome, directly capturing the patient's views, experiences, and perceptions of their health and treatments. Each item possessed 25 points to generate a total value of 100 points.[19] The higher the score, the higher the nursing route satisfaction, calculated by dividing the number of satisfied patients by the total number of patients ($Satisfaction = \frac{\text{number of people satisfied}}{\text{total number of people}} \times 100$). A value higher than 85 was considered satisfactory, while one below 60 was known as dissatisfied. Notably, others were assumed to be basically satisfactory.

Matching Degree

The department made a self-made questionnaire to investigate the matching degree within two groups, classifying them into complete matching, partial matching, and matching. The matching degree was estimated by adding the complete matching degree to the partial matching degree.[20] This variable may indicate the level of homogeneity and similarity among the participants within each class. A higher degree of consistency among participants in a specific group could suggest that the intervention affects the target area uniformly across that group.

Psychological Resilience Score

The psychological resilience refers to a participant's ability to adapt positively and cope effectively with stress, adversity, or negative experiences encountered during the evaluation. Therefore, a self-made questionnaire was provided to investigate the psychological resilience of the two groups, including complete resilience, partial resilience, and not resilience, measured through Psychological resilience = Complete resilience + Partial resilience.[21]

Cardiac Function Index and Blood Pressure Control Level

Blood pressure, diastolic blood pressure, and systolic blood pressure were analyzed before nursing and 3 months after nursing. Left ventricular ejection fraction (LVEF) and left ventricular peak early/late diastolic velocity (early diastolic peak velocity/late diastolic tissue velocity) were monitored by SIMENSS2000 echocardiography. Additionally, cardiac index (CI) was observed by pulse contour waveform. Notably, a 6-min walking distance (6MWD) was measured in both groups.

SAS and SDS Scoring

Self-rating anxiety scale (SAS) and self-rating depression scale (SDS) were used to assess the emotional state of patients before admission, at discharge time, and post-discharge point.[22] These parameters could show the effectiveness of interventions on conditions like anxiety and depression. SAS variable is designed to measure the severity of anxiety symptoms experienced by an individual by providing a numerical score reflecting the intensity of anxiety. In contrast, the SDS variable measures the severity of depressive symptoms through providing a numerical indication of the depression level. Regarding SAS, the values of < 50, > 50 and < 60, > 60 and < 70, and > 70 were known as normal, mild, moderate, and severe anxiety, respectively. Meanwhile, the cut-off value of the SDS standard score was 53 points, in which > 53 and < 62 were known as mild depression, > 63 and < 72 points were assumed to be moderate depression, and > 73 points were classified as severe depression. The higher score examined more serious anxiety and depression.

Compliance Score

The treatment compliance of the patients was evaluated by the treatment compliance scale (TASHP), which mainly encompassed 25 items and 4 dimensions, including medical compliance, adverse drug use, lifestyle habits, and tobacco and alcohol management behaviors.[23] Accordingly, a compliance score is a numerical representation of how well

a participant adhered to the study protocol. The sum of the scores from all relevant questions could reveal a score for each participant. The total compliance score was 125, implying proper compliance of the patient.

Life Quality Scale

The impact of the employed medical conditions on the participant's overall well-being was also analyzed through measuring the life quality of the individuals. The life quality scale consisted of 29 items relating to physical, psychological, social, and health self-awareness.[24] The Cronbach's α coefficient of the scale is in the range from 0.79 to 0.91. The scale was scored by 1 to 5 grades, in which the lower score was linked to higher satisfaction. Notably, the same instructions and methods were utilized for all participants to ensure standardization of the administration and minimize the variability in data collection.

Statistical Analysis

SPSS 19.0 software was adopted to analyze the data, in which the obtained data of SAS, using an independent sample *t*-test. The chi-square test was employed for counting data, including nursing satisfaction rate and patient matching degree ($p < 0.05$). The statistical analysis was performed assuming that the observations within each group were independent of each other, and the observations between the two groups were also independent. This means that the outcome of one participant did not influence the outcome of another. Therefore, random assignment and ensuring that there was no interaction between study participants were important for this assumption.

Results

This study conducted a retrospective analysis to assess the impact of a combined nursing model and the Picture Dialogue Tool on controlling blood pressure and cardiac function in patients with HTN. For this aim, 82 patients with HTN complicated by heart disease who were treated at Beijing Tongren Hospital from March 2019 to June 2021 were considered. The patients were divided into two groups: a control group and an experiment group. The control group engaged in standard health education and received telephone follow-ups. Meanwhile, the experiment group benefited from an enhanced approach that included typical health education alongside a specially designed picture dialogue tool. This innovative tool, grounded in the Chinese guidelines for Cardiac Rehabilitation and Secondary Prevention, consisted of nine chapters, each showcasing vibrant images that clearly illustrated essential concepts. To estimate the impact of the generated intervention, various variables, including satisfaction score, matching degree, psychological resilience score, cardiac function and blood pressure control level, SAS and SDS, compliance score, and life quality level were measured and discussed.

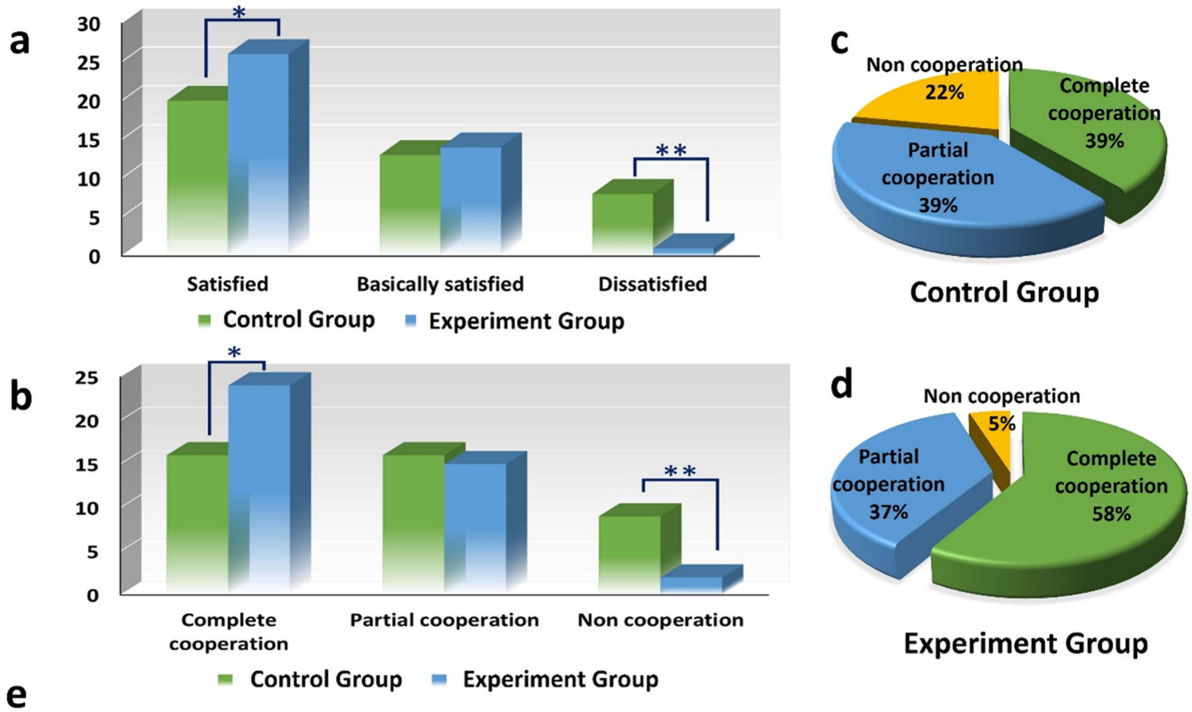
Comparison of Satisfaction and the Matching Degree

The satisfaction value was calculated for the control and experiment groups and compared, which is shown in Figure 1a. Based on the data, the experiment group represented a significantly higher satisfaction rate than the control group. The matching degree was also obtained for the control and experiment groups (See Figure 1b–d). Accordingly, a 95.12% matching degree was observed in the experiment group. Meanwhile, the control group exhibited a 78.05% matching degree. Based on the result, the matching degree was significantly superior in the experiment group than in the control group ($p < 0.05$).

Figure 1. a) The nursing satisfaction rate of control and experiment groups, Cooperation degree in the control and experiment groups; (b) the number of cases with complete, partial, and non-cooperation in both groups and the percentage of various cooperations in (c) control and (d) experiment groups, and (e) Comparison of systolic blood pressure and diastolic blood pressure between the two groups before and after nursing ($\bar{x} \pm s$).

Comparison of Systolic and Diastolic Blood Pressures

The systolic and diastolic blood pressures were measured and compared before and after nursing (Figure 1e). Accordingly, a significant reduction was observed in the systolic and diastolic blood pressures after 3 months of nursing. It is worth noting that the systolic and diastolic blood pressures were remarkably lower in the experiment group than



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Group	N	Systolic blood pressure (mmHg)		Diastolic pressure (mmHg)	
		Before nursing	After 3 months nursing	Before nursing	After 3 months nursing
Control	41	159.64 ± 5.87	144.45 ± 3.27	102.08 ± 3.56	89.46 ± 4.57
Experiment	41	158.87 ± 5.43	129.63 ± 3.06	103.28 ± 3.41	79.51 ± 3.53
t		0.617	20.189	1.559	11.233
P		> 0.05	< 0.05	> 0.05	< 0.05

Figure 1 (**a**) The nursing satisfaction rate of control and experiment groups, Cooperation degree in the control and experiment groups; (**b**) the number of cases with complete, partial, and non-cooperation in both groups and the percentage of various cooperations in (**c**) control and (**d**) experiment groups, and (**e**) Comparison of systolic blood pressure and diastolic blood pressure between the two groups before and after nursing $(\bar{x} \pm s)$. (The symbols * and ** indicate a significant difference, with P values less than 0.05 and 0.0001, respectively).

those in the control group, indicating the significant effect of homemade dialogue tools on lowering the systolic and diastolic blood pressures. The p-value for systolic blood pressure between the control and experiment groups decreased from 0.42 to less than 0.0001. This indicates no significant difference between the two groups before the nursing intervention, but a significant difference emerged after three months of nursing. Similarly, the p-value for diastolic blood pressure dropped from 0.123 to less than 0.0001, further supporting the findings.

Comparison of SAS, SDS, and Psychological Resilience Scores

Based on data summarized in Table 1, a significant increase was observed in the values after nursing for 3 months. In addition, the SAS, SDS, and psychological elasticity scores in the experiment group were significantly superior to those in the control group. These results were evaluated by tracking the reduction of the p-value between the control and experiment groups, which changed from 0.67, 0.63, and 0.58 (before nursing) to less than 0.0001 (after 3 months of nursing). Therefore, positive emotions were obtained in the patients who benefited from homemade dialogue tools.

Comparison of Cardiac Function Indexes

The cardiac function indexes are detailed in Table 2. Based on the results, after nursing for three months, a remarkable increase was detected in the LVEF, CI, E/A, and 6MWD. Based on the statistical analysis, the p-value declined from

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Table 1 Comparison of SAS, SDS, and Psychological Resilience Scores Between the Two Groups Before and After Nursing ($\bar{x} \pm s$)

Group	N	SAS		SDS		Psychological Resilience Score	
		Before Nursing	After 3 Months Nursing	Before Nursing	After 3 Months Nursing	Before Nursing	After 3 Months Nursing
Control	41	56.33 ± 14.06	21.54 ± 5.16	55.67 ± 9.41	24.43 ± 4.86	61.42 ± 1.75	72.18 ± 2.49
Experiment	41	55.16 ± 11.75	44.51 ± 4.86	54.22 ±10.53	48.56 ± 10.47	61.23 ± 1.66	82.43 ± 3.66
t		0.409	20.749	0.657	13.385	0.504	17.430
P		> 0.05	< 0.05	> 0.05	< 0.05	> 0.05	< 0.05

Table 2 Comparison of Cardiac Function Indexes Between the Two Groups Before and After Nursing ($\bar{x} \pm s$)

Group	N	LVEF (%)		CI (L/min/m^2)		E/A		6MWD (m)	
		Before Nursing	After 3 Months Nursing	Before Nursing	After 3 Months Nursing	Before Nursing	After 3 Months Nursing	Before Nursing	After 3 Months Nursing
Control	41	62.08 ± 2.56	70.33 ± 3.18	16.78 ± 0.94	17.14 ± 1.17	0.68 ± 0.07	0.77 ± 0.15	342.36 ± 16.88	398.67 ± 20.45
Experiment	41	62.14 ± 2.54	77.43 ± 4.17	16.83 ± 0.96	19.25 ± 1.56	0.72 ± 0.11	0.95 ± 0.24	341.77 ± 16.78	451.83± 25.97
P		> 0.05	< 0.05	> 0.05	< 0.05	> 0.05	< 0.05	> 0.05	< 0.05

0.91, 0.63, 0.053, and 0.77 to less than 0.0001 after three months of nursing for LVEF, CI, E/A, and 6MWD variables, respectively. Additionally, the values were significantly superior in the experiment group than those in the control group, corroborating better cardiac functions in the patients who were given continuous care based on homemade dialogue tools.

Comparison of TASHP Score of Treatment Compliance

The TASHP scores of treatment compliance displayed no significant difference in medical compliance ($p \approx 0.15$), life management ($p \approx 0.73$), and adverse medication behavior ($p \approx 0.95$), as well as tobacco and alcohol hobby management ($p \approx 0.76$) behavior before nursing (see Table 3). Meanwhile, after three months of nursing, the scores significantly increased, and superior values were gained in the experiment group ($p < 0.0001$).

Table 3 Comparison of TASHP Scores Before and After Nursing ($\bar{x} \pm s$)

Group	N	Medical Compliance Behavior		Bad Drug Use Behavior		Life Management Behavior		Tobacco and Alcohol Hobby Behavior	
		Before Nursing	After 3 Months Nursing	Before Nursing	After 3 Months Nursing	Before Nursing	After 3 Months Nursing	Before Nursing	After 3 Months Nursing
Control	41	17.33 ± 2.46	18.26 ± 2.45[a]	20.34 ± 3.55	31.55 ± 3.61[a]	29.18 ± 4.56	31.06 ± 4.48[a]	5.66 ± 0.47	5.89 ± 0.45[a]
Experiment	41	18.07 ± 2.43	24.52 ± 3.96[b]	20.08 ± 3.34	40.41 ± 4.78[b]	29.23 ± 4.35	48.46 ± 5.24[b]	5.62 ± 0.71	8.78 ± 1.86[b]
t		1.370	8.608	0.342	9.471	0.051	16.039	0.301	9.670
P		> 0.05	< 0.05	> 0.05	< 0.05	> 0.05	< 0.05	> 0.05	< 0.05

Note: [a] & [b]show $p < 0.05$ regarding the difference in the control and experiment groups before and after nursing.

Table 4 Comparison of Life Quality Scores Between the Two Groups Before and After Treatment ($\bar{x} \pm s$)

Group	N	Physiological Function		Psychological Function		Social Function		Healthy Self-Cognition	
		Before Treatment	After Treatment	Before Treatment	After Treatment	Before Treatment	After Treatment	Before Treatment	After Treatment
Control	41	15.23 ± 4.61	13.94 ± 2.13[a]	16.87 ± 3.17	14.13 ± 4.68[a]	18.34 ± 3.15	16.29 ± 2.13[a]	15.31 ± 3.45	13.93 ± 1.81[a]
Experiment	41	15.43 ± 4.26	11.45 ± 2.11[b]	16.23 ± 3.18	10.34 ± 4.36[b]	18.41 ± 3.53	12.17 ± 3.19[b]	15.15 ± 3.28	10.44 ± 2.61[b]
t		0.204	5.318	0.913	3.794	0.095	6.878	0.215	7.036
P		> 0.05	< 0.05	> 0.05	< 0.05	> 0.05	< 0.05	> 0.05	< 0.05

Note: [a] & [b]denote p < 0.05 regarding the difference in the control and experiment groups before and after nursing.

Evaluation of the Life Quality Scores

The scores of life quality were investigated in the considered patients. Based on the data obtained (see Table 4), no significant difference was observed before nursing regarding the physiological ($p \approx 0.83$), psychological ($p \approx 0.36$), social ($p \approx 0.92$), and health self-cognition ($p \approx 0.83$) functions between the control and experiment groups. After three months of nursing, a reduction was displayed in the scores. The scores of physiological, psychological, social, and health self-cognition functions were significantly lower in the experiment group ($p<0.0001$), confirming better life quality in the patients who benefited from continuous care based on homemade dialogue tools.

Discussion

HTN, as one of the common cardiovascular chronic diseases, has a relatively high incidence, which mostly occurs in the elderly. According to the Framingham Heart study, the prevalence rate of HTN is about 75% in people around 80 years old, and greater than 90% over 80 years old.[25] HTN can cause a variety of cardiovascular and cerebrovascular diseases, as well as important organ failures, leading to great losses to individuals, families, communities, and even national finances.[26] Based on the literature, the National Nursing Development Plan (2016–2020) has pointed out that continuous nursing has become one of the main tasks for the development of nursing in China.[27] The outline of the Healthy China 2030 Plan puts forward the strategic theme of "joint construction, sharing, and health for all", insisting on prioritizing prevention and focusing on the grass-roots level. Correspondingly, in 2017, China issued the first edition of the National Guidelines for the Prevention and Management of Primary HTN, making it clear that the grass-roots institutions represented by communities and township health centers played a key role in the continuous nursing management of HTN.[28]

The concept of continuous nursing was first created in 1947. However, a unified conceptual framework for the definition of continuing nursing still needs to be developed. In 2003, Agyepong et al developed the continuous care model and declared that continuity refers to the degree of coherence and connection of a series of separate health service events received by patients, as well as the degree of consistency with patients' medical needs and personal background.[28,29] Kietzmanr and Naylor classified the existing continuous nursing models. In this study, community-based continuous care relied on guided care and geriatric resources for evaluating and caring for the elderly, while the extended nursing care transferred out of the hospital in the acute stage, mainly including extended nursing intervention and continuous nursing.[30]

The continuous nursing model is aimed at patients with chronic diseases, providing comprehensive, coordinated, and cooperative nursing services. Zhao Yue introduced the concept of "continuous nursing" and carried out continuous nursing research for patients with HTN and other chronic diseases. It was also found that the blood pressure control level and rhythm of the treatment group were remarkably better than those of the control group through continuous nursing care.[31] Moreover, another study confirmed the suitability of continuous care guided by chronotherapy for general adult patients.[32] Furthermore, the health education model of dialogue tool can ensure the effect of health education, and it has been popularized and implemented in many colleges with satisfactory results.[33,34] The innovative picture-reading dialogue tool has been designed and presented to patients with HTN in this evaluation. In this structure, picture cartoons and vivid images were designed. In addition, the metaphors and impressive pictures were employed to promote the

memory of patients and resolve the problems affected by the education level in implementing health education. Furthermore, in one-to-one interactive dialogue, patients' mistakes or weak knowledge points could be found and explained emphatically to improve their treatment compliance.

In this study, the results indicated remarkable improvement in physiological, psychological, and social functions, along with health self-cognition, in the experiment group after 3 months of nursing. Additionally, the experiment group displayed a superior matching degree than the control group, showing that the participants within the study group were more alike to each other on the measured characteristics than the individuals within the control group. This result could imply the very specific effect of the considered treatment for the experiment group. The employed tool could reduce systolic and diastolic blood pressure. In a similar attempt, Qureshi et al[35] also explored that training patients using pictogram-based educational tools could lead to better blood pressure control in patients with chronic kidney diseases, which approves the findings attained in this study.

Moreover, it significantly enhanced SAS, SDS, and psychological resilience scores in the experiment group. The findings strongly support the conclusions drawn by Lamsdale et al[36] which demonstrated that employing a visual training review tool can effectively alleviate the anxiety experienced by patients undergoing nocturnal home hemodialysis. By implementing this approach, the patient's well-being and overall treatment experience could be enhanced. Based on the literature, higher scores on the SAS and SDS can negatively impact long-term outcomes in HTN by increasing cardiovascular risk. Anxiety and depression activate the sympathetic nervous system, resulting in elevated stress hormones like cortisol, which can sustain high blood pressure. This chronic stress response strains the cardiovascular system and contributes to inflammation linked to heart disease. Depression reduces motivation and decision-making, making it challenging to follow medication and lifestyle changes. Anxiety can also impair focus, leading to missed medications and appointments. Moreover, emotional eating and decreased physical activity can worsen blood pressure issues in those affected by anxiety and depression, further highlighting the positive effects of the employed nursing on the experiment group.[37]

According to the cardiac function indexes, a remarkable increase was observed in LVEF, CI, E/A, and 6MWD after 3 months in the experiment group. This finding ties well with the results declared by Albert et al,[38] showcasing that using 3 months of visual training in healthcare could remarkably reduce heart failure and improve cardiac function by promoting self-care behavior in patients. The employed one-to-one interactive education and nurse-patient communication in this evaluation could receive more attention from the patients, compared with the traditional way of health education. Also, the targeted intervention could alleviate the psychological pressure of patients more effectively as well as not be limited by time, place, or personnel. The nursing service satisfaction of the experimental group was higher than that of the control group, suggesting using picture-viewing dialogue tools to carry out health education during hospitalization to meet patients' psychological and individual needs. Previous studies have confirmed that the educational model of picture-reading dialogue can enhance smoking cessation and medication compliance.[5,10] The results of this study indicated no significant difference in the scores of compliance, life management, bad drug use, and alcohol hobby management behaviors before and after nursing. Based upon the results, the scores of compliances, life management, bad drug use behaviors, as well as tobacco and alcohol hobby management behavior were inclined, and the values were superior in the experiment group. Notably, this study faced some valuable shortcomings that need to be addressed in future evaluations. First, the quality of this study could have been improved due to the small sample size, requiring the assessment in larger sizes. Secondly, it was a single-center study, and our findings were subject to some degree of bias. Therefore, our results may differ from those from large-scale multicenter studies or other academic institutes. This research is still clinically significant, and further in-depth investigations will be carried out in the future.

To sum up, combating HTN requires a multifaceted approach in which nursing services can directly enhance HTN outcomes and resolve this growing global health concern. The present study analyzed the performance of continuous nursing based on a self-made picture-viewing dialogue tool. According to the outcomes, the advancement of nursing is becoming increasingly promising due to the constant development of media technology, artificial intelligence tools, and advanced practical nursing systems. Regarding the study scale and the assumed region, it is highly recommended that the effect of the proposed tool be investigated in a scale-up group in various zones to gain more validated results and optimize the method.

Declaration

The Medical Ethics Association of Beijing Tongren Hospital permitted this study, and all patients declared their consent.

Consent Statement

All participants were informed about the purpose of the study, in accordance with the Declaration of Helsinki.

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Disclosure

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