

Exercise therapy and nutrition guidance in hypertension: effects on physiological indices

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Abstract: Objective: To investigate the efficacy of the intervention combining exercise therapy with nutritional guidance in the treatment of hypertensive patients and analyze its effects on physiological parameters. Methods: Clinical data of 60 hypertensive patients were collected from January 2023 to March 2024. The patients were divided into two groups using the random number table method, with 30 cases in each group. The control group received routine nursing care, while the observation group received exercise therapy combined with nutritional guidance on this basis. Results: After intervention, the observation group showed lower blood pressure values, higher quality of life scores, and lower SAS and SDS scores compared with the control group, with statistically significant differences between the two groups ($P < 0.05$). Conclusion: The intervention combining exercise therapy with nutritional guidance for hypertensive patients can not only significantly improve blood pressure control but also help patients establish healthy lifestyles, enhance their quality of life, and promote positive changes in mental health.

Keywords: Hypertension, Exercise Therapy, Nutritional Guidance, Quality of Life

1. Introduction

As a widely occurring clinical condition, hypertension has a relatively high incidence. If patients fail to achieve effective blood pressure management, resulting in excessive blood pressure fluctuations, the risk of developing cardiovascular diseases may be significantly increased, thereby adversely affecting their overall health status. In modern society, with the continuous improvement of living standards, the incidence of hypertension remains at a relatively high level and has shown an upward trend in recent years. In clinical treatment of hypertension, pharmacotherapy is usually the first choice; however, since middle-aged and elderly populations constitute the main patient group for hypertension and they often suffer from multiple chronic diseases with low compliance to drug treatment, implementing targeted nursing measures is crucial for them. Nevertheless, traditional nursing methods cannot rapidly and effectively maintain stable blood pressure. In contrast, the nursing strategy combining exercise therapy with nutritional guidance can implement nursing measures from multiple perspectives, effectively reduce related risk factors, and achieve ideal blood pressure control [1]. Therefore, the purpose of this study is to explore the potential advantages of combining exercise therapy with nutritional guidance in blood pressure control among elderly hypertensive patients. The detailed information of this study is reported as follows.

2. Materials and methods

2.1. General information

Clinical data of 60 hypertensive patients were collected from January 2023 to March 2024. The patients were divided into two groups using the random number table method, with 30 cases in each group. In the control group, there were 16 males and 14 females, aged 40-79 (53.45 ± 4.54) years. In the observation group, there were 17 males and 13 females, aged 40-78 (54.37 ± 4.45) years. The baseline characteristics were balanced between the two groups ($P > 0.05$). Inclusion criteria: (1) All participants met the diagnostic criteria established in the Guidelines for the Management of Hypertension at the Primary Care Level in China (2014

Revised Edition) [2], namely diastolic blood pressure not less than 90 mmHg and systolic blood pressure not less than 140 mmHg; (2) Individuals suitable for participating in basic physical activities. Exclusion criteria: (1) Patients with severe heart disease; (2) Patients with severe organ failure; (3) Patients with communication disorders or mental health problems.

2.2. Methods

The control group received routine nursing intervention: a practical and feasible nursing plan was formulated according to the specific health conditions of each patient, and health education for patients and their families was strengthened. The potential causes, common symptoms, treatment options, and expected rehabilitation process of cerebral hemorrhage with hemiplegia were explained in detail, aiming to enhance their understanding of the disease. Subsequently, considering that patients often develop negative emotions such as inferiority, depression, and fear due to the disease, timely psychological counseling was provided, and family members and friends were encouraged to offer emotional support, helping patients feel cared for, overcoming difficulties together, and promoting positive changes in their psychological state. Meanwhile, patients were instructed to engage in moderate rehabilitation training, and family members were guided on how to effectively assist, so as to maximize the recovery of limb function.

The observation group adopted exercise therapy combined with nutritional guidance, as detailed below: Exercise therapy. Patients were encouraged to participate in moderate aerobic exercise, with one to two sessions recommended daily, each lasting approximately 30 minutes. Tai Chi and brisk walking were the recommended forms of exercise, while high-intensity and intermittent training should be avoided. Developing regular exercise habits and setting clear exercise goals were equally important. In the first month, the focus was on establishing standardized exercise routines; in the second month, attention was paid to adjusting the relationship between body energy balance and physical exertion; by the third month, the goal was to cultivate patients' awareness of autonomous exercise, ensuring the sustainability and scientific nature of exercise. Nutritional guidance: Restriction of sodium intake: For patients with mild symptoms, daily sodium intake was recommended not to exceed 5 g; for patients with moderate symptoms, further restriction was advised, with daily intake not exceeding 2 g; for patients with severe symptoms, a sodium-free diet was recommended. To help patients and their families accurately control sodium intake, nursing staff could provide standard measuring spoons and instruct them on how to use the spoons to measure sodium in food, so as to avoid excessive intake. Ensuring adequate vegetable intake: Ensuring a diet rich in vegetables was very important, as vegetables are a treasure trove of various trace elements and vitamins, especially fresh green vegetables, which should be the first choice in the diet. Meanwhile, appropriately increasing the intake of beans and melon foods helped achieve comprehensive nutritional balance. In the diet, the intake of animal fats and animal-derived foods should be reduced, such as avoiding lard. Patients were advised to consume 400 to 500 g of fresh vegetables and fruits daily to maintain nutritional balance in the diet. For patients with concurrent diabetes, when blood glucose was stably controlled, approximately 200 g of low-sugar or moderately sugary fruits was recommended. Increasing protein intake: To ensure adequate and diverse protein intake, it was recommended to choose fish as a protein source at least two to three meals per week. In addition, daily protein intake was suggested to be calculated at the standard of 1 g per kilogram of body weight. Promoting healthy lifestyle: Patients were advised to improve their dietary habits, reduce the intake of strong tea, coffee, and concentrated fruit juice, and were encouraged to quit smoking and limit alcohol consumption, so as to reduce blood pressure fluctuations that might be caused by excessive alcohol intake. Meanwhile, drinking pure water was recommended, and a moderate and distributed drinking pattern was adopted, which helped alleviate the excretory burden on the liver and kidneys. Following the principle of small, frequent meals: Patients needed to plan their diet reasonably, with each meal maintaining a certain amount of food, and dinner should be avoided too late, preferably finished before 19:00. Foods that were easy to digest, low in carbohydrates, and low in fat were recommended, so as to prevent abnormal blood pressure elevation at night or in the early morning due to excessive energy intake.

After adhering to dietary adjustments and exercise plans for 6 months, the health status of patients was evaluated to observe changes.

Table 1 Comparison of Blood Pressure Indicators Between the Two Groups($\bar{x} \pm s$, mmHg)

Group	Systolic Blood Pressure		Diastolic Blood Pressure	
	Before Intervention	After Intervention	Before Intervention	After Intervention
Observation Group (n=30)	160.25±8.43	135.28±10.31	108.47±8.85	82.58±9.75
Control Group (n=30)	159.85±8.05	149.87±10.54	107.35±8.24	93.91±9.46
t	0.188	5.419	0.507	4.568
p	0.852	0.000	0.614	0.000

Table 2 Quality of Life Assessment Scores ($\bar{x} \pm S$, minute)

Group	Psychological Domain		Physiological Domain		Environmental Domain		Social Domain	
	Before Intervention	After Intervention	Before Intervention	After Intervention	Before Intervention	After Intervention	Before Intervention	After Intervention
Observation Group (n=30)	63.25±4.27	87.85±5.74	62.75±4.22	85.47±6.64	63.22±4.64	87.82±5.76	64.45±4.64	83.42±6.75
Control Group (n=30)	62.96±4.52	74.16±5.65	63.11±4.35	68.25±5.17	63.46±5.39	71.34±5.39	64.25±4.31	67.55±6.28
t	0.255	9.310	0.325	11.208	0.185	13.213	0.173	9.428
P	0.799	0.000	0.746	0.000	0.854	0.000	0.863	0.000

Table 2 Quality of Life Ratings ($\bar{x} \pm S$, minute)

Group	Psychological Domain		Physiological Domain		Environmental Domain		Social Domain	
	Before Intervention	After Intervention	Before Intervention	After Intervention	Before Intervention	After Intervention	Before Intervention	After Intervention
Observation Group (n=30)	63.25±4.27	87.85±5.74	62.75±4.22	85.47±6.64	63.22±4.64	87.82±5.76	64.45±4.64	83.42±6.75
Control Group (n=30)	62.96±4.52	74.16±5.65	63.11±4.35	68.25±5.17	63.46±5.39	71.34±5.39	64.25±4.31	67.55±6.28
t	0.255	9.310	0.325	11.208	0.185	13.213	0.173	9.428
P	0.799	0.000	0.746	0.000	0.854	0.000	0.863	0.000

2.3. Observation indicators

The systolic and diastolic blood pressure values of subjects in both groups were recorded and compared before the implementation of the intervention and after 6 months of intervention.

The quality of life of patients was evaluated in multiple dimensions using the Chinese version of the World Health Organization Quality of Life Assessment Scale (WHOQOL-BREF), covering four aspects: physiological, psychological, social, and environmental. This scale uses a 5-level scoring system, with a maximum score of 100 points for each dimension; the higher the score, the better the quality of life.

Anxiety levels were assessed using the Self-Rating Anxiety Scale (SAS), with 50 points as the critical threshold; scores exceeding this threshold indicate higher levels of anxiety. Depressive symptoms in patients were evaluated using the Self-Rating Depression Scale (SDS), with 53 points as the cutoff; scores

exceeding this value suggest the presence of depressive symptoms, with higher scores indicating greater severity of symptoms.

2.4. Statistical methods

Data were entered into SPSS 22.0 for statistical analysis. Count data were expressed as n (%), and the chi-square χ^2 test was applied. Measurement data were expressed as ($\bar{x} \pm s$), and the t-test was applied. A P-value < 0.05 was considered statistically significant.

3. Results

3.1. Blood pressure indicators of the two groups

The blood pressure values in the observation group were lower after nursing intervention (P<0.05). See Table 1.

3.2. Comparison of quality of life scores between the two groups

The scores in the observation group were higher after nursing intervention (P<0.05). See Table 2.

3.3. Comparison of emotional state scores between the two groups

The SAS and SDS scores in the observation group were lower after nursing intervention (P<0.05). See Table 3.

4. Discussion

4.1. Hazards of hypertension and the necessity of intervention

Hypertension, as a widespread chronic disease, is often regarded as a major independent risk factor for cardiovascular and cerebrovascular diseases. If hypertensive patients fail to receive effective long-term management, sustained elevated blood pressure may exert excessive pressure on renal function, causing the kidneys to exceed their normal workload. In the long term, this not only damages the patient's health but may also significantly reduce their quality of life [3]. Therefore, comprehensive management of hypertension is particularly important.

The blood pressure levels of hypertensive patients are influenced by multiple factors, not only related to the natural fluctuations of the disease but also closely associated with patients' daily lifestyle and dietary habits. Unhealthy lifestyles, such as lack of exercise, high-salt and high-fat diets, smoking, and alcohol consumption, may exacerbate hypertensive symptoms [4]. Therefore, in clinical practice, it is crucial to adopt exercise and dietary nutrition interventions for hypertensive patients. These nursing strategies not only help patients control blood pressure but also improve their overall health status.

4.2. Exercise and nutrition intervention protocol and research outcomes

In terms of exercise intervention, patients were encouraged to engage in regular aerobic exercise, such as walking, swimming, or cycling, which helps enhance cardiovascular health, improve myocardial function, and facilitate weight management. Nutritional intervention typically includes reducing sodium intake, controlling total energy intake, and increasing the proportion of vegetables and fruits in the diet. These measures help alleviate the burden on the cardiovascular system, thereby lowering blood pressure.

In this study, the observation group received exercise therapy combined with nutritional guidance. The results showed that after intervention, the observation group had lower blood pressure values, higher quality of life scores, and lower SAS and SDS scores compared with the control group, with statistically significant differences between the two groups (P<0.05). This suggests that the comprehensive program combining exercise intervention and nutritional guidance can effectively manage and optimize blood pressure status in elderly hypertensive patients, help improve their quality of life, and alleviate their negative emotions.

Improving the success rate of blood pressure management and preventing cardiovascular and cerebrovascular diseases are key goals of blood pressure control. Currently, medical practice increasingly emphasizes non-pharmacological treatment for hypertension management, advocating that patients develop

skills for self-health management. This intervention program was tailored to patients' specific patterns of blood pressure changes, pathological characteristics, and daily behavioral habits, following the patient-centered treatment principle to provide customized dietary and exercise recommendations, aiming to educate patients about the critical importance of energy balance.

4.3. Mechanisms and practical essentials of comprehensive intervention

4.3.1. Mechanisms of comprehensive intervention

In the intervention model combining exercise therapy with nutritional guidance, healthcare workers play a crucial role in the treatment process of hypertensive patients. They not only need to supervise patients' daily aerobic exercise, such as walking, jogging, or cycling, but also help patients overcome exercise barriers caused by personal factors such as inertia and lack of motivation. Such regular aerobic exercise is critical for enhancing patients' self-management capabilities; it not only improves blood circulation but also strengthens the function of the nervous system and cardiac muscles, and effectively regulates peripheral vascular resistance, thereby improving patients' physical flexibility [5]. Through this form of exercise, patients can experience improvements in physical strength and endurance, which has a positive impact on their overall health.

Aerobic exercise has been proven to significantly enhance cardiovascular health, reduce the risk of heart attack, and contribute to blood pressure control. Furthermore, regular physical activity can promote the release of endorphins, a natural "feel-good" chemical that helps alleviate stress and anxiety and improve mood states. When formulating exercise plans, healthcare professionals should provide personalized guidance, taking into account patients' age, health status, and personal preferences. For example, for elderly patients or those with joint problems, low-impact exercises such as swimming or yoga may be more suitable.

4.3.2. Practical essentials of comprehensive intervention

Meanwhile, educating patients to develop scientific dietary habits can not only meet their daily nutritional and energy needs but also achieve dietary balance and prevent health conditions exacerbated by improper diet [6]. Professional dietary guidance is crucial for patients to identify healthy foods and avoid high-salt and high-fat foods, which helps reduce the risk of elevated blood pressure. A reasonable diet plan is important for balancing the ratio of patients' energy intake and consumption, ensuring that daily energy intake matches their physical activity level to achieve energy balance. This is critical for maintaining healthy body weight and controlling blood pressure.

Combined exercise and nutrition intervention measures can help patients achieve a healthier lifestyle and reduce dependence on pharmacological treatment. Through this approach, patients can better control their health status, reduce the risk of future health problems, and improve their quality of life. Equally important is educating patients on how to self-monitor blood pressure and seek medical assistance when needed. Providing these tools and knowledge enables patients to actively manage their own health. In summary, through comprehensive intervention measures combining regular exercise and healthy diet, we can provide hypertensive patients with a holistic health management program, helping them achieve better health outcomes.

5. Conclusion

In conclusion, the intervention combining exercise therapy with nutritional guidance for hypertensive patients can not only significantly improve blood pressure control but also help patients establish healthy lifestyles, enhance their quality of life, and promote positive changes in mental health.

6. References

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