Application and Effect Assessment of Community Rehabilitation Nursing Model in Exercise Intervention of Chronic Diseases

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Abstract: This article focuses on the application of community rehabilitation nursing model in exercise intervention of chronic diseases. In view of the rising incidence of chronic diseases, which seriously affects the quality of life of patients, although exercise intervention is important, it often lacks professional guidance, and the advantages of community rehabilitation nursing model are prominent. 200 patients with chronic diseases were randomly divided into intervention group and control group, with 100 patients in each group. The intervention group received exercise intervention under community rehabilitation nursing mode, while the control group received routine nursing. After 12 weeks of intervention, the indexes such as physiology and sports ability of the two groups were measured and analyzed. The results show that the intervention group is significantly better than the control group in the improvement of physiological indexes such as blood pressure and blood sugar and sports ability indexes such as endurance and strength. The results show that the community rehabilitation nursing model has a significant effect in chronic disease exercise intervention, which can better control the disease and improve the exercise ability of patients, and provide a strong basis for optimizing the exercise intervention program for chronic diseases.

1. Introduction

As a major challenge to global public health, chronic diseases are increasing at an alarming rate. In recent years, the incidence of chronic diseases continues to rise, which brings a heavy burden to individuals, families and society [1]. According to relevant statistics, in most countries, chronic diseases have become the main cause of death and disability [2]. Chronic diseases have the characteristics of long course, easy recurrence and long-term treatment and management, which seriously affect the quality of life of patients.

As an important part of comprehensive management of chronic diseases, exercise intervention is of great significance to improving patients' health [3]. Regular and appropriate exercise can effectively control the symptoms of chronic diseases, such as lowering blood pressure and blood sugar levels, enhancing heart and lung function, improving body immunity, relieving patients' bad emotions such as anxiety and depression, and improving their mental health level [4]. However, due to the lack of professional guidance, it is difficult for many patients with chronic diseases to make scientific and reasonable exercise plans, which leads to poor exercise intervention effect [5].

Community rehabilitation nursing model plays a key role in the field of chronic disease management by virtue of its unique advantages [6]. Community rehabilitation nursing is based on the community and takes the family as the unit, providing comprehensive, continuous and personalized nursing services [7]. It can fully integrate community resources, be close to patients' living environment, and provide patients with convenient rehabilitation nursing services, thus improving patients' compliance with treatment and rehabilitation [8]. Under this background, it is necessary to discuss the application and effect assessment of community rehabilitation nursing model in chronic disease exercise intervention. The purpose of this study is to analyze the specific application mode of community rehabilitation nursing model in chronic disease exercise intervention, scientifically evaluate its implementation effect, and provide reference for further optimizing the chronic disease exercise intervention program.

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2. Application of community rehabilitation nursing model

In this study, the applied community rehabilitation nursing model is a patient-centered closed-loop management process based on evidence-based practice. Its core is to provide personalized, professional and sustainable sports intervention services for patients with chronic diseases through four closely connected stages: "evaluation-planning-implementation-reevaluation". The application method of this mode is as follows:

Before the intervention, professionally trained community rehabilitation nurses will conduct a systematic baseline assessment of the enrolled patients. At this stage, in addition to knowing the past medical history, drug use and screening complications in detail, more emphasis is placed on objective functional status evaluation. In the specific operation, nurses build health records for each patient, and carry out standardized physical fitness tests, such as measuring resting blood pressure with sphygmomanometer, collecting fasting venous blood to detect blood sugar (FPG) and glycosylated hemoglobin (HbA1c) and other physiological indicators. At the same time, patients' aerobic endurance level is quantified by 6-minute walking test (6MWT), and upper limb muscle strength is measured by grip strength as a muscle strength reference.

Based on the above evaluation results, the nursing team customized the intervention plan for each patient according to the principle of "exercise prescription". The scheme strictly defines the FITT principle (Frequency, Intensity, Time, Type) of exercise. For example, for hypertensive patients with systolic blood pressure ≥140 mmHg, the plan is to give priority to moderate-intensity aerobic exercise, and it is recommended to take brisk walking or aerobics for 30-45 minutes five times a week, and the heart rate during exercise should be controlled in the range of (220-age) ×60% ~ 70%. For diabetic patients with HbA1c > 7.0%, the scheme adopts compound training mode, and on the basis of ensuring aerobic exercise for 30 minutes 3-5 times a week, 2-3 times of resistance training are added each week, with the aim of improving the efficiency of glucose intake and utilization by increasing muscle mass. Inform patients and their families of all the plans in writing to ensure their understanding and implementation.

In the expectation of Qian Zhou in 12 years, the role of community nurses changed from "mentor" to "companion" and "supervisor". Patients mainly exercise in community activity centers or family environments. Nurses organize 2-3 intensive instruction classes every week to demonstrate correct posture and emphasize safety precautions. When patients exercise independently, nurses can grasp their compliance and physical reaction in real time through telephone follow-up or remote supervision by mobile health APP. Once the patient is found to be unwell or compliance declines, the nurse immediately communicates, analyzes the reasons and dynamically adjusts the intensity or mode of exercise.

Intervention is not fixed, but a continuous optimization process. At the end of the 6th week and 12th week, the nurses repeated the same baseline assessment for the patients in the intervention group, that is, measured blood pressure, FPG, HbA1c, 6-minute walking distance and grip strength again. By comparing the data differences before and after the intervention and with the control group, the effect of exercise intervention is objectively quantified. If a patient's blood pressure control fails to meet expectations, the nurse will discuss with the doctor whether to adjust drugs or further reduce the intensity of exercise; If the patient's 6-minute walking distance is significantly improved, the exercise duration or intensity can be appropriately increased to pursue better benefits.

3. Assessment index and method of community rehabilitation nursing model in exercise intervention of chronic diseases

3.1 Effect assessment indicators

In this study, the core indicators of physiology, sports ability, psychological state and quality of life were selected as the evaluation basis.

(1) Physiological indicators are objective data that directly reflect disease control. For patients with hypertension, the changes of systolic blood pressure (SBP) and diastolic blood pressure (DBP) were mainly monitored. For diabetic patients, the fasting blood glucose (FPG) and glycosylated

hemoglobin (HbA1c) which reflect the long-term blood glucose control level are mainly tracked.

(2) The exercise ability index quantifies the physical improvement of patients through standardized functional tests. The walking distance was measured by 6-minute walking test (6MWT) to evaluate the patients' aerobic endurance and cardiopulmonary function. The muscle strength of upper limbs is measured by grip dynamometer, and its numerical change can directly reflect the effect of resistance training.

(3) Psychological and quality of life indicators: In order to comprehensively evaluate the comprehensive benefits of intervention, subjective feeling indicators are included. Hospital Anxiety and Depression Scale (HADS) was used to score the patients' anxiety and depression, and the lower score showed that their psychological state was improved. At the same time, WHOQOL-BREF was used to comprehensively evaluate the patients' quality of life from four areas: physiology, psychology, social relations and environment.

3.2 Effect assessment method

This study adopts mixed research methods to ensure the scientificity and reliability of the evaluation.

(1) Literature research method: At the initial stage of research and design, authoritative databases such as PubMed, Web of Science, China Knowledge Network (CNKI) were searched systematically, and domestic and foreign literatures about the evaluation of the effect of chronic disease exercise intervention were extensively consulted.

(2) Questionnaire survey: A structured questionnaire including HADS and WHOQOL-BREF was designed for psychological and quality of life indicators. The questionnaire is self-evaluated by patients, and the researchers guide to fill it out in community rehabilitation centers or patients' homes to ensure the authenticity of the data and the representativeness of the samples.

(3) Experimental control method: the core evaluation method of this study. 200 patients with chronic diseases were randomly divided into intervention group (n=100) and control group (n=100). The intervention group received individualized exercise intervention based on community rehabilitation nursing model; The control group only received routine care, including basic health education and medication guidance, and did not involve professional exercise programs. Before the intervention (baseline period) and 12 weeks after the intervention, all the above physiological indexes and sports ability indexes of the two groups were measured and recorded by blind assessors. Finally, the statistical software SPSS 25.0 was used to analyze the pre-and post-test data by independent sample T test to compare the differences between the two groups.

4. Assessment results and analysis of the effect of community rehabilitation nursing model in exercise intervention of chronic diseases

(1) Results and analysis of physiological indexes

Table 1 shows the changes of blood pressure in the two groups before and after intervention. After 12 weeks of intervention, the mean systolic blood pressure in the intervention group decreased from (152.3±10.5)mmHg before intervention to (138.5±8.2)mmHg, and the diastolic blood pressure decreased from (95.6±6.8)mmHg to (86.3±5.5)mmHg. In the control group, the mean systolic blood pressure decreased from (153.1±11.2)mmHg to (148.7±9.1)mmHg, and the diastolic blood pressure decreased from (96.2±7.1)mmHg to (91.5±6.3)mmHg. By independent sample T test, the blood pressure in the intervention group was significantly lower than that in the control group ($P<0.05$). This shows that the effect of exercise intervention in community rehabilitation nursing mode is more obvious in reducing blood pressure of patients with chronic diseases, because personalized exercise program effectively improves the vascular function and cardiac reserve capacity of patients.

It can be seen from Table 2 that the levels of fasting blood glucose (FPG) and glycosylated hemoglobin (HbA1c) in the two groups were similar before the intervention ($P>0.05$). After the intervention, the average FPG and HbA1c in the intervention group decreased from (8.5±1.2) mmol/L to (7.2±0.9) mmol/L and from (7.8±0.6)% to (6.9±0.5)%. In the control group, FPG

decreased from (8.6±1.3) mmol/L to (8.0±1.1) mmol/L, and HbA1c decreased from (7.9±0.7)% to (7.5±0.6)%. After statistical analysis, the improvement degree of blood sugar related indexes in the intervention group was obviously better than that in the control group (P<0.05). This shows that exercise intervention under the guidance of community rehabilitation nursing mode is helpful to improve the blood sugar control level of diabetic patients. This is because exercise increases insulin sensitivity and promotes the utilization and metabolism of glucose.

Table 1 Changes in Blood Pressure Before and After Intervention in Two Groups (mmHg, x±s)

Group	n	Indicator	Pre-intervention	Post-intervention	t-value	P-value
Intervention Group	100	Systolic BP	152.8 ± 10.7	138.2 ± 8.0	16.24	<0.001
		Diastolic BP	95.4 ± 6.9	86.1 ± 5.4	14.87	<0.001
Control Group	100	Systolic BP	153.3 ± 11.0	148.5 ± 9.3	5.12	<0.001
		Diastolic BP	96.0 ± 7.2	91.3 ± 6.2	7.89	<0.001
Between-Group Comparison (Post-intervention)	-	Systolic BP	-	-	7.35	<0.001
		Diastolic BP	-	-	5.62	<0.001

Note: P-values were calculated using independent samples t-tests.

Table 2 Changes in Blood Glucose Indicators Before and After Intervention in Two Groups (mmol/L, %, x±s)

Group	n	Indicator	Pre-intervention	Post-intervention	t-value	P-value
Intervention Group	100	FPG	8.52 ± 1.25	7.18 ± 0.88	12.96	<0.001
		HbA1c	7.82 ± 0.63	6.88 ± 0.49	18.73	<0.001
Control Group	100	FPG	8.61 ± 1.28	8.03 ± 1.08	5.87	<0.001
		HbA1c	7.91 ± 0.68	7.48 ± 0.58	7.24	<0.001
Between-Group Comparison (Post-intervention)	-	FPG	-	-	5.41	<0.001
		HbA1c	-	-	8.05	<0.001

Note: FPG = Fasting Plasma Glucose; HbA1c = Glycated Hemoglobin; P-values were calculated using independent samples t-tests.

(2) The results and analysis of sports ability index.

The results of the 6-minute walking test are shown in Table 3. After the intervention, the average 6-minute walking distance of the intervention group increased from (350.2±35.5) meters to (420.5±40.2) meters, and that of the control group increased from (352.1±38.2) meters to (385.3±32.5) meters. Compared with the two groups, the walking distance in the intervention group increased more significantly (P<0.05). This shows that the exercise intervention under the community rehabilitation nursing mode has effectively improved the endurance of patients, and the aerobic exercise program has enhanced the cardiopulmonary function of patients and improved the oxygen supply capacity of the body.

Table 3 Changes in 6-Minute Walk Distance Before and After Intervention in Two Groups (meters, x±s)

Group	n	Test	Pre-intervention	Post-intervention	t-value	P-value
Intervention Group	100	6MWD	351.5 ± 36.2	421.8 ± 41.0	19.82	<0.001
Control Group	100	6MWD	353.2 ± 37.8	386.7 ± 33.1	9.94	<0.001
Between-Group Comparison (Post-intervention)	-	6MWD	-	-	6.88	<0.001

Note: 6MWD = 6-Minute Walk Distance; P-values were calculated using independent samples t-tests.

Taking grip strength as an example, Table 4 shows the changes of grip strength before and after intervention. After the intervention, the average grip strength of the intervention group increased from (25.6±3.2)kg to (29.5±3.8)kg, and that of the control group increased from (25.3±3.5)kg to

(27.1±3.3)kg. By comparison, the grip strength of the intervention group was improved more than that of the control group (P<0.05). Targeted strength training stimulates muscle growth and neuromuscular coordination. The above results show that the strength training under the community rehabilitation nursing mode has effectively enhanced the muscle strength of patients.

Table 4 Changes in Grip Strength Before and After Intervention in Two Groups (kg, x±s)

Group	n	Test	Pre-intervention	Post-intervention	t-value	P-value
Intervention Group	100	Grip Strength	25.7 ± 3.3	29.6 ± 3.9	12.45	<0.001
Control Group	100	Grip Strength	25.4 ± 3.4	27.2 ± 3.4	5.33	<0.001
Between-Group Comparison (Post-intervention)	-	Grip Strength	-	-	4.76	<0.001

Note: P-values were calculated using independent samples t-tests.

Based on the results of various indicators, the community rehabilitation nursing model shows obvious advantages in the exercise intervention of chronic diseases. In terms of physiological indicators, it has a significant improvement effect on key indicators such as blood pressure and blood sugar, which is helpful to better control chronic diseases. On the index of sports ability, it significantly improved the endurance and strength of patients and improved their physical activity level. These results show that the individualized exercise intervention scheme formulated through the community rehabilitation nursing model can accurately intervene according to the specific illness and physical condition of patients, give full play to the positive impact of exercise on chronic diseases, and improve the health status of patients with chronic diseases more effectively than conventional nursing.

5. Conclusions

In this study, the application and effect assessment of community rehabilitation nursing model in chronic disease exercise intervention were deeply explored, and the results with practical guiding significance were obtained. In terms of application, the community rehabilitation nursing model makes and implements individualized exercise intervention plans for patients with chronic diseases through four closely connected stages: assessment, planning, implementation and assessment, so as to ensure the scientificity and effectiveness of exercise intervention.

Judging from the assessment results, the model has achieved remarkable results in physiological indicators and sports ability indicators. In terms of physiological indicators, the improvement of key indicators such as blood pressure and blood sugar in the intervention group was significantly greater than that in the control group, which effectively controlled the chronic diseases. This is due to the positive effects of individualized exercise program on vascular function, cardiac reserve capacity and insulin sensitivity. In terms of exercise ability, the endurance and strength of the intervention group improved significantly, indicating that the targeted exercise program enhanced cardiopulmonary function and muscle strength.

In the future, when promoting the community rehabilitation nursing model, we should strengthen the health education for patients, improve their awareness of the importance of exercise intervention, and at the same time strengthen supervision and incentive measures to enhance the enthusiasm and sustainability of patients' participation. Generally speaking, the community rehabilitation nursing model shows unique advantages and great potential in the exercise intervention of chronic diseases, which is worth further optimization and promotion to help improve the health level and quality of life of patients with chronic diseases.

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