Original Article
Effects of cognitive re-education on compliance, emotion and attitude in patients with coronary heart disease

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Abstract: Objective: To investigate the effect of cognitive educational intervention on compliance, emotion and perceptual attitudes in patients with coronary heart disease. Methods: A total of 107 patients with coronary heart disease who were admitted to our hospital were divided into two groups based on the intervention methods used. Patients in group A (n=53) received conventional nursing intervention, while those in group B (n=54) received cognitive guidance addition to the conventional intervention given in group A. We compared the two groups of patients with respect to treatment compliance, anxiety, depression, Control Attitudes Scale-Revised (CAS-R) scores, Medical Coping Modes Questionnaire (MCMQ) scores, and satisfaction towards nursing. Results: Compared with group A, group B reported superior compliance after intervention ($P < 0.05$), less cases of moderate and severe anxiety/depression and more patients with anxiety/depression and mild anxiety/depression ($P < 0.05$ for all), higher CAS-R scores ($P < 0.05$), lower scores of yield and avoidance, but greater scores of face ($P < 0.05$), and better satisfaction towards nursing ($P < 0.05$). Conclusion: Cognitive counseling intervention for patients with coronary heart disease was beneficial to improve treatment compliance and satisfaction, reduce anxiety and depression and ameliorate negative attitudes in perceptive control and coping style.

Keywords: Coronary heart disease, cognitive intervention, compliance, emotions, perceived control attitude

Introduction

Coronary heart disease, *i.e.* coronary atherosclerotic heart disease, is one of the cardiovascular diseases with highest incidence. It is caused by atherosclerotic lesions of coronary arteries that cause blockage or stenosis of the vascular cavity, leading to myocardial necrosis and hypoxia or ischemia [1, 2]. The World Health Organization divides coronary heart disease into five categories: sudden death, ischemic heart failure, myocardial infarction, angina pectoris and asymptomatic myocardial ischemia [3]. The related risk factors can be divided into two categories: modifiable and unmodifiable. The former includes social-psychological factors, overdrinking, lack of physical activity, unreasonable diet, high blood glucose, dyslipidemia and hypertension, *etc.* and the latter contains family history, age and gender [4, 5]. The

onset of the disease is characterized by chest tightness and chest pain and is usually associated with alcohol abuse, smoking, over satiety, agitated, and seasonal changes [6].

Due to the long course of disease, social function and deviated family role formation, coupled with the uncertainty of conditions, patients are prone to poor perceptive understanding of their disease and negative emotions such as depression or anxiety [7, 8]. Studies have shown that actual control or subjective feeling of control of heath outcome will have a positive effect on the psychological state of the patients. When the human mind is deprived of control, unhealthy psychology can occur [9]. To this end, it is necessary to reduce adverse emotions and improve the attitude in perceptive control of patients with coronary heart disease [10]. Cognitive reconstruction is the process of

transforming negative thinking into positive thinking, that is, from self-negation to self-affirmation, so as to improve perceptive control and reduce anxiety, depression and other negative emotions [11, 12].

Cognitive reconstruction has been widely used in memory training and teaching and has achieved good results [13]. In view of this, a cognitive reconstruction intervention model in coronary heart disease was applied to improve perceptive control, reduce anxiety or depression, and improve treatment and nursing compliance in patients with coronary heart disease.

Materials and methods

Materials

A total of 107 patients with coronary heart disease who were admitted to our hospital were divided into two groups. Patients in group A (n=53) were given conventional nursing interventions. Patients in group B (n=54) were managed with cognitive reconstruction along with conventional nursing interventions. This study has been approved by the Ethics Committee of The Fourth People's Hospital of Shaanxi. (1) Inclusion criteria: the subjects who signed the informed consent, those with a course of disease > 6 months, those aged 18-70 years and were consistent with the American College of Cardiology's coronary heart disease diagnostic criteria [14], those with normal cognitive function & literacy, and those who had been classified as grade I-III by NYHA were included. (2) Exclusion criteria: patients who fell by the wayside or who were combined with severe visceral diseases such as kidney, lung, liver, brain disease, or who had cognitive or mental disorders were excluded.

Methods

Patients in group A were given conventional care: That is, based on the patients' education level, the best method for health education was used; more communication was provide for mental support for each patient, who also strictly follow the doctor's instructions for medication, patients were given a "low salt" "low fat" & "light" diet, and routine morning and evening care were also given.

Patients in group B were given cognitive reconstruction intervention in addition to conventional care as follows.

A team of professionals: 5 members including 2 nurses, 2 senior nurses, and 1 supervising nurse, were required with working experiences of ≥ 3 years and trained by psychological counselors with respect to the concept of cognitive remodeling, intervention methods, and precautions to be considered during the care. All members were informed of the use of Control Attitudes Scale-Revised (CAS-R), Medical Coping Modes Questionnaire (MCMQ), Self-rating Anxiety Scale (SAS), and Self-rating Depression Scale (SDS) for evaluation. Each training lasted for 45-60 min. A total of 6 trainings (once per week) were designed.

Cognitive assessment: First, medical staff need to establish mutual trust and a cooperative relationship with patients, actively communicated with patients, evaluated baseline data such as patient's education level, gender, age, cardiac function, CAS-R, MCMQ, SAS, SDS, explained the intervention methods, specific steps, nursing risks and benefits to them, encouraged patients to ask questions actively, and the medical staff answered and established a good nurse-patient relationship. Then, the medical staff informed the patients of the assessment results, so that they understood patients current level of anxiety, depression and perceptual control, and encourage the patients to actively express their own inner thoughts, so as to facilitate the timely discovery of patients' negative thoughts, and, if necessary, the whole process can be recorded with the consent of the patients.

Scenario reevaluation: Based on the results of communication recording and baseline assessment, expert consultation and group discussion were conducted to summarize the existing negative thinking of patients with coronary heart disease, such as labeling thinking, overthinking, avalanche thinking and fate prediction thinking.

Adoption and substitution: The negative thinking of patients was questioned to make patients fully recognize the adverse effects of negative thinking, including quality of life, disease control, daily behavior, perceptual control attitude, and emotional state. Coping styles included the following: (1) Task-directed coping style: This coping style is suitable for various types of negative thinking; Patients are assisted to formulate corresponding tasks in stages, such as "self-emotional control", "abstinence

from alcohol" and "smoking cessation", so as to promote the formation of positive thinking. (2) Context-directed coping style: For patients with avalanche thinking and fate prediction thinking, targeted intervention can be taken in specific situations, such as informing patients that coronary heart disease is not terminal, and the condition can be effectively controlled by active treatment. (3) Positive self-talk: This coping style is effective for patients who feel negative. Medical staff directed patients to fully affirm their correct and positive behaviors, so as to strengthen the correct behaviors, such as "I have correctly handled the angina attack, I am wonderful!", "I've lost 2 kg. I'm doing a good job!".

Re-evaluation: The baseline data were re-evaluated to understand whether the negative thinking has been improved through communication with the patient. If no improvement is observed or the patient complains that the improvement result is not satisfactory, the negative thinking will be the main subject in the next round cognitive reconstruction, if a satisfactory improvement effect is obtained, cognitive reconstruction intervention can be carried out for other negative thinking.

Outcome measures

(1) Compliance with intervention: Before and after intervention, the Morisky medication compliance questionnaire was used to evaluate the compliance of the two groups of patients. The scale has a total of 8 items, including "Have you forgotten to take drugs?", "In the past 2 weeks, have you forgotten to take drugs for a few days or 1 day?", or "Did you stop taking the drugs when the symptoms are more serious or other symptoms appear?". For medication, if you answer yes, you will get a score of 0, and if you answer no, you will get a score of 1, with a total score of 8. Compliance is proportional to the score [15, 16].

(2) Anxiety: Before and after intervention, SAS was used to evaluate the two groups of patients. There were 20 items, which were scored according to the Likert 4-level scoring method. The critical value was 50. Based on the score, the patients could be divided into mild (50-59), moderate (60-69), and severe (≥ 70) anxiety [17].

(3) Depression: Before and after intervention, SDS was used to evaluate the two groups of patients, with a total of 20 items. According to Likert 4-level scoring method, the critical value was 53. Based on the score, the patients could be divided into mild (53-62), moderate (63-72), and severe (≥ 72) depression [18].

(4) CAS-R score: Before and after intervention, CAS-R was used to evaluate the perceptual control attitude of the two groups of patients. There were 8 items, all of which were scored by Likert grade 5. The total score of the scale was between 8 and 40 points, and the perceptual control ability was proportional to the score [19].

(5) MCMQ score: Before and after intervention, MCMQ was used to evaluate the coping style of the two groups of patients. There were three evaluation dimensions of yield, avoidance and face, all of which were evaluated with a score of 1-4. A higher score indicates a stronger tendency of this dimension [20].

(6) Satisfaction towards nursing: After intervention, the satisfaction towards nursing of the two groups of patients was investigated. The investigation included nursing attitudes, nursing professional knowledge, nursing professional skills, nursing responsibility, *etc*. The total score of satisfaction was 100 points. A higher score indicates a higher patient satisfaction towards nursing [20].

Statistical analysis

SPSS 22.0 was used for data analysis. Measurement data were expressed as mean ± standard deviation (mean ± SD); those following a normal distribution were tested by t test, and those not were tested by Mann-Whitney U test. Enumeration data were expressed as [n (%)], and chi-aquared test was used for intergroup comparisons. *P* < 0.05 indicated statistical significance.

Results

General data of the two groups of patients

There were 29 males (54.72%) and 24 females (45.28%) in group A; there were 32 males (59.26%) and 22 females (40.74%) in group B. Patients in group A were 35-70 years old, with an average age of (62.15 ± 3.25) years; patients in group B were 33-68 years old, with an

Table 1. Comparison of general data between the two groups [n (%)]/($\bar{x} \pm s$)

Item		Group A (n=53)	Group B (n=54)	t/X^2	P
Sex (case)	M	29 (54.72)	32 (59.26)	0.225	0.635
	F	24 (45.28)	22 (40.74)		
Age (year)		62.15 ± 3.25	62.09 ± 3.21	0.096	0.924
Course of disease (year)		5.29 ± 0.19	5.32 ± 0.28	0.647	0.519
NYHA heart function classification (case)					
I		12 (22.64)	11 (20.37)	0.125	0.885
II		28 (52.83)	31 (57.40)		
III		13 (24.53)	12 (22.22)		
Educational level (case)					
Junior high school and below		18 (33.96)	20 (37.04)	0.002	0.859
Senior high school and technical secondary school		21 (39.62)	23 (42.59)		
University or college education		14 (26.42)	11 (20.37)		

Table 2. Compliance score between the two groups ($\bar{x} \pm s$)

Group	Before intervention	After intervention
Group A (n=53)	3.12 ± 0.22	4.22 ± 0.31#
Group B (n=54)	3.15 ± 0.19	7.18 ± 0.18#,*
t	0.756	60.538
P	0.452	0.000

Note: #indicates compared with pre-intervention $P < 0.05$; *indicates compared with group A $P < 0.05$.

average age of (62.09 ± 3.21) years. Patients in group A had a course of disease of 1-9 years, averaged (5.29 ± 0.19) years; patients in group B had a course of disease of 2-11 years, averaged (5.32 ± 0.28) years. There were 12 patients (22.64%) classified into NYHA class I, 28 (52.83%) classified into NYHA class II, and 13 (24.53%) as NYHA class III in group A. The counterparts in group B were 11, 31 and 12 (20.37%, 57.40% and 22.22% respectively). For education, 18 (33.96%) had a level under junior high school and below, 21 (39.62%) had senior high school and technical secondary school, and 14 (26.42%) had a university or college education in group A. These were similar to those in group B: 20, 23 and 11 (accounting for 37.04%, 42.59% and 20.37% respectively). Little differences were found between the two groups in terms of gender, age, course of disease, cardiac function classification and education level ($P > 0.05$) (**Table 1**).

Comparison of compliance with interventions between the two groups

Compliance score before intervention was not significantly different between the two groups

($P > 0.05$). Compliance score after intervention was improved in both groups ($P < 0.05$), and group B was superior to group A ($P < 0.05$) (**Table 2**).

Comparison of changes in anxiety between the two groups

Before intervention, there were 10, 13, 18 and 12 patients with no anxiety, mild, moderate and severe anxiety in group A accounting for 18.87%, 24.53%, 33.96% and 22.64%, respectively; while there were 11, 12, 20 and 11 patients in group B, accounting for 20.37%, 22.22%, 37.04% and 20.37%, respectively. There was no significant difference between the groups ($P > 0.05$). After intervention, the counterparts were 20, 22, 7 and 5 (37.04%, 40.74%, 12.96% and 9.26%, respectively) in group B, and 12, 15, 15 and 11 (22.64%, 28.30%, 28.30% and 20.75%, respectively) in group A. Less cases with moderate and severe anxiety were observed in group B ($P < 0.05$) (**Figure 1**).

Comparison of changes in depressive emotions between the two groups

Before intervention, there were 8, 11, 20 and 14 patients with no depression, mild, moderate and severe depression in group A accounting for 15.09%, 20.75%, 37.74% and 26.42% respectively; while there were 9, 10, 21 and 14 patients in group B, accounting for 15.09%, 20.75%, 37.74% and 26.42%, respectively. There was no significant difference between the two groups ($P > 0.05$). After intervention, the counterparts were 21, 23, 8 and 2 (38.89%, 42.59%, 14.81% and 3.70%, respectively) in
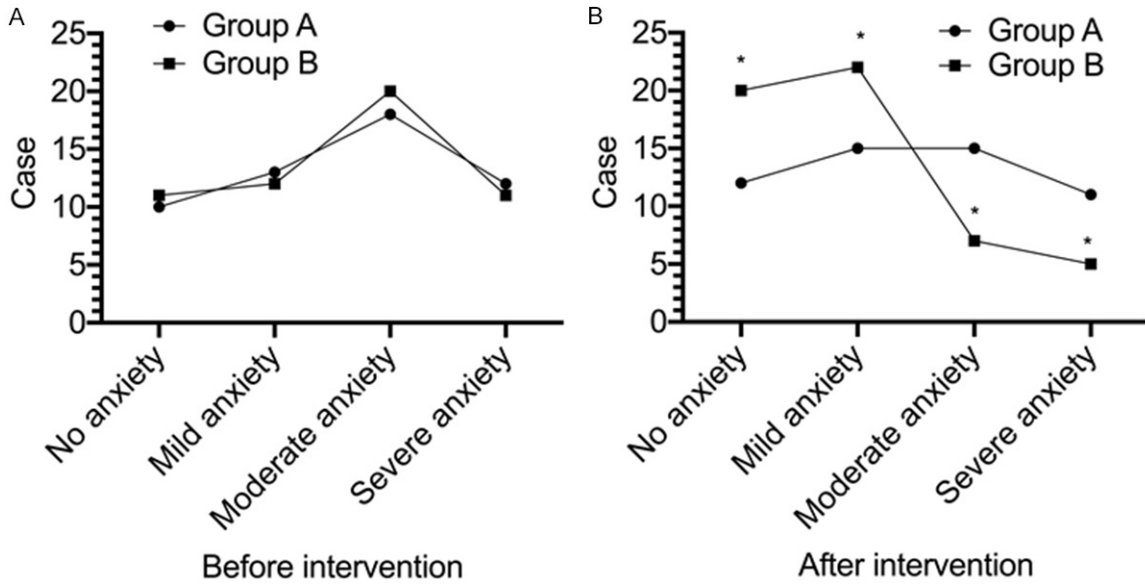
Figure 1. Comparison of anxiety between the two groups before and after intervention. There were 10, 13, 18 and 12 patients with no, mild, moderate and severe anxiety in group A before intervention, and 11, 12, 20 and 11 in group B respectively, showing $P > 0.05$. The counterparts after intervention were 20, 22, 7 and 5 patients in group B, and 12, 15, 11 patients in group A. Less cases of moderate and severe anxiety but more mild ones or even cured patients were found in group B after intervention $P < 0.05$. *$P < 0.05$ compared with group A.
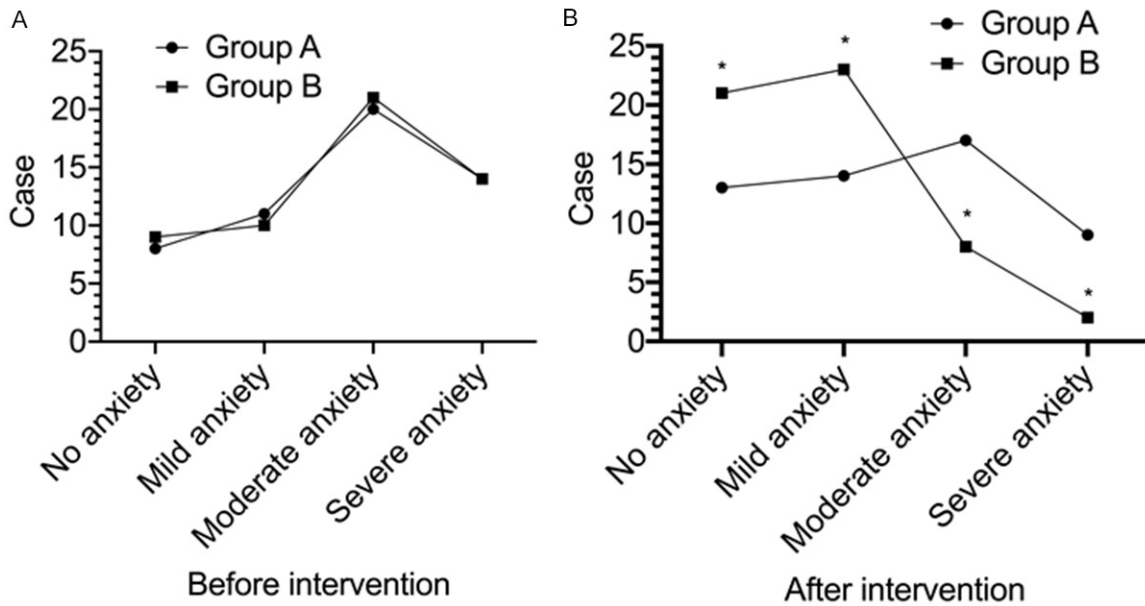

Figure 2. Comparison of depression between the two groups before and after intervention. There were 8, 11, 20 and 14 cases of non-depression, mild, moderate and severe depression in group A before intervention, and 9, 10, 21 and 14 respectively in group B, $P > 0.05$. The counterparts after intervention were 21 23, 8 and 2 in group B, and 13, 14, 17 and 9 in group A. Less cases of moderate and severe depression but more mild ones or even cured patients were found in group B after intervention $P < 0.05$. *$P < 0.05$ compared with group A.

group B; and 13, 14, 17 and 9 (24.53%, 26.42%, 32.08% and 16.98%, respectively) in group A. Less cases with moderate and seve-re depression were observed in group B ($P < 0.05$) (**Figure 2**).

Comparison of CAS-R scores between the two groups

There was no significant difference in CAS-R score between the two groups before interven-

Table 3. Comparison of CAS-R scores between the two groups ($\bar{x} \pm s$)

Group	Before intervention	After intervention
Group A (n=53)	26.29 ± 2.58	27.98 ± 2.62[#]
Group B (n=54)	26.32 ± 2.56	30.52 ± 2.28[#,*]
t	0.060	5.352
P	0.952	0.000

Note: [#]indicates compared with pre-intervention $P < 0.05$; [*]indicates compared with group A $P < 0.05$.

tion ($P > 0.05$). Compared with before intervention, CAS-R score improved after intervention in both groups ($P < 0.05$), and that in group B was higher than that in group A ($P < 0.05$) (**Table 3**).

Comparison of MCMQ scores and nursing satisfaction between the two groups

The scores of yield, avoidance and face before intervention in group A were (14.15 ± 1.25), (13.05 ± 1.06) and (7.11 ± 0.58), respectively; while those in group B were (14.18 ± 1.22), (13.09 ± 1.03) and (7.13 ± 0.52), respectively: showing no significant difference ($P > 0.05$). After intervention, the scores of yield (6.98 ± 2.25) and avoidance (7.05 ± 0.23) in group B were lower than those of (12.52 ± 0.36) and (11.63 ± 0.12) in group A, but the face dimension was better (12.18 ± 1.08) vs (9.05 ± 0.17) ($P < 0.05$) (**Figure 3**). The score of nursing satisfaction was (62.55 ± 2.36) in group A and (89.98 ± 2.88) in group B. The score of nursing satisfaction in group B was higher than that in group A ($P < 0.05$) (**Table 4**).

Discussion

Coronary heart disease is a common cardiovascular disease in the elderly. With the continuous improvement of social and economic development in China, the incidence of coronary heart disease remains high [21]. Studies have shown that if scientific and reasonable treatment and care for patients with coronary heart disease are not implemented in time, it may cause serious complications such as cardiogenic shock, heart failure and thrombosis, which poses a serious threat to the life safety of patients [22].

Coronary heart disease not only belongs to a physical disease, but also brings a series of psychological problems to patients. The occurrence and behavioral characteristics of the dis-

ease are closely related to psychological stress and they can affect each other [23]. Some scholars have found that anxiety and depression are independent risk factors for coronary heart disease and are closely related to adverse cardiovascular events. Under the influence of depression, anxiety and other negative emotions for a long time, patients with coronary heart disease will promote the sympathetic nervous system to be in an excited state, and the levels of catecholamine in the body will also be significantly increased, and catecholamine will also stimulate vasoconstriction, accelerate heart rate, cause serious complications such as heart failure, angina, arrhythmia and hypertension [24, 25]. At the same time, the long-term excitation of the sympathetic nervous system will stimulate the renin-angiotensin-aldosterone system, making it over activate, damage the vascular endothelium, cause ventricular remodeling, eventually cause systemic arteriosclerosis, and significantly worsen the condition [26]. To this end, this study implemented cognitive remodeling intervention for patients, and the results showed that the degree of anxiety and depression in group B was lower than that in group A ($P < 0.05$), suggesting that cognitive remodeling intervention for patients with coronary heart disease is beneficial to alleviate anxiety and depression. The mechanism of action may be because after cognitive restructuring intervention for patients, their level of perceptual control is significantly improved, and a more positive thinking mode is formed, which lays a good foundation for alleviating the adverse emotions such as depression and anxiety, and also guides patients to correctly view the problem, analyze and solve the problem, which can produce the emotions caused by diseases and life stress events. In addition, compared with group A, group B had a higher compliance score after intervention ($P < 0.05$), suggesting that cognitive remodeling intervention is also beneficial to improve patient compliance, which may be due to the improvement of the level of perceived control in patients with coronary heart disease, as well as their compliance, self-control ability and self-management ability.

Perceptual control, which refers to the subjective feelings generated by individual control events and situations, is an important basis for individual optimistic cognition, healthy behavior patterns and positive emotional experience
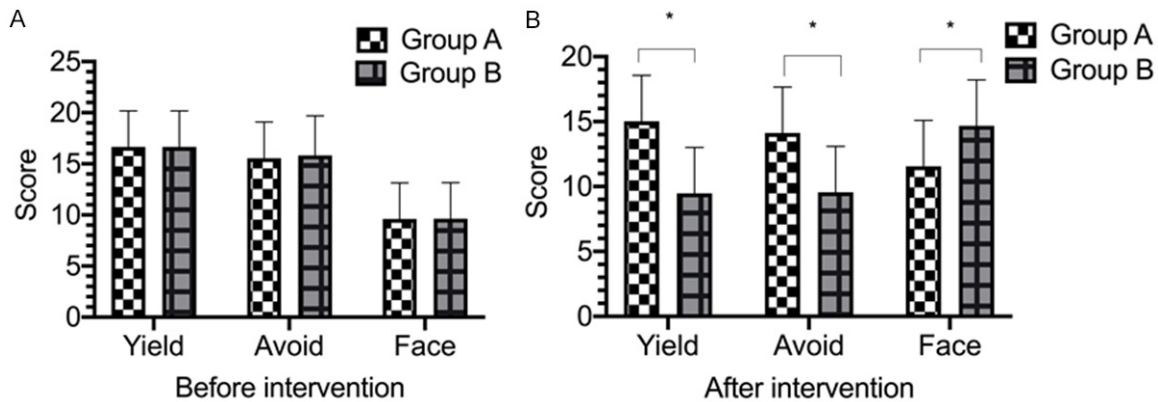
Figure 3. Comparison of MCMQ scores between the two groups before and after intervention. The scores of three evaluation dimensions including yield, avoidance and face before intervention in group A and group B suggested *P* > 0.05. After intervention, the scores of yield and avoidance in group B were lower than those in group A, but the scores of face were better in group B *P* < 0.05. *P* < 0.05 as compared with group A.

Table 4. Comparison of nursing satisfaction between the two groups ($\overline{x} \pm s$)

Group	Nursing satisfaction
Group A (n=53)	62.55 ± 2.36
Group B (n=54)	89.98 ± 2.88*
t	53.831
P	0.000

Note: *indicates *P* < 0.05 compared with group A.

[27]. For patients with coronary heart disease, improving the level of perceptual control is beneficial to fully stimulate positive energy. In this study, compared with group A, CAS-R score was higher in group B after intervention (*P* < 0.05), suggesting that cognitive remodeling intervention is beneficial to improve the level of perceptual control in patients with coronary heart disease. Probing into its mechanism of action, this may be because in the cognitive restructuring model, medical care is based on the actual life experience of patients, through cognitive assessment, scenario re-evaluation, adoption and replacement, and re-evaluation, which is conducive to helping patients construct positive and optimistic behavior and cognitively remodel their thinking. Secondly, from the results of this study, we can see that the scores of yield and avoidance in group B after intervention were lower than those in group A, and the scores in the face were higher than those in group A (*P* < 0.05), suggesting that the coping style of patients with coronary heart disease was significantly improved after cognitive remodeling intervention. This may be because

scenario-directed coping style can improve the avalanche thinking and fate prediction thinking of patients, improve their disease awareness, eliminate unnecessary fear, and reduce the level of body stress, so that they dare to face the disease with an upbeat attitude [28]. Task-directed coping style and positive self-dialogue style are actually the process of self-suggestion and encouragement, and also involved in the process of coping with negative thinking. With the improvement of the patients' cognition, their psychological state and behavior will be improved accordingly, and finally positive feedback will be formed. Therefore, the scores of yield and avoidance will be reduced, and the coping style will be improved [29]. Compared with group A, group B had a higher satisfaction towards nursing score (*P* < 0.05), which may be due to the improvement of patients' self-perceived control, the reduction of adverse emotions, and the improvement of satisfaction towards nursing.

In conclusion, cognitive restructuring intervention in patients with coronary heart disease is beneficial to improve compliance and satisfaction, alleviate anxiety and depression, and improve perceptual control attitude and coping style.

Although this study has collected results, there are limitations of a small sample size, which requires a larger study cohort, longer time and more comprehensive study and analysis in the future.

Disclosure of conflict of interest

None.

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