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Original Article

Psychocardiology-based nursing intervention enhances self-efficacy in elderly patients with angina pectoris

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Abstract: Objective: To assess the effect of psychocardiology-based nursing intervention on cardiac function and self-efficacy in elderly patients with angina pectoris. Methods: A total of 127 elderly patients with angina pectoris admitted to the First Affiliated Hospital of Xi'an Jiaotong University from December 2022 to December 2023 were divided into two groups: the control group (n=63) received routine nursing care, while the observation group (n=64) received psychocardiology-based nursing intervention in addition to routine care. The psychological status, self-efficacy, cardiac function, and severity of angina were compared between the two groups before and after intervention. Results: After intervention, Hamilton Anxiety Scale (HAMA) and Hamilton Depression Scale (HAMD) scores significantly decreased in both groups compared to pre-intervention levels (both $P<0.05$), with the observation group showing a more pronounced reduction (both $P<0.05$). The left ventricular ejection fraction (LVEF) increased significantly in both groups post-intervention ($P<0.05$), while left ventricular end-diastolic diameter (LVEDD) and left ventricular wall thickness (LVWT) showed no significant changes (both $P>0.05$). Self-efficacy scores significantly improved in both groups post-intervention ($P<0.05$), with a greater increase observed in the observation group ($P<0.05$). Additionally, all dimensions of the Seattle Angina Questionnaire (SAQ) showed significant improvement in both groups post-intervention ($P<0.05$), with higher scores in the observation group compared to the control group ($P<0.05$). Conclusion: Psychocardiology-based nursing intervention effectively improves psychological well-being, self-efficacy, quality of life, and cardiac function in elderly patients with angina pectoris.

Keywords: Psychocardiology-based nursing mode, nursing intervention, angina pectoris, cardiac function, self-efficacy

Introduction

Cardiovascular diseases are prevalent conditions that pose significant risks to human life and health. Research indicates that patients with cardiovascular diseases often experience psychological disorders such as anxiety and depression, which can adversely affect clinical outcomes and contribute to disease progression [1, 2]. Coronary heart disease (CHD), caused by coronary atherosclerosis, results in myocardial ischemia and hypoxia, particularly affecting middle-aged and elderly individuals [3]. Angina pectoris, a clinical syndrome characterized by acute and brief episodes of myocardial ischemia and hypoxia, is caused by insufficient blood supply to the coronary arteries [4]. Patients with CHD and angina pectoris frequently suffer from psychological disorders, including depression, anxiety, and fear. Conventional treatment and care for these conditions primarily focus on alleviating clinical symptoms, often neglecting the importance of psychological intervention. This oversight can lead to the worsening of the patient's condition. Therefore, effective care must address both the physical and psychological aspects of the disease, aiming to alleviate negative emotions and improve the patient's quality of life [5].

Psychocardiology, also known as psychological or behavioral cardiology, focuses on addressing the emotional, social, and behavioral issues associated with heart disease. It emphasizes the psychological well-being of patients alongside the diagnosis and treatment of cardiovascular conditions. While current research primarily concentrates on the physical aspects of CHD

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or psychological care in isolation, there is a need for a more comprehensive exploration of the interplay between CHD and psychological factors. This study investigates the effects of psychocardiology-based nursing intervention on cardiac function and self-efficacy in elderly patients with angina pectoris.

Materials and methods

Research subjects

In this retrospective study, 127 elderly patients with angina pectoris, admitted to the First Affiliated Hospital of Xi'an Jiaotong University from December 2022 to December 2023, were divided into a control group (n=63) and an observation group (n=64) based on their admission time. The study was approved by the ethics committee of the First Affiliated Hospital of Xi'an Jiaotong University.

Inclusion criteria

(1) Patients diagnosed with angina pectoris and CHD according to WHO clinical diagnostic criteria, confirmed by electrocardiogram, dynamic electrocardiogram, coronary angiography, and echocardiography [6]; (2) Patients aged between 60-80 years old; (3) Patients with grade I-II cardiac function; (4) Patients with an education level above elementary school; and (5) Patients capable of effective communication.

Exclusion criteria

(1) Patients with cognitive impairment or hearing loss; (2) Patients with myocardial infarction, severe arrhythmia, or heart failure; (3) Patients with mental disorders; (4) CHD patients with severe liver or kidney dysfunction, cerebrovascular disease, or malignant tumors.

Methods

Patients in the control group received routine nursing care: (1) Patients were instructed to stay in bed and remain quiet, with close monitoring; (2) Adverse reactions to anti-angina drugs (e.g., nitroglycerin) were observed, including vasodilation symptoms such as headache, facial flushing, and dizziness. Patients sensitive to the medication were monitored for orthostatic hypotension; (3) The room temperature was controlled to avoid increasing the cardiac workload or triggering angina; (4) Patients were advised to follow a low-fat, low-cholesterol, high-vitamin diet, with small, frequent meals, and to avoid smoking and alcohol; (5) Heart rate, pain location, nature, and duration, as well as responses to medication, were closely monitored. Night rounds were intensified, and any changes in the frequency or nature of angina were documented; (6) Patients were guided to engage in moderate exercise once pain was stable; (7) Health education was reinforced during hospitalization.

The observation group received psychocardiology-based nursing intervention in addition to routine care. This included relaxation therapy combined with exercise therapy. Mindfulness was used as the relaxation therapy, and cardiac rehabilitation exercises were implemented as the exercise therapy. The specific interventions were as follows.

Cardiac rehabilitation exercise therapy: It was conducted daily at 4 p.m. in the open corridor space of the inpatient ward. Nurses guided patients through cardiac rehabilitation exercises, ensuring no discomfort such as chest tightness or shortness of breath. Exercises were avoided within 2 hours of eating. Patients followed nurses or instructional videos for 20-30 minutes, accompanied by background music and professional guidance.

Meditation therapy: This therapy was conducted at 8:30 p.m. daily during hospitalization (not within 2 hours after a meal). Nurses instructed patients in meditation therapy in a calm environment, ensuring emotional stability. Patients were seated upright, in a flat sitting position, or cross-legged, with hands held above the head. Breathing techniques were emphasized, with deep chest-abdomen breathing, inhaling through the nose and exhaling through the mouth. The tip of the tongue should lightly touch the roof of the mouth when inhaling, and should rest flat when exhaling. during exhalation. Breathing was paced at 8-10 breaths per minute. Each session lasted 10-15 minutes, with low-decibel meditation music and professional instruction.

Psychological intervention and nursing: Nurses in the Department of Geriatrics were trained in psychological nursing, enabling them to identify

and address patients' psychological issues effectively. This training helped cultivate professional competence in psychological nursing. Nurses established strong nurse-patient relationships, monitored mood changes, identified negative emotions, and provided individualized psychological interventions based on each patient's specific condition.

Observation of indexes

Anxiety: The patients' anxiety levels were assessed using the Hamilton Anxiety Scale (HAMA) before and after the intervention, with a maximum score of 100 points [7]. A higher HAMA score indicates more severe anxiety. The anxiety levels were classified as follows: a score less than 50 indicates no anxiety, 50-59 indicates mild anxiety, 60-69 indicates moderate anxiety, and a score of 70 or above indicates severe anxiety.

Depression: Patients' depression levels were measured using the Hamilton Depression Scale (HAMD) before and after the intervention, also with a total score of 100 points [8]. The depression levels were classified similarly to the HAMA: a score less than 50 indicates no depression, 50-59 indicates mild depression, 60-69 indicates moderate depression, and a score of 70 or above indicates severe depression.

Cardiac function: Cardiac function was evaluated by measuring the left ventricular ejection fraction (LVEF), left ventricular end-diastolic diameter (LVEDD), and left ventricular wall thickness (LVWT) before and after the intervention. These measurements were obtained using a GE Vivid E9 ultrasonic diagnostic instrument with an M5s probe. ECG leads were placed on the chest, and cardiac ultrasound images were optimized by adjusting gain, focus, fan width, and depth to achieve the best image quality. The echocardiographic views included left ventricular long-axis, aortic short-axis, apical (four-chamber, two-chamber, and three-chamber), and left ventricular short-axis views (at the mitral valve, papillary muscle, and apex levels). For each slice, 3-5 cardiac cycles were recorded.

Self-efficacy: Patients' self-efficacy was assessed using a self-efficacy scale before and after the intervention [9]. The scale comprises five dimensions: emotion management, symptom management, disease cognition, medication compliance, and medication management, with each dimension scoring up to 20 points. A higher score indicates a stronger self-efficacy in managing these aspects.

Degree of angina pectoris: The degree of angina pectoris was evaluated using the Seattle Angina Questionnaire (SAQ) [10]. This questionnaire includes five dimensions: physical activity limitation, stability of angina, frequency of angina, treatment satisfaction, and disease awareness. The standard score is calculated as follows: Standard score = (actual score - the lowest score)/(the highest score - the lowest score) × 100. A higher score indicates a better quality of life and functional status.

Statistical analysis

Data were analyzed using SPSS 22.0. Two independent sample t-tests were used for comparisons between groups, paired t-tests were used for within-group comparisons, and chi-square tests were used for comparing categorical data. A p-value <0.05 was considered statistically significant.

Results

Comparison of clinical materials

The comparison of general data between the two groups, including gender, age, disease duration, and educational level, showed no significant differences (all P>0.05, **Table 1**).

Comparison of anxiety and depression before and after intervention

After the intervention, the HAMA and HAMD scores in both groups decreased significantly compared to pre-intervention levels (both P< 0.05), with the scores in the observation group being significantly lower than those of the control group (both P<0.05, **Tables 2**, **3** and **Figure 1**).

Comparison of cardiac function

The LVEF in both groups increased significantly after the intervention compared to before (P<0.05), with the observation group showing a notably higher LVEF than the control group (P<0.05). However, there were no significant

Table 1. Comparison of clinical data between two groups

Group	Number of cases	Gender		Age (years old, $\bar{x}$±s)	Course of disease (years, $\bar{x}$±s)	Education degree	
		Male	Female			Junior high school and below	High school and above
Observation group	64	35	29	69.36±9.75	5.74±1.36	42	22
Control group	63	31	32	68.94±8.94	5.93±1.52	39	23
t/X^2	-	0.382		0.253	0.743	0.102	
P	-	0.537		0.801	0.459	0.750	

Table 2. Comparison of HAMA scores between two groups before and after intervention (points, $\bar{x}$±sd)

Group	Number of cases	Before intervention	After intervention	t	*P*
Observation group	64	59.83±6.49	49.21±5.94	9.657	<0.001
Control group	63	59.10±7.21	54.52±6.82	3.691	<0.001
t	-	0.600	4.681	-	-
P	-	0.550	<0.001	-	-

HAMA: Hamilton Anxiety Scale.

Table 3. Comparison of HAMD scores between two groups before and after intervention (points, $\bar{x}$±sd)

Group	Number of cases	Before intervention	After intervention	t	*P*
Observation group	64	58.32±5.39	48.27±5.26	10.676	<0.001
Control group	63	58.05±6.12	52.31±7.02	4.892	<0.001
t	-	0.265	3.674	-	-
P	-	0.792	<0.001	-	-

HAMD: Hamilton Depression Scale.

differences in LVEDD and LVWT before and after the intervention in either group (both P>0.05, **Table 4**).

Comparison of self-efficacy

As shown in **Table 5**, self-efficacy scores in both groups significantly increased after the intervention compared to pre-intervention levels (P<0.05), with the observation group achieving higher self-efficacy scores than the control group (P<0.05).

Comparison of angina pectoris

As shown in **Table 6**, all dimensions of the SAQ in both groups improved significantly after the intervention compared to pre-intervention levels (P<0.05), with the observation group scoring higher than the control group (P<0.05).

Discussion

Numerous studies have demonstrated that accurate diagnosis, effective treatment methods, and early nursing intervention can significantly enhance the therapeutic outcome and clinical prognosis of patients with CHD and angina pectoris [11, 12]. Elderly patients often experience long-term psychological stress and tension due to factors such as declining physical health, limited social interaction, reduced communication with others, recurrent illness, prolonged disease duration, and frequent hospital admissions. These factors can exacerbate negative emotions, impair arterial dilation, increase heart rate and blood pressure, and consequently worsen myocardial ischemia and hypoxia [13]. Therefore, psychological disorders such as anxiety and depression have emerged as critical risk factors for cardiovascular diseases, warranting attention from clinical practitioners [14]. The psychocardiology medical model, derived from the biopsychosocial model, provides a framework for understanding patients' psychological states by integrating psychological monitoring with clinical diagnosis and treatment [15]. To further enhance the therapeutic efficacy and quality of life in elderly patients with CHD and angina pectoris, this study explores the impact of nursing interventions based on the biopsychosocial model on cardiac function and self-efficacy in this patient population.

The results of this study demonstrated that the HAMA and HAMD scores in both patient groups

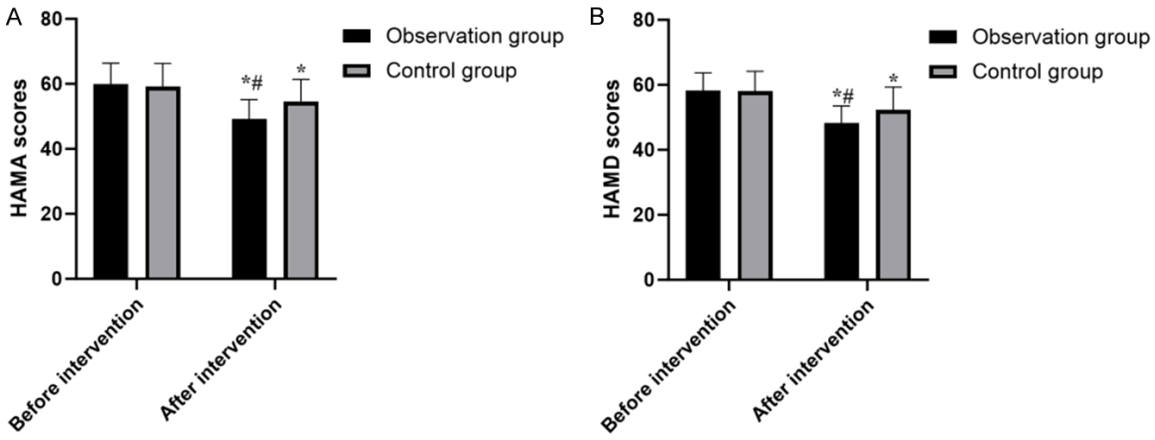

Figure 1. Comparison of HAMA and HAMD scores between the two groups before and after intervention. Note: A: Hamilton Anxiety Scale (HAMA); B: Hamilton Depression Scale (HAMD). Compared to before intervention, paired t-test, *P<0.05; compared to control group, U, #P<0.05.

Table 4. Comparison of cardiac function between two groups before and after intervention ($\bar{x}$±sd)

Group	Period	LVEF	LVEDD	LVWT
Observation group (n=64)	Before intervention	42.93±3.74	60.27±6.83	70.82±7.38
	After intervention	48.65±3.96*	58.95±6.20	69.32±5.63
	t	8.040	1.145	1.293
	P	<0.001	0.255	0.199
Control group (n=63)	Before intervention	42.65±3.62	61.02±5.33	71.21±8.03
	After intervention	45.27±2.75	59.28±7.22	69.84±6.84
	t	4.597	1.539	1.031
	P	<0.001	0.126	0.305

Note: Compared to the control group in the same period, U, **P<0.05*. LVEF: left ventricular ejection fraction; LVEDD: left ventricular end-diastolic diameter; LVWT: left ventricular wall thickness.

Table 5. Comparison of self-efficacy scores between two groups before and after intervention (points, $\bar{x}$±sd)

Group	Period	Emotion Management	Symptom Management	Disease Cognition	Medication Compliance	Medication Management
Observation group (n=64)	Before intervention	12.97±1.03	13.84±1.75	13.28±1.65	11.95±2.17	13.64±1.27
	After intervention	18.19±2.16*	19.27±2.03*	20.19±2.37*	17.69±1.79*	18.96±2.24*
	t	17.451	16.208	19.143	16.324	16.528
	P	<0.001	<0.001	<0.001	<0.001	<0.001
Control group (n=63)	Before intervention	13.11±1.26	13.97±1.81	13.79±1.75	11.62±1.72	13.77±1.64
	After intervention	15.39±1.68	16.28±1.95	17.49±1.97	14.85±1.88	15.90±2.18
	t	8.618	6.891	11.145	10.061	6.197
	P	<0.001	<0.001	<0.001	<0.001	<0.001

Note: Compared to the control group in the same period, U, **P<0.05*.

significantly decreased after treatment compared to baseline. Furthermore, the observation group exhibited significantly lower scores than the control group post-intervention. This aligns with the findings of other studies [16, 17], indicating that the dual-heart medical model effectively alleviated anxiety and mood disturbances in patients. This further supports

Table 6. Comparison of SAQ scores between two groups of patients before and after intervention (points, $\bar{x}\pm s$)

Group	Period	Physical activity limitation	Stable state	Frequency	Satisfaction degree	Awareness of disease	Total score
Observation group (n=64)	Before intervention	32.64±3.04	4.10±0.52	7.96±0.75	13.26±2.08	7.28±1.66	65.41±6.94
	After intervention	41.98±3.29*	5.27±0.83*	9.37±1.21*	17.21±3.27*	11.20±1.53*	83.27±9.30*
	t	16.680	9.556	7.924	8.090	13.891	12.313
	P	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Control group (n=63)	Before intervention	32.87±2.92	4.08±0.44	7.84±0.85	13.18±1.96	7.19±1.58	65.93±7.02
	After intervention	37.95±3.17	4.70±0.69	8.20±0.97	15.01±2.75	9.89±1.26	76.58±7.82
	t	9.429	6.013	2.216	4.301	10.605	8.044
	P	<0.001	<0.001	0.029	<0.001	<0.001	<0.001

Note: Compared to the control group in the same period, U, *$P<0.05$. SAQ: Seattle Angina scale.

the notion that effective psychological intervention can enhance the mental health of elderly patients with CHD and angina pectoris.

Self-efficacy, shaped by information from various sources, is a critical factor in behavioral decision-making and a key determinant of healthy behavior in patients with CHD [18]. Patients with high self-efficacy tend to attribute their illness to external factors, view it as a personal challenge, and believe that they can manage their daily lives and improve their health through their efforts [19]. In contrast, patients with low self-efficacy are more likely to doubt their abilities, focus on potential failures, and experience negative psychological states such as tension, anxiety, and depression when faced with setbacks [20]. The study found that the self-efficacy scores in both groups improved significantly after intervention, with the observation group showing greater improvements than the control group. This suggests that nursing interventions based on the dual-heart medical model can enhance patients' self-efficacy, which in turn improves their psychological state, aids in disease recovery, and promotes treatment adherence. The model likely improves patients' psychological states by reducing symptoms of angina pectoris and enhancing their ability to manage the disease, creating a positive feedback loop for disease management.

The SAQ is a comprehensive tool for assessing psychological status, bodily function, and quality of life in post-intervention patients. It is a practical and effective method for evaluating body function, quality of life, treatment efficacy, and prognosis in patients with CHD in China [21]. The study indicated that all SAQ dimensions improved significantly post-intervention, with the observation group showing higher scores than the control group. This suggests that the psychocardiology-based nursing intervention effectively addresses the negative psychological conditions in patients with angina pectoris, consistent with previous reports [22, 23]. Additionally, the LVEF values in both groups were significantly higher post-intervention, with the observation group outperforming the control group. This indicates that the dual-heart medical model not only enhances cardiac function but may also improve psychological status and self-efficacy, thereby contributing to better clinical outcome [24, 25].

However, this study included only 127 patients with CHD and angina pectoris, which limits its scope. The sample size was small, and long-term follow-up was not conducted after discharge. Future studies should aim to expand the sample size, broaden the study areas, and analyze long-term impacts to develop effective care models for improving patient quality of life.

In conclusion, the psychocardiology-based nursing intervention improved the psychological states, self-efficacy, quality of life, and cardiac function of elderly patients with angina pectoris.

Disclosure of conflict of interest

None.

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