Effects of the Application of Individualized Nursing on Blood Pressure Levels in the Elderly with Hypertension

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ABSTRACT

Hypertension is a potentially serious issue in old people, so the proper treatment of indicated conditions is very important. The purpose of the present work was to assess the effectiveness of personal nursing interventions in lowering blood pressure and improving other health indicators in elderly hypertensive patients. In this study, a cross-sectional study design with records review was employed among one hundred elderly hypertensive patients who attended a PHC in a period of March 2022 to March 2023. Patients were divided into two groups: For the control group, consisting of 50 patients, standard nursing care was given, and for the observation group, which also counted 50 patients, individualized nursing interventions. These are; blood pressure, medication adherence, self-management capacity, endoluminal vascular endothelial function, psychological status, quality of life and cardiovascular event rates. The outcomes observed by the members of the observation group were much improved compared to those of the members of the control group. There were significant differences on diastolic and systolic blood pressure, Morisky scores and hypertension self-management ability scores compared with basal data, ($P < 0.05$). The observation groups had increased level of Nitric oxide (NO) and reduced level of endothelin-1 (ET-1 $P<0.05$). Concerning the psychological parameter, realistic dimensions slightly reduced, whereas anxiety and depression scores decreased ($P < 0.05$). Psychologically, physically, socially and materially_, the observation group obtained

higher overall quality of life scores than the comparator group (P < 0.05) . Also an observational study revealed that the frequency of cardiovascular events was significantly lesser in the observation arm (P < 0.05). Nurse-prescribed and delivered interventions are effective for older hypertensive patients to improve blood pressure control, self-management of hypertension, psychological well-being, and health-related quality of life, as well as to avoid adverse outcomes. These observations confirm the practice relevance of individualised nursing approaches to this group of patients.

Keywords：   Individualized nursing; The elderly with hypertension; Vascular endothelial function; Quality of life; Self-management ability

INTRODUCTION

Hypertension is a common chronic cardiovascular disease and cerebrovascular disease with high incidence in internal medicine, mainly in middle-aged and elderly people, bad living habits and obesity people. This disease is much triggered by genetic and poor eating habits. The disease is primarily characterized by abnormal blood pressure level, with patients presenting may show dizziness, fatigue, palpitations and even headache, and if the treatment is not timely or the control effect is not good, the longer the course of the disease, the further development of the disease, it can be significantly increased in patients with cardiovascular and cerebrovascular related complications risk, seriously threatening the physical and mental health of patients, life safety [1]. The clinical incidence of hypertension in Kingdom saudia arab is relatively high, but the control effect of blood pressure level is not good. Most hypertensive patients have been effectively controlled after being hospitalized, but the blood press levels increase again because of the weak self-care awareness, not actively monitoring blood pressure levels, unreasonable diet and lifestyle habits [2]. In addition, most patients lack knowledge about hypertension, and believe that high blood pressure levels will not have a great effect on the body's health, and there is no need to take medicine or exercise, which makes it impossible for them to strictly follow the doctor's orders and monitor blood pressure regularly during their home recuperation, affecting the effects of disease control [3]. In order to reasonably control the blood pressure levels of patients, clinical medical staff need to pay full attention to nursing intervention [4]. Relevant studies have shown that [5] the

implementation of scientific and reasonable care management for sufferers with chronic diseases can help them form living habits that are beneficial to their own health and improve disease symptoms. Personalized nursing is a series of nursing interventions implemented according to the individual conditions of patients. It can take into account the patients' physiological and psychological characteristics, connects in-hospital and out-of-hospital nursing, and incorporates the concept of rehabilitation nursing, which is highly targeted and scientific. Different from the nursing operations and procedures that are generally applicable to routine care, such as measuring vital signs, assisting in eating, and cleaning the body, etc., personalized nursing emphasizes the assessment and attention to each patient's unique needs and the formulation of an individualized nursing plan based on those needs. Personalized nursing takes into account each patient's physical, psychological, social and cultural factors, and formulates corresponding nursing methods according to the patients' conditions and preferences to provide more targeted nursing services. This article aims to explore the values of individualized care in elderly sufferers with hypertension, and the specific content is organized as follows.

Data and methods

Data

All of 100 instances of elderly hypertensive sufferers received in our hospital were regarded as the study objects and the sample selection period was between March 2022 and March 2023. The medical records of the sufferers were collected for retrospective analysis, and patients were grouped by using random number table and 50 sufferers were included in the control one and the observation one respectively. It can be seen from the data in Table 1and Figure 1 that it had no distinction in the data presented in the research between the 2 groups of sufferers, with P>0.05.

Table 1: The data compared between the 2 groups of elderly sufferers with hypertension

Group	n	Male (n)	Female (n)	Age (Years)	Disease duration (Years)	Junior high school or below (n)	High school or above (n)
Control group	50	29	21	68.08±2.28	7.12±1.04	38	12

Observation group	50	27	23	68.22±2.43	7.30±0.95	33	17
X^2/t	-	0.162		0.280	0.705	1.214	
P	-	0.687		0.780	0.483	0.271	

Figure 1: Data analysis between groups

Note: "ns" means P>0.05

The diagnostic criteria was: Patients were aged > 65 years old; the clinical symptoms of patients were in line with the diagnostic criteria for hypertensive disorders in the "Guidelines for Primary Diagnosis Treatment of Hypertension (2019)", that, without using antihypertensive drugs, three measurements of the blood pressure in the clinic on different days indicating systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg; Patients who agreed and actively cooperated the study; Sufferers with complete clinical data.

Exclusion criteria: (1) Patients with secondary heart disease; (2) Patients with other chronic diseases; (3) Patients with severe-heart, liver, kidney and other organic disease; (4) Patients with malignant tumor disease; (5) Patients with severe mental illness who could not cooperate with the work.

Methods

Control group: The subjects included in this group were treated with a 3-month routine nursing program, in other word, during the treatment period, the monitoring of the blood pressure levels of the sufferers was strengthened, the patients were given reasonable antihypertensive drugs for treatment, and the patients' diet was guided to control the blood pressure levels of the patients within a reasonable range; hypertension was a disease with a long course of disease and patients would have a variety of negative psychology when they did not understand the disease, and the appearance of negative psychology would further aggravate the disease, so it was necessary to provide patients with health knowledge education interventions, so that they could have a comprehensive understanding of various pathogenic factors, treatment measures, and precautions of their own diseases.

Observation group: The subjects included in this group applied a 3-month

individualized nursing plan, which mainly included the following contents:

(1) The individualized nursing team was formed by head nurse of the department and experienced nursing staff, and the team leader was the head nurse of the department. Before the implementation of those nursing activities, the team leader arranged the nursing staff of that team to attend training to let the team members understand the content involved in individual nursing, and operational skills and so on, in order to guarantee that adequate nursing care services could be delivered to the patients, then an assessment of the effectiveness of the training was also done. The assessment content included three aspects: In the knowledge domain there unfolded theory knowledge, and skills. The full scores were 100 points, and more than 60 points are qualified, and the qualified people would perform the nursing services for patients.

(2 As an overall check of the changes in the patients' actual blood pressure levels, an evaluation was made towards their living/activities, their eating/food habits, and their an illness state. Patients and their families were given detailed explanations about the significance and needs for compliance with the doctor's instructions as measures for disease prevention and control, and they were encouraged to promptly inform the medical staff of the abnormal phenomena so that corresponding measures called for could be exercised on time.

(3) Patients were regularly organized to participate in health education lectures on high blood pressure, and the causes, effects, related complications, and prevention and control measures of high blood pressure were introduced in detail to help patients fully grasp disease-related knowledge; the mission was strengthened through the distribution of simple and easy to understand mission manuals, setting up bulletin boards and other ways. The bulletin boards mainly published knowledge such as the preventive measures for hypertension complications, daily diet and life-related precautions, and the necessity of taking medication as prescribed by the doctor. Through subtle influences, patients' awareness of self-management was improved.

(4) Key publicity and education were carried out to patients on the dangers of self-stopping and increasing or decreasing drug dosage, and family members were asked to strictly supervise the patients' medication to ensure that they could take the drug on time and in accordance with the amount; the occurrence of adverse reactions was observed after the patients took the drug, and patients were informed that during their stayed at home, if adverse drug reactions occurred, they could be treated at the

nearest community hospital.

（5）A professional nutritionist formulated a diet management plan based on the patients' eating habits and taste preferences, and patients fasted raw and cold foods, animal fat, animal offal, etc., strictly controlled the intake of lipids and sodium salts in the diet, increased the intake of foods rich in dietary fiber and easy to digest, controlled the daily sodium intake below 6g, quit smoking and alcohol, and increased the intake of fresh fruits and vegetables; family members were asked to monitor the patients' daily diet, and patients were arranged to eat three meals within a fixed time every day, but patients could not overeat.

(6) The doctors in the department clarified the disease classification based on the patients' clinical manifestations and diagnostic results, then the drug regimen was adjusted, and the usage and dosage of the drugs were adjusted based on the sufferers' conditions to improve the rationality and safety of the drug regimen; the nursing staff introduced drug names, application methods, etc. to patients and family members in detail, and repeatedly told them to prohibit taking more or missing medicines. Nursing staff closely monitored the changes in blood pressure levels of patients during medication, and instructed patients to maintain a comfortable position for rest.

(7) Patients were instructed to form good work and rest habits, ensuring daily sleep time, and they were guided to carry out appropriate exercise according to their conditions and physical tolerance, and started exercising 60 minutes after meals, mainly focusing on walking, Tai Chi, etc. The frequency of exercise was 3-6 times a week, and the time of each exercise was controlled to about 60 minutes. Patients were advised to stop the activity immediately if symptoms such as fatigue and asthma occurred during exercise.

(8) Nursing staff closely monitored the psychological and emotional changes of patients, then analyzed the related reasons that affected their psychological and emotional to grasp the source of psychological stress of patients, and carried out psychological counseling work based on the actual situation. In the process of communicating with sufferers, they were encouraged to share their feelings, symptoms, etc. with their family members or medical staff, to guide them to vent their negative emotions; classic cases were introduced to patients to help them build confidence in disease treatment, reduce psychological pressure, and improve their cooperation with medical activities.

(9) Guidance on blood pressure monitoring: Patients were instructed to regularly

go to the hospital for blood pressure testing, then changes in blood pressure were evaluated, and the medication regimens were adjusted reasonably according to the patients' conditions to improve the treatment effects of the patients' diseases.

Observation indicators

（1）The changes in blood pressure levels of the 2 groups of elderly hypertensive sufferers were counted, and the diastolic and systolic blood pressure levels of the sufferers were measured with a blood pressure measuring instrument before and after the implementation of nursing work.

（2）The patients' changes in medication regarding compliance was also documented. Prior to and after nursing, the subjects were assessed by the Morisk questionnaire as follows, whether he/she had forgotten to take the medicine, stopped paying attention to taking medicine, stopped taking the medicine on their own when they felt better, increased or decreased the drug dose when the condition worsened, and the more dominant the higher the scores.

（3）The levels of self- management ability of the two groups were compared, and with the implementation of the nursing work and before and after the nursing works, the Self-Care Management Ability Scale (ESCA) was adopted, including self-concept dimension (1-8 questions), nursing responsibility dimension (9-14 questions), nursing ability dimension (15-26 questions), health knowledge level dimension (27-43 questions), each question was scored

（4）The changes in the vascular endothelial function indexes of the 2 groups of sufferers were counted. Fasting venous blood (5ml) was collected from the sufferers before and after the intervention, and centrifuged (3000r/min, 5min), then serum was taken to complete the determination of nitric oxide (NO) and endothelin-1 (ET-1) by nitrate reductase method.

(5) The mental state and life quality improvement of elderly hypertensive sufferers were analyzed between groups. Before and after the implementation of nursing activities, the assessment of Mental State was done by the HADS making use of the anxiety scale and the depression scale, with 14 items in all; 7 items in the anxiety scale which helped to assess the anxiety level; And the other 7 items in the depression scale which helped to assess the depression level. Students completed the survey for each item assigning the item to four grades 0 to 3 points. The scores of anxiety and depression scales were from 0 to 21 points, 7 was Tajreed's value, the

higher point were more severities of anxiety or depression. Life quality of the sufferers was measured using GQOL-74 questionnaire that focuses on following aspects: Psychological, social, physical and material. The total point score was achievable at 100, and a point got higher the more dominant it was.

（6）Cardiovascular complications which developed in the 2 groups of sufferers were identified. This was done after the nursing activities had been performed to the sufferers, for six months to establish incidences of the complications such as heart failure, arrhythmia and myocardial infarction.

Statistical processing

The relevant data involved in the research were all processed by SPSS20.0 statistical software. The measurement data were expressed in the form of ($\bar{x} \pm s$), and the results were obtained by the t-test; the count data were expressed in the form of "%", and the results were obtained by the chi-square test. The expression form of statistically significant data difference was P<0.05.

Results

The blood pressure levels compared between the 2 groups

Analyzing the data in Table 2 and Figure 2, before the nursing work was carried out, it had no obvious distinction between the measured values of diastolic blood pressure and systolic blood pressure between the groups, with P>0.05; after the implementation of nursing work, the measured values of blood pressure indexes of the included subjects in the observation one were less than the control one, with P < 0.05.

Table 2 : The blood pressure changes compared between the 2 groups of elderly sufferers with hypertension (n=50, mmHg)

Group	Diastolic pressure		Systolic blood pressure	
	Before nursing	After nursing	Before nursing	After nursing
Control group	97.74±10.13	88.48±4.21	155.84±11.54	134.14±8.75
Observation group	97.80±10.25	76.98±3.09	155.88±11.47	119.50±5.70

t	0.083	15.763	0.013	9.824
P	0.934	0.001	0.990	0.001

Figure 2: Analysis of blood pressure levels between groups

Note: "****" means $P<0.0001$; "ns" means $P>0.05$

Comparison of medication compliance and self-management ability between the 2 groups

Analyzing the data in Table 3 and Figure 3, before nursing, it had no obvious distinction between the Morisk scores and ESCA points of each dimension in the observation one and the control one, with $P>0.05$; after nursing, the various points of the sufferers in the observation one were obviously greater than the control one, with $P < 0.05$.

Table 3: The medication compliance and self-management ability of elderly sufferers with hypertension compared between the 2 groups (n=50, points)

Group	Morisk scores		Self-concept scores		Nursing accountability scores		Nursing competence scores		Health knowledge level	
	Before nursing	After nursing	Before nursing	After nursing	Before nursing	After nursing	Before nursing	After nursing	Before nursing	After nursing
Control group	2.00±0.00	2.94±0.24	23.50±1.36	26.18±2.07	18.50±1.16	20.42±1.33	32.02±2.29	40.70±3.09	51.72±2.27	60.44±3.39
Observation group	2.00±0.00	3.52±0.50	23.30±1.28	29.32±2.25	18.44±1.09	22.40±1.29	31.90±2.32	44.18±2.99	51.62±2.07	63.98±2.82
t	1.841	14.210	0.832	6.748	0.545	6.385	0.175	5.462	0.414	4.845
P	0.069	0.001	0.407	0.001	0.587	0.001	0.861	0.001	0.680	0.001

Figure 3: Analysis of medication compliance and self-management ability between groups

Note: "****" means $P<0.0001$; "ns" means $P>0.05$

The vascular endothelial function compared between the 2 groups

Analyzing the data in Table 4 and Figure 4, the measurement values of NO and ET-1 before the care of the observation one were not significant compared with the

control one, with P>0.05; after nursing, in comparison of the the control one, the NO measurement value and was higher and the ET-1 measurement value was less in the observation one, with P<0.05.

Table 4: The changes in vascular endothelial function in elderly sufferers with hypertension compared between the 2 groups (n=50)

Group	NO (μmol/L)		ET-1 (ng/L)	
	Before nursing	After nursing	Before nursing	After nursing
Control group	16.45±2.19	17.96± 2.25	86.59±3.37	67.26±2.47
Observation group	16.53±2.26	21.83±3.06	86.61±3.45	54.91±1.19
t	0.180	7.205	0.029	31.851
P	0.858	0.001	0.977	0.001

Figure 4: Analysis of vascular endothelial function between groups

Note: "****" means P<0.0001; "ns" means P>0.05

The mental state compared between the 2 groups

Analyzing the data in Table 5 and Figure 5, there was no significant difference in the anxiety scores, depression scores, and total points between the 2 groups before care, with P>0.05; the various scores of the observation one after care were obviously less than the control one, with P<0.05.

Table 5: The changes in the mental state of the elderly sufferers with hypertension compared between the 2 groups (n=50, points)

Group	Anxiety scores		Depression scores		Total scores	
	Before nursing	After nursing	Before nursing	After nursing	Before nursing	After nursing
Control group	5.48±1.31	2.88±0.69	6.50±1.13	3.18±0.72	11.86±2.38	6.04±1.03

Observation group	5.54±1.33	2.32±0.59	6.62±1.28	2.74±0.44	12.14±2.57	5.08±0.75
t	0.270	5.778	0.578	4.517	0.419	5.304
P	0.788	0.001	0.564	0.001	0.676	0.001

Figure 5: Analysis of mental state between groups

Note: "***" stands for P<0.001; "****" stands for P<0.0001; "ns" stands for P>0.05

The life quality compared between the 2 groups

Analyzing the data in Table 6 and Figure 6, it had no obvious distinction in the QLQ-C30 points of each dimension before nursing in the observation one in comparison of the control one, with P>0.05; after care, the scores of each dimension in the observation one were greater than the control one, with P<0.05.

Table 6: The changes in the life quality of elderly sufferers with hypertension compared between the 2 groups (n=50, points)

Group	Mental function scores		social function scores		Physical function scores		Material life scores	
	Before nursing	After nursing	Before nursing	After nursing	Before nursing	After nursing	Before nursing	After nursing
Control group	60.26±1.19	67.46±2.33	61.50±2.31	65.52±3.06	65.34±2.20	72.60±3.09	61.52±2.62	75.14±4.17
Observation group	60.14±1.13	72.32±3.63	61.32±2.19	70.46±3.30	65.24±2.14	77.98±4.13	61.52±2.44	80.52±5.06
t	0.585	8.050	0.316	7.783	0.329	7.312	0.100	5.829
P	0.560	0.001	0.753	0.001	0.743	0.001	0.921	0.001

Figure 6: Analysis of quality of life between groups

Note: "****" means P<0.0001; "ns" means P>0.05

The frequency of cardiovascular complications compared between the 2 groups

Analyzing the data in Table 7 and Figure 7, the incidence of cardiovascular complications in the observation one was obviously less than the control one, with P<0.05.

Table 7: The frequency of cardiovascular complications compared between the 2

groups of elderly sufferers with hypertension (n, %)

Group	n	Myocardial infarction	Arrhythmia	Heart failure	Total
Control group	50	2	4	3	18.00
Observation group	50	0	1	1	4.00
x^2	-	-	-	-	5.005
P	-	-	-	-	0.025

Figure 7: Analysis of the frequency of cardiovascular complications between groups

DISCUSSION

Hypertension is one of the cardiovascular diseases with a high prevalence in clinical practice. The most prominent clinical manifestation of this disease is abnormally elevated blood pressure levels, however, majority of the patients do not show apparent signs and symptoms and onset of this disease is gradual, chronic, difficult to treat and has multiple comorbidities[5]. The rise in blood pressure raises pressure on the wall of blood vessel and forms cardiovascular and cerebrovascular accident such as stroke and coronary heart illness. As the disease progresses, it may also cause heart failure, kidney damage, brain damage and even endanger the lives of patients [6]. The clinical studies reveal that [7] the proportion of elder patients having hypertension is considerably high with variations of 38 % to 56% and with changes in modem lifestyle and diet, the incidence rate is on the rise and corresponding cardiovascular and cerebrovascular diseases are on the rise and in extreme cases, patients' death. However, blood pressure must be actively regulated and ways to prevent cardiovascular complications are most important to treat hypertension clinically, and it is now said to manage the disease with drugs. However, elderly patients with hypertension do not pay attention to the disease knowledge, with such factors as bad habits and negative emotions as a negative impact on the medication compliance and disease treatment efficacy[8].

In order to meet the nursing needs of elderly sufferers with hypertension, while carrying out basic nursing interventions, it is also necessary to implement other

nursing work [9]. Individualized nursing means that clinical nursing staff carry out targeted diet guidance, exercise guidance, medication care, health education, psychological counseling, etc. according to the characteristics and conditions of elderly sufferers with hypertension, and closely monitor the blood pressure levels of the patients to ensure that the intervention program is adjusted according to the changes in their conditions [10]. After systematic training, nursing staff will carry out personalized health education work according to the patients' knowledge levels and comprehension of disease-related knowledge, popularize health knowledge related to hypertension to them, correct their misunderstandings, stimulate patients' positive psychology, and improve their treatment compliance [11,12].

Self-management ability means that patients can actively use the relevant knowledge they have learned in daily life to care for and manage their own diseases, and reduce the impact of diseases on their emotions, social and physical aspects [13,14]. Clinical studies have shown that [15] the self-management ability of elderly sufferers with hypertension is closely relevant to the effect of disease control. In this study, the points of each dimension of ESCA in the observation one were obviously greater than the control one, suggesting that individualized nursing programs could effectively improve the self-management ability of elderly sufferers with hypertension. The reasons are that personalized cognitive education, psychological counseling, etc., can help patients fully grasp the knowledge about hypertension, reduce their negative emotions, improve medication compliance and enthusiasm for self-care management [16,17]. During the process of nursing work, the nursing staff affirm the progress of patients in a timely manner, introduce the benefits of health and good living habits to disease treatment, and correct bad behaviors, which can improve their self-management ability [18,19]. In the study, the frequency of cardiovascular complications in the observation one was obviously less than the control one, which may be related to the improvement of patients' self-management ability and further improvement in blood pressure control.

In the research, the blood pressure, each HADS dimension scores, vascular endothelial function indicators, medication compliance scores, and life quality scores in the observation one were obviously better than the control one. It is suggested that individualized nursing can improve the condition control effect of elderly patients with hypertension, reduce their negative emotions, and improve their life quality. The reasons are that the individualized nursing plan can ease the painful emotions of the

patients, help the patients to build confidence in fighting the disease, mobilize their internal drive to make them take the initiative to form a diet and living habits that are beneficial to the treatment of the disease, and follow the doctor's advice to use rational drugs, gradually reduce physiological discomfort, and ultimately improve the effects of disease treatment and quality of life [20]. In conclusion, the application effects of individualized nursing in elderly sufferers with hypertension are remarkable, and it is worthy of further promotion and application.

Conclusion

The result of this study emphasizes the potential of the nursing intervention in enhancing patients' health outcome related to hypertension in elderly patients. The observation group of the study revealed a significant decrease of their systolic and diastolic blood pressures than the control group post intervention thus making the difference statistically significant. Also, the observation group had improvement on medication adherence and self-care skills compared to the pre-nursing care period as showed by higher Morisk and ESCA scores. The endpoints we noted here include increased NO levels and detrimental ET-1 levels, showing the endothelial function on the blood vessels was enhanced. Since the cross-sectional analysis we conducted a one-way between-groups analysis of variance showed that the observation group had a significantly lower score on the anxiety, depression, and the total score compared to the control group. The observation group had improved their QoL after nursing cares with increased scores on mental, social, physical, and material aspects of life. Also, the incidence of cardiovascular events was less than in the observation group, which confirms the effectiveness of the introduced nursing measures in the prevention of complications. These findings suggest that enhanced, complex nursing care as an approach is effectively useful in promptly treating hypertension in the elderly and enhancing physiological, psychological, and quality of life outcomes.

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