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An interventional study on the application of heart-collateral-based enlightenment words intervention in anxiety and depression of patients after percutaneous coronary intervention

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Abstract

Objective To study the effect of heart-collateral-based enlightenment words intervention on anxiety and depression in patients following percutaneous coronary intervention (PCI).

Methods In this class experimental study, one hundred patients who were hospitalized after PCI from May 2020 to October 2021, were included in this interventional study. They were divided into the test group ($n=50$) and the control group ($n=50$) based on the random number table. The heart-collateral-based enlightenment words intervention was used in the test group versus routine nursing in the control group. Data was collected using a self-rating anxiety scale (SAS), self-rating depression scale (SDS), and an independently developed satisfaction questionnaire. Psychological indicators and satisfaction were compared between the two groups before and after the intervention.

Results After 3 months of intervention, the test group scored significantly lower in SDS and SAS than the control group (SDS score: [55.06 ± 8.63] vs. [62.90 ± 9.52]; SAS score: [46.83 ± 10.24] vs. [56.02 ± 8.92]) ($P<0.05$ for both SDS and SAS difference). The satisfaction rate of the test group vs. control group was 96% vs. 82% after the intervention, with a statistically significant difference ($P<0.05$).

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Conclusion Heart-collateral-based enlightenment words intervention can effectively alleviate anxiety and depression in patients after PCI and increase their satisfaction with nursing services. To develop the theory and guide clinical practice, future research in different treatment area with larger sample size should be conducted.

Keywords Enlightenment words intervention, PCI, Anxiety, Depression, Postoperative care

Introduction

It is estimated that the number of current cardiovascular diseases (CVD) patients in China is around 330 million, including 11.39 million coronary heart disease, and the risk factors include smoking, hypertension, diabetes, dyslipidaemia and obesity [1, 2]. The indications for percutaneous coronary intervention (PCI) continue to increase due to its advantages of less trauma, short treatment course, and good efficacy. PCI has become a common treatment method for coronary heart disease [3]. However, PCI remains an invasive procedure that may cause different degrees of harm to patients [4], with anxiety and depression being the most common. According to studies, 75.6% of patients experience anxiety symptoms after PCI, with 81.4% experiencing depressive symptoms [5]. Negative emotions such as anxiety and depression can have a direct impact on the enthusiasm for postoperative rehabilitation, resulting in reduced patient treatment compliance, and eventually become a risk factor for cardiovascular complications following PCI [6]. The effects of long-term exposure of the cardiovascular system to the endocrine and autonomic dysregulations are possible underlying mechanisms that may explain the relationship between major depressive disease and CAD [7].

Despite the significant prevalence of psychological distress in this population, there is limited exploration of non-pharmacological interventions that can effectively address these issues. Most existing research focuses on pharmacological or cognitive interventions, leaving a critical gap in the understanding of culturally rooted therapeutic approaches. Enlightenment words intervention is a Chinese psychotherapy method based on heart collateral science, integration of systematic traditional Chinese medicine (TCM) theory, and meridian-collateral theory [8]. Its treatment concept is "To cure by eradicating the crux of the disease with stepwise and repeated effort." The two major goals of this treatment concept are to resolve the crux of the disease and reshape human health and soul. This method is currently being used to improve the psychological problems faced by heart failure [9] and breast cancer patients [10], with promising results. This study aims to fill the gap by examining the effectiveness of heart-collateral-based enlightenment words intervention on anxiety and depression in patients who have undergone PCI, thereby offering an innovative and culturally relevant alternative for mental health care in this context.

Patients and methods

Patients were randomized into different groups. Interventions were conducted in groups, with patients undergoing PCI being instructed in Heart-collateral-based Enlightenment Words during the hospitalization and Heart-collateral-based Enlightenment Words after PCI. Three months after discharge, patients were observed for anxiety, depression, and satisfaction.

Patients

The convenience sampling method was used in this study. One hundred patients who were hospitalized after PCI in the Department of Cardiovascular Medicine at a tertiary grade A hospital in Jiangxi Province between May 2020 and October 2021 were included. Inclusion criteria: ① Patients who are elective intervention patients and underwent PCI for the first time; ② Aged 18 years or older; ③ No disturbance of consciousness and language communication; ④ No use of antidepressants and anxiolytics; ⑤ No previous experience with enlightenment words intervention; ⑥ Patients signed the informed consent of the study. Exclusion criteria: ① Patients or their family members had a history of anxiety and depression; ② Patients suffering from severe malignant diseases such as malignant tumors, and liver and kidney failure; ③ Patients who were lost to follow-up due to various reasons. The sample size is calculated according to the method of independent sample t test. According to the purpose and significance of the study, the sample size was calculated according to the formula of "comparison of two sample means":

$$\mathrm{N1} = \mathrm{N2} = 2[\sigma(\mathrm{t}\alpha/2 + \mathrm{t}\beta)/\mu 1 - \mu 2]2$$

where α is 0.05 (bilateral) and β = 0.1. According to the results of previous literature, μ1-μ2 = 2.43, σ = 3.45, and the above formula is applied to calculate 40. Considering the loss rate of 10-20%, 100 subjects are required.

The patients were divided into two groups based on a random number table: test group ($n = 50$) and control group ($n = 50$). The control group included 34 males and 16 females, aged 31.4–76.2 years, with an average age of (55.94 ± 6.77) years. The test group consisted of 37 males and 13 females, aged 37.5–73.5 years, with an average age of (58.77 ± 7.69) years. There was no significant difference in terms of age, gender, and number of stents between the two groups, as shown in Table 1 ($P > 0.05$). The study complied with ethics-related regulations.

Table 1 Comparison of general data between the two groups [X ± s, n (%)]

Project	Control group	Intervention group	Value of t/χ2	*P* value
Age	64.35 ± 9.32	64.59 ± 9.03	1.018	0.053
Gender			0.085	0.811
Male	36(72.00)	35(70.00)		
Female	14(28.00)	15(30.00)		
Level of education			0.758	0.903
Primary school and below	9(18.00)	10(20.00)		
Junior middle school	15(30.00)	14(28.00)		
High school	17(34.00)	15(30.00)		
Bachelor degree or above	9(18.00)	11(20.00)		
Marital status			0.178	0.539
Married	40(80.00)	42(84.00)		
Unmarried	10(20.00)	8(16.00)		
Living conditions			0.451	0.893
Living alone	11(22.00)	12(24.00)		
Not living alone	39(78.00)	38(76.00)		
Primary caregiver			0.223	1.597
Spouse	38(76.00)	37(74.00)		
Children	12(24.00)	13(26.00)		
Course of disease (years)			1.731	0.775
≤ 1	13(26.00)	12(24.00)		
2–4	26(52.00)	27(54.00)		
≥ 5	11(22.00)	10(20.00)		

Intervention methods

Control group intervention methods

Routine nursing care was provided, including health education guidance (disease-related knowledge and surgical precautions) before PCI, a quiet ward environment was established, the postoperative conditions of the patients were closely observed, and the patients were provided with drug and dietary guidance, rehabilitation therapy, and psychological care.

Test group intervention methods

Based on the control group, the heart-collateral-based enlightenment words intervention was used.

Establish intervention team and develop intervention program One master of TCM, three cardiovascular specialist nurses, one nationally recognized psychologist, and three postgraduates studying cardiovascular care comprised the intervention team. After searching relevant literature in fields such as heart collateral science, enlightenment words intervention, and psychological nursing, the team members developed the intervention program. The project leader trained the researchers for 2 weeks prior to the intervention. The training included heart collateral theory, detailed implementation methods of enlightenment words intervention, and the distribution and entry precautions related to the anxiety and depression scales. During the implementation of the intervention program, regular meetings on the progress of the topic were held to solve the existing problems in a timely manner and ensure the quality control of the study.

Implementation of enlightenment words intervention (1) The key to psychotherapy is determining the crux of the disease that the patient is suffering: the theory of heart collateral advocates starting from the longitudinal and reverse relationship, transverse and reverse relationship, and reticular and radiation relationship of the cause of the disease to find the crux of the disease, and form a psychological etiology network to determine the treatment point, entry point, and breakthrough point. The heart collateral elements related to anxiety and depression in patients after PCI were summarized through interviews and inquiries according to the heart collateral view, psychopathological view, and psychological symptom classification view of Zhu's point therapy. To be more specific: desire (incomplete desire, paranoid desire, desire imbalance), personality (low self-esteem, obsessive-compulsive, type A personality), cognition (deviation, one-sided, negative, solidification), ability (poor self-management ability), emotion (fear, depression, depressed affect, irritability), behavior (evasion, habits and bad habits, bad lifestyle), attention (hyperattention, fixed attention), interest (lack of interest, loss of interest), attitude (negative attitude, lack of subjective initiative), will (loss of will, weak-willed), perception (hyperesthesia), interpersonal disorder (interpersonal contradiction, lack of interpersonal communication), stress (objective event stress), discomfort (psychological discomfort, physical discomfort). Following that, the patients were instructed to choose the factors that were most relevant to their own situation from a list of potential factors affecting the occurrence of anxiety and depression. The interpersonal knot was used as the mesh part of the etiological network diagram according to the concept of psychopathological view, and the main part (instinct, need, desire), secondary part (cognitive knot, personality knot, ability knot), and final part (complex knot, behavior knot, attention knot, interest knot, attitude knot, volitional knot) were used as the framework of the etiological network diagram [7]. Patients were asked to create a preliminary etiological network diagram. The nurses then discussed and determined the final etiological structure diagram of the patients based on their actual situation and they helped the patients in understanding their primary and secondary problems more figuratively. This provided the basis for the implementation of subsequent enlightenment words intervention.

(2) Promoting patient enlightenment: Language has an impact on all aspects of people's lives. Enlightenment

words have resonance, incentive, enlightenment, and other psychological effects. The nature of people's original language system gradually changes as enlightenment words are repeated. Patients were guided to think about their own cores based on these principles. The primary treatment plan was then created based on the patient's enlightenment, cultural level, and acceptability. When the patients were gaining enlightenment on the crux of their disease and causes of symptoms, the researchers would promptly capture important enlightenment words. For example, patients who had a stable work and rich social life before illness, were concerned about their disease recurrence after PCI. It was not convenient to socialize with a stent in their bodies. They were unable to travel like their peers. They needed to take care to avoiding exertion. As a result, they felt that it would weaken their enthusiasm. The researchers found important enlightenment words that the patients perceived that "the root cause is loss of hope". Patients are always concerned that they will not survive long after surgery. A stent is a foreign object. They must take antithrombotic drugs every day. They are afraid of losing control of themselves and of lacking ability." The nurses and patients pondered on and extracted enlightenment words related to the patients' existing problems based on the patients' important enlightenment words, for example, "Believe in yourself and don't give up. You can do it." The nurses and patients then jointly developed treatment priorities and specific measures based on the patients' previous heart collateral etiological structure diagram. Simultaneously, nurses were constantly refining the patients' enlightenment words and implementing the intervention stepwise. They observed changes in the patients' language, attitude, and emotion and flexibly adjusted the implementation plan. Patients were encouraged to write down enlightenment words in their diaries daily or make posters, wallpapers, etc., to consistently develop an understanding of the crux of their condition. The patients would explore how they felt based on the enlightenment words subtly and imperceptibly, then form a core concept with the enlightenment words as the core and establish a new language expression program. Using this in daily treatment and nursing gradually changed their bad behavior and eliminated fear and negative emotions of the disease during the rehabilitation treatment. Patients could then take their medication regularly, and experienced moderate sleep, a reasonable diet, and exercise, and lived a regular life.

(3) Specific implementation of word-based enlightenment: This can be divided into three types: morning and evening word-based enlightenment, daily word-based enlightenment, and word-based enlightenment when facing annoyances. The enlightenment was integrated into the shift handovers and routine visits to wards by the nurses in the morning and evening; as well as in the patients' normal treatment, nursing, and health education guidance. ① Enlightenment in the morning and evening: During the morning and evening shifts, the patients were instructed to close their eyes and chant the enlightenment words for at least 5 min. When the patients were chanting the enlightenment words in their minds, the nurses communicated with them and talked to them about their enlightenment and feelings for about 15–30 min depending on the patient's condition.The patients were encouraged to write down the enlightenment words that affected them the most. The entire treatment course emphasized on persistence, immediacy, flexibility, and systematism of the enlightenment words intervention. ② Daily enlightenment: Namely, to encourage patients to consciously and frequently use enlightenment words in daily life. To accomplish this, nurses spoke with patients about how positive they felt when they used enlightenment words during routine diagnosis, treatment, and nursing. They also helped patients in explaining and showing different points of view about their enlightenment words until those words became the patient's daily guidance or wisdom-providing phrase. ③ Word-based enlightenment when encountering annoyances: Namely, when the patients were facing difficulties, they used enlightenment words to admonish, mediate, and soothe themselves. To clarify, during the health education, nurses asked the patients about their recent annoyances, provided the patients with solutions, and enlightened the patients with the key points of the enlightenment words (namely, to find out the enlightenment words that they had deeply pondered on and could reflect the root causes of the problems, and then to apply this method for self-prevention or digestion of psychological problems).

Method of evaluation

This research intervention lasted 3 months. The patients' condition was monitored in the hospital after the interventional procedure for about 3–5 days. No patient developed complications after stent placement. The self-rating anxiety scale (SAS) [11], self-rating depression scale (SDS) [12], and an independently developed satisfaction questionnaire were used to assess the level of anxiety and depression, as well as the satisfaction with nursing of the patients after undergoing PCI. The SAS was compiled by W.K.Zung in 1971 and has been widely used at home and abroad. In this study, the Cronbach's alpha was 0.91. The SDS was developed by William W.K.Zung in 1965–1966, and the Cronbach's alpha in this study was 0.89. The SAS scale and SDS scale each had 20 items, and each item was scored on a scale of 1 ~ 4 points. The scale score was calculated by multiplying the total score by 1.25 and then taking the integer portion.

Table 2 Comparison of SAS and SDS scores before and after intervention, between the test group and the control group

Group	Number of cases	SAS score				SDS score			
		Preintervention	Postintervention	t	P	Preintervention	Postintervention	t	P
Control group	50	59.06 ± 10.71	56.02 ± 8.92	1.603	0.115	65.43 ± 6.66	62.90 ± 9.52	1.546	0.129
Test group	50	59.02 ± 10.58	46.83 ± 10.24	5.526	0.000	64.17 ± 7.02	55.06 ± 8.63	5.364	0.000
t		0.015	4.784			0.918	4.318		
P		0.988	0.000			0.361	0.000		

Table 3 Comparison of nursing satisfaction between the two groups

	Completely satisfied *n* (%)	Partially satisfied *n* (%)	Not satisfied *n* (%)	Satisfaction *n* (%)
Control group	28(56%)	13(26%)	9(18%)	41(82%)
Test group	40(80%)	8(16%)	2(4%)	48(96%)
t				7.654
P				0.022

A SAS scale score ≥ 50 indicated mild anxiety; ≥ 60 indicated moderate anxiety; ≥ 70 indicated severe anxiety. SDS scale ≥ 53 indicated mild depression; ≥ 63 indicated moderate depression; ≥ 73 indicated severe depression. The questionnaires consists of 4 dimensions of service attitude, professional competence, nursing care, and safety and privacy, with 25 questions, and is rated on a 4-point Likert scale, and were distributed to the patients by the trained nursing staff before and after the intervention. The nurses used the incorporated instructions to inform patients to fill out the questionnaires based on their current situation. Questionnaires were issued using the software of Wenjuanxing. Patients filled in the documents within 30 min and returned the questionnaires, and then the data was entered by two people.

Statistical methods

SPSS 25.0 software was used for data processing. Enumeration data were compared using the adoption rate and constituent ratio. The Chi-square test was used for statistical analysis. Measurement data were compared using mean and standard deviation. Two independent-sample t-tests were used for statistical analysis of anxiety and depression scores before and after intervention in the two groups (test criteria $\alpha = 0.05$).

Results

2.1 Anxiety and depression levels in the two groups were compared before and after the intervention. The difference was statistically significant ($P < 0.01$) (Table 2). After the intervention, there was an improvement in anxiety and depression in patients with PCI.

2.2 The two groups' satisfaction with nursing care before and after the intervention, was compared. The difference was statistically significant ($P < 0.05$) (Table 3). After the intervention, there was an increased patient satisfaction.

Discussion

Working mechanism and key points of enlightenment words intervention

Enlightenment words intervention is a systematic psychotherapy that originated from Zhu Family's Enlightenment Therapy. The theoretical basis of heart collateral science is its central concept. According to the heart collateral theory, despite the complexity and diversity of the causes of individual psychological issues, structural factors such as desire, cognition, personality, and other fundamental components predominate; these causes are affected by physiological factors and external events. The conductivity of specific heart collateral components or elements of the heart collateral may contribute to psychological problems. Enlightenment words intervention focuses on the causes of psychological problems and analysis of the psychological etiological structure of individuals in a systematic manner. Psychological nursing methods commonly used in clinical practice today focus on changing the patients' thinking and behavior but do not systematically address the root causes of patients' psychological issues. Instead, they tend to focus more on a specific symptom or aspect of the patients' psychological problems. Enlightenment words intervention emphasizes identifying and addressing the crux of the condition. After sufficient communication with the patients, the operators can determine the psychological etiology network diagram. Patients' perspectives on their own problems are refined into enlightenment words through enlightenment based on the principles that languages can affect all aspects of people, languages have a direct and strong influence on individual psychology, and repeated enlightenment words intervention can gradually change the nature of the original language system. When people use the enlightenment words repeatedly, the crux of the problem dissolves and a conceptual system with enlightenment as its core emerges. The clinical application should focus on the repeatability and duration of the enlightenment as well as the accuracy and logic of the words [10].

Enlightenment words intervention can successfully reduce the anxiety and depression of patients after PCI and improve their satisfaction with nursing

Due to a lack of surgery-related knowledge, the need to continue medication after surgery, and fear of complications, patients after undergoing PCI have a high incidence of negative emotions such as anxiety and depression [13]. Such negative emotions in patients can directly lead to poor prognosis [14–16], affecting their quality of life. The results of this study showed that there was no statistical difference in anxiety and depression scores between the two groups before intervention. Following the intervention, the test group scored significantly lower in anxiety and depression than the control group ($P < 0.05$), indicating that the enlightenment words intervention was effective in lowering patients' anxiety and depression after PCI. The lack of persistence, pertinence, and individualization of patients receiving routine nursing interventions is the reason for the failure to completely remove the causes of anxiety and depression in patients. Enlightenment words intervention does not just focus on the adverse symptoms that individuals experience, it also helps them gradually form a healthy concept subtly and imperceptibly through repeated enlightenment words intervention. Traditional psychotherapy breaks the inherent ideology of patients from the outside, whereas enlightenment words intervention is based on the comprehensive self-perception of patients. When patients repeatedly use enlightenment words to express their ideas, it not only helps to shape their ideological concepts but also becomes the core of how they see life and what they value. During the intervention process, patients involuntarily strengthen the positive concept associated with enlightenment words, allowing them to gradually establish healthy behavior. Enlightenment words can allow them to actively build their self-belief in their ability to overcome their disease, reducing their anxiety and depression. Following the intervention, the satisfaction of the two groups with the nursing was assessed. The results showed that the test group had significantly higher satisfaction than the control group ($P = 0.022$). This demonstrated that the patients preferred the nurses' use of enlightenment words over the routine nursing approach. It could be because nurses followed a more personalized approach in identifying the problems of patients while promoting enlightenment words intervention. They effectively helped patients to find out confusing problems and solutions. Routine nursing, whereas, focused more on correcting the patients' behavior and levels of knowledge rather than systematically identifying the patients' core issues.

Conclusion and limitations

In this study, heart-collateral-based enlightenment words were used for the first time in patients who had undergone PCI. The results confirmed that it could effectively relieve patients' anxiety and depression following PCI as well as improve patients' satisfaction with nursing. Future research should broaden the range of applications and place a greater emphasis on training by using clinical examples before interventions. This will help to develop the theory and guide clinical practice. This study included only three evaluation indicators—anxiety, depression, and nursing satisfaction. This study had some limitations and contamination issues because the samples came from a single center. Future studies should use a larger sample size and employ more comprehensive outcome indicators. The scales used in this study were based on patient reports and had certain biases. In the future, the scope of application should be further expanded, large sample and multi-center studies can be carried out, and the intervention time can be extended, and physiological evaluation indicators can be introduced to explore the effect of enlightenment words intervention applied to different populations and further verify its long-term effect. If circumstances permit, relevant biological indicators should be included to assess the long-term efficacy of enlightenment words intervention.

Abbreviations

PCI	Percutaneous coronary intervention
SAS	Anxiety self-rating scale
SDS	Depression self-rating scale

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Author contributions

Conception and design of the research: Xing-Lan Sun, Hui-Lin Zhou, Xiao-Yun XiongAcquisition of data: Yi-Wei Hu, Jiang-Qin Xu, Hao-Deng-Jie Xiong Analysis and interpretation of the data: Feng-Yi Yi, Meng-Die LiuStatistical analysis: Feng-Yi Yi, Meng-Die LiuObtaining financing: Xing-Lan SunWriting of the manuscript: Xing-Lan Sun, Hui-Lin Zhou, Zhi-Lin Zhang, Yu-Jie Song, Critical revision of the manuscript for intellectual content: Zhi-Lin Zhang, Yu-Jie Song, Yi-Wei Hu, Jiang-Qin XuAll authors read and approved the final draft.

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Data availability

The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

This study was conducted in accordance with the declaration of Helsinki. This study was conducted with approval from the Ethics Committee of The Second Affiliated Hospital of Nanchang University. A written informed consent was obtained from all participants.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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