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A Study on the Correlation between Fear of Disease Progression, Perceived Control, and Medical Coping in Patients with Coronary Heart Disease after PCI

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Abstract: This study aims to understand the current status of fear of disease progression (FoP) in patients with coronary heart disease (CHD) following percutaneous coronary intervention (PCI), and to explore the relationship between FoP levels, perceived control, and medical coping strategies in these patients. A total of 360 CHD patients who underwent PCI at Xijing Hospital in Shaanxi Province between June and November 2024 were selected using a convenience sampling method. Surveys included a general information questionnaire, the Fear of Progression Questionnaire-Short Form (FoP-Q-SF), the revised Control Attitudes Scale (CAS-R), and the Medical Coping Modes Questionnaire (MCMQ). Pearson correlation analysis was used to examine the relationships between disease perception, positive coping strategies, and FoP. A total of 360 patients completed the study. The average score for FoP in patients with CHD after PCI was 31.64 ± 4.61. FoP was negatively correlated with perceived control (r = -0.106, $P < 0.01$) and medical coping (r = -0.194, $P < 0.01$). Multivariate regression analysis showed that the type of intervention, family history of CHD, smoking status, perceived control, and total medical coping score were significant factors influencing FoP ($P < 0.01$). Enhancing perceived control and identifying positive coping strategies can improve FoP levels in patients with CHD after PCI. Therefore, clinicians should focus on perceived control and medical coping levels in patients and develop targeted interventions to alleviate negative emotions related to FoP.

Keywords: Coronary heart disease; Fear of disease progression; Social support; Correlation

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1. Introduction

The 2024 Report on Cardiovascular Health and Disease in China indicates that due to unhealthy lifestyles and

accelerated population aging, the incidence and mortality rates of cardiovascular diseases in China are still on the rise [1]. Percutaneous coronary intervention (PCI) is an effective treatment for CHD, playing a crucial role in restoring cardiac blood perfusion and preventing disease progression [2]. However, current PCI treatments cannot correct the pathological basis of atherosclerosis, and adverse cardiovascular events such as in-stent restenosis, recurrent myocardial infarction, and arterial dissection may still occur after the procedure [3]. This can lead to significant fear of disease progression (FoP) in patients with CHD after PCI. FoP refers to the psychological fear of life-threatening diseases, including concerns about disease recurrence and the physical, psychological, and social consequences of disease progression [4]. The Common Sense Model of Self-Regulation suggests that when patients perceive a threat to their health, they form initial illness representations, which lead to coping strategies and ultimately result in illness or emotional outcomes, with these three elements interacting with each other [5]. The innovation of this study lies in integrating perceived control and medical coping with FoP to construct a multidimensional cognitive model. This model systematically evaluates the relationships among these factors in patients after PCI and provides a theoretical basis for subsequent interventions. This framework integrates the latest research findings from modern cognitive science and psychosomatic medicine. The study will collect empirical data on perceived control, medical coping, and FoP to explore the dynamic relationships among these factors.

2. Methods

2.1. Study participants

A convenience sampling method was used to select 360 patients with CHD who underwent PCI at the Department of Cardiology, Xijing Hospital, from June to November 2024. Inclusion criteria were: (1) compliance with the World Health Organization (WHO) diagnostic criteria for CHD (stenosis ≥ 30% in the left main coronary artery, or stenosis ≥ 50% in at least one of the other three major coronary arteries); (2) all patients underwent coronary angiography and coronary stent implantation; (3) normal communication and cognitive abilities; (4) informed consent and willingness to participate in the study. Exclusion criteria included: (1) presence of malignant tumors; (2) severe liver, kidney, brain, or other systemic diseases or functional impairments. Data with illogical entries were excluded. The study was approved by the hospital's medical ethics committee.

2.2. Survey instruments

2.2.1. General information questionnaire

The questionnaire was self-designed by the researchers and included general information and disease-related items. It covered age, gender, education level, employment status, method of payment for medical expenses, average monthly family income, medical history, family history, number of stents implanted, coronary artery involvement, smoking history, and alcohol consumption history.

2.2.2. Fear of Progression Questionnaire-Short Form (FoP-Q-SF)

The FoP-Q-SF is a self-assessment scale developed by Mehnert *et al*. in Germany in 2006 and translated into Chinese by Wu *et al*[6]. in 2015. The scale consists of 12 items, extracting two common factors: physical health and social/family aspects. The total Cronbach's α coefficient is 0.883. The Chinese version has a Cronbach's

α coefficient of 0.883, with coefficients of 0.829 and 0.812 for the two dimensions, respectively. In this study, the scale had a validity of 0.837 and a Cronbach's α coefficient of 0.831. The Cronbach's α coefficients for the physical health and social/family dimensions were 0.763 and 0.701, respectively.

2.2.3. Revised control attitudes scale (CAS-R)

The CAS-R was developed by Moser et al. based on the original Control Attitudes Scale. It is a unidimensional self-assessment scale designed to evaluate the attitudes, abilities, and beliefs of patients with cardiovascular diseases regarding disease control. The scale was translated into Chinese by Zhang *et al*[7]. and validated in patients with CHD, showing good reliability and validity. The CAS-R consists of 8 items, using a 5-point Likert scale. Items 1, 2, 3, 4, 6, and 7 are scored from 1 to 5, corresponding to the options "Strongly Disagree" to "Strongly Agree," respectively. Items 5 and 8 are reverse-scored. The total score ranges from 8 to 40, with higher scores indicating better perceived control. In this study, the scale had a validity of 0.784 and a Cronbach's α coefficient of 0.793.

2.2.4. Medical coping modes questionnaire (MCMQ)

The MCMQ was originally developed by Feifel *et al*[8]. It is a self-assessment questionnaire with three dimensions: confrontation, avoidance, and surrender, consisting of 20 items. The Chinese version of the MCMQ, revised by Shen *et al.*, was used in this study. The scale had a validity of 0.661 and a Cronbach's α coefficient of 0.631. The Cronbach's α coefficients for the confrontation, avoidance, and surrender dimensions were 0.69, 0.60, and 0.76, respectively.

2.3. Data collection and quality control

Researchers strictly screened participants according to the inclusion and exclusion criteria. The participants were informed in detail about the purpose and significance of the survey and obtained their consent. Trained researchers distributed paper questionnaires and provided on-site guidance for completion, ensuring the quality of the responses by collecting the questionnaires immediately after completion.

2.4. Statistical methods

Descriptive statistical analysis, univariate analysis, correlation analysis, and regression analysis were performed using SPSS 23.0. Between-group comparisons were conducted using t-tests and one-way analysis of variance (ANOVA). Pearson correlation analysis was used to explore factors associated with FoP, with a two-sided significance level of $\alpha = 0.005$. Structural equation modeling was used to analyze the mediating effect of positive coping strategies on the relationship between illness perception and FoP. A two-sided test was used, with $P < 0.05$ indicating statistical significance.

3. Results

3.1. General information of patients with CHD after PCI

A total of 360 patients were included, comprising 271 males and 89 females.

(1) Ages were distributed as follows: < 50 years (48 patients), 50–60 years (139 patients), 60–70 years (90 patients), and > 70 years (83 patients). Ethnicity included 151 Han Chinese and 9 other ethnic groups.

(2) Place of residence was urban for 221 patients and rural for 139 patients. Education levels were as follows: primary school or below (47 patients), junior high school (107 patients), senior high school or vocational school (107 patients), and college or above (99 patients).
(3) Marital status included 4 unmarried patients, 330 married patients, 10 divorced patients, and 16 widowed patients.
(5) Number of children: no children (5 patients), one child (125 patients), two children (152 patients), and ≥ 3 children (78 patients).
(6) Average monthly family income was < 3000 yuan (93 patients), 3000–5000 yuan (156 patients), 5000–10000 yuan (91 patients), and > 10000 yuan (18 patients).
(7) Employment status included 72 employed patients, 155 retired patients, 82 self-employed or farmers, and 51 unemployed patients.
(8) Types of medical insurance included: urban employee basic medical insurance (184 patients), urban and rural resident basic medical insurance (78 patients), public-funded medical care (11 patients), new rural cooperative medical care (87 patients), and other (2 patients).
(9) Body Mass Index (BMI) was < 18.5 for 11 patients, 18.5–24 for 200 patients, 25–29 for 131 patients, and 30–34 for 18 patients.
(10) Heart function classification included: Class I (11 patients), Class II (200 patients), Class III (131 patients), and Class IV (18 patients).
(11) Number of comorbidities: ≤ 3 (115 patients), 3–6 (181 patients), and > 6 (64 patients).
(12) Types of surgery included: PCI (120 patients), PTCA (138 patients), and PCI+PTCA (102 patients).
(13) Smoking status included 129 smokers and 231 non-smokers.
(14) Alcohol consumption status included 113 patients who drank alcohol and 246 who did not.
(15) Number of stents implanted: one stent (89 patients), two stents (124 patients), and ≥ 3 stents (147 patients).
(16) Duration of CHD was < 3 years for 176 patients and ≥ 3 years for 174 patients.
(17) Family history of CHD included 240 patients without a family history and 120 with a family history.

3.2. Current status of FoP, perceived control, and medical coping in patients with CHD after PCI

According to the one-sample Kolmogorov-Smirnov test, the scores for FoP in the 360 patients with CHD after PCI met the assumption of normal distribution ($P \geq 0.05$). The average score for FoP was (31.64 ± 4.61), with an average score of (16.67 ± 2.65) for the physical health dimension and (14.96 ± 2.87) for the social/family dimension (see **Table 1**). The scores for perceived control met the assumption of normal distribution ($P < 0.05$), with an average score of (28.85 ± 4.50). The average score for medical coping was (40.22 ± 4.40), with confrontation dimension scores averaging (18.17 ± 2.78), avoidance dimension scores averaging (14.29 ± 2.28), and surrender dimension scores averaging (8.32 ± 1.88) (see **Tables 1** and **2**).

Table 1. Scores for FoP, perceived control, and medical coping ($N = 360$, ±S)

Variable	Items	Mean ± SD	Score Range
FoP	12	31.64 ± 4.61	20–50
Physical health	6	16.67 ± 2.65	12–26
Social/Family	6	14.96 ± 2.87	7–27
Perceived control	8	28.85 ± 4.50	14–40
Medical coping	20	40.22 ± 4.40	30–57
Confrontation	8	18.17 ± 2.78	30–11
Avoidance	7	14.29 ± 2.28	9–23
Surrender	5	8.32 ± 1.88	5–17

Table 2. Univariate Analysis of FoP ($N = 360$, ±S)

Item	Number	FoP Score	t/F Value	*P*-Value
Type of intervention			3.58	0.029
PCI	120	32.55 ± 4.85		
PTCA	138	31.13 ± 4.45		
PCI+PTCA	102	31.27 ± 4.43		
Smoking status			-1.94	0.042
Yes	129	31.01 ± 4.96		
No	231	32.00 ± 4.38		
Family history			-2.83	0.005
No	240	31.17 ± 4.39		
Yes	120	32.62 ± 4.92		

3.3. Univariate analysis of FoP in patients with CHD after PCI

Univariate analysis showed that the type of intervention, smoking status, and family history had statistically significant differences in FoP scores ($P < 0.05$) (see **Table 3**).

Table 3. Correlation analysis of FoP, perceived control, and medical coping ($N = 360$)

	FoP	Perceived Control	Medical Coping
FoP	1		
Perceived control	-0.106*	1	
Medical coping	-0.194**	-0.50	1

3.4. Correlation analysis of FoP, perceived control, and medical coping in patients with CHD after PCI

Pearson correlation analysis showed that FoP was negatively correlated with perceived control and medical coping ($P < 0.01$). The physical health and social/family dimensions of FoP were negatively correlated with perceived control ($P < 0.01$) and positively correlated with the confrontation dimension of medical coping (P

< 0.01). FoP was positively correlated with the avoidance and surrender dimensions of medical coping (see **Tables 3** and **4**).

Table 4. Correlation analysis of FoP, perceived control, and dimensions of medical coping ($N = 360$)

	Physical Health	Social/Family	Perceived Control	Confrontation	Avoidance	Surrender
Physical Health	1					
Social/Family	0.395**	1				
Perceived Control	-0.120*	-0.060*	1			
Confrontation	-0.244**	-0.173**	0.109*	1		
Avoidance	0.106*	0.194**	0.003	0.237**	1	
Surrender	0.219**	0.168**	0.000	-0.043	0.641	1

Note: ** indicates $P < 0.001$, * indicates $P < 0.005$.

3.5. Multivariate analysis of factors influencing FoP in patients with CHD after PCI

Multivariate regression analysis was performed with FoP as the dependent variable and the type of intervention, smoking status, family history, perceived control, and total medical coping score as independent variables. The results showed that the type of intervention, smoking status, family history, perceived control, and total medical coping score were significant factors influencing FoP in patients with CHD after PCI ($P < 0.001$) (see **Table 5**).

Table 5. Multivariate regression analysis of factors influencing FoP in patients with CHD after PCI ($N = 360$)

Variable	Regression Coefficient	Standard Error	Standardized Regression Coefficient	t Value	*P* Value
Constant	40.551	2.794		14.514	< 0.001
Smoking	1.145	0.488	0.119	2.348	< 0.005
Family History	1.546	0.489	0.160	3.160	< 0.001
Medical Coping	-0.226	0.053	-0.216	-4.246	< 0.001
Perceived Control	-0.130	0.052	-0.127	-2.496	< 0.005

4. Discussion

4.1. Current status and demographic variables of patients with CHD after PCI

The average FoP score in patients with CHD after PCI was (31.64 ± 4.61), higher than that of patients with cervical cancer and gastric cancer [9,10]. The average score for the physical health dimension was (16.67 ± 2.65), and for the social/family dimension, it was (14.96 ± 2.87). The fear related to social/family aspects was higher than that related to physical health, which is contrary to findings in acute myocardial infarction patients by Gao *et al.* [11].

Self-employed individuals or farmers had higher FoP levels compared to retirees, and patients with urban employee basic medical insurance had lower FoP levels than those with public-funded medical care. This may be related to the economic support required for medical expenses during hospitalization. Patients treated with PCI had higher FoP levels, consistent with findings by Liu *et al.* [12]. This may be due to the lack of knowledge about disease treatment, nursing, and post-intervention prevention and management in the early stages of

diagnosis.

As the disease progresses, patients gradually gain more knowledge about their condition, and remote medical follow-up systems established by nursing staff can help patients communicate with healthcare providers in a timely manner, thereby reducing fear of disease progression. Patients with a family history of CHD had higher FoP levels, possibly due to genetic factors, internal family pressure, conflicts, or social stigma, which may exacerbate health behaviors and increase the risk of CHD. Insufficient preventive awareness and education may lead to a lack of understanding and preventive measures, thereby increasing fear and the risk of disease spread.

4.2. Correlation between FoP, perceived control, and medical coping

Perceived control is closely related to psychological coping mechanisms and can effectively suppress negative emotions, thereby reducing fear of disease [13]. In this study, perceived control in patients with CHD after PCI was at a moderate to low level and negatively correlated with FoP. Higher perceived control levels were associated with greater confidence in disease progression, better psychological adaptation, and lower likelihood of FoP, consistent with findings in patients with atrial fibrillation by You *et al.*[14]. Medical coping refers to the process by which individuals actively adjust their psychology and behavior to improve symptoms and relieve stress when facing life or psychological challenges. It includes not only medical treatments or lifestyle interventions but also multidimensional mechanisms such as psychological and social support [15].

In this study, medical coping in patients with CHD after PCI was at a moderate level, consistent with findings in patients with pituitary neuroendocrine tumors by Li *et al.* [16]. FoP was negatively correlated with confrontation coping and positively correlated with avoidance and surrender coping. Patients who adopt positive coping strategies have stronger coping abilities, better psychological adaptation, higher subjective well-being and sense of benefit, and lower psychological burden related to disease progression. This is consistent with findings in patients with thyroid cancer by Ma *et al*[17]. In patients with CHD after PCI, especially those sensitive to cardiovascular diseases, medical coping ability is closely related to disease perception. Studies have shown that individuals consciously seek psychological comfort and emotional support when facing health threats, thereby reducing fear and anxiety related to disease [18]. Therefore, medical coping ability can effectively promote disease perception and behavioral adjustment.

5. Conclusion

FoP levels in patients with CHD after PCI were moderate. Perceived control had a negative predictive effect on FoP, and the confrontation dimension of medical coping had a negative predictive effect on FoP, while the surrender and avoidance dimensions had positive predictive effects[19, 20]. Multiple studies have found that coping strategies are important variables affecting psychological and social adaptation, similar to the findings in this study. Patients with lower FoP levels tend to have fewer negative emotions, lighter psychological burdens, and a more optimistic view of their disease. They actively cope with disease progression, seek solutions, and obtain more social support, leading to positive medical coping and better FoP outcomes. Therefore, healthcare providers should focus on the impact of medical coping on FoP in patients with CHD after PCI and implement interventions such as rumination interventions or psychological interventions based on the PERMA model [21, 22]. By enhancing perceived control and identifying positive coping strategies, healthcare providers can improve FoP levels in patients with

CHD after PCI. FoP is closely related to perceived control and medical coping, especially in patients after PCI. Understanding these relationships can provide more effective psychological adjustment mechanisms for individuals, reducing fear of disease progression and promoting disease awareness and behavioral adjustment.

Disclosure statement

The authors declare no conflict of interest.

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