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Study on the Status of Exercise Fear, Rehabilitation Exercise KAP and Their Ccorrelation in Patients after Percutaneous Coronary Intervention

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Abstract: *The current status of rehabilitation exercise KAP and exercise fear in patients after percutaneous coronary intervention was understood, and the correlation between the two was analyzed. Methods: A general information questionnaire, an exercise fear scale for cardiac patients and a rehabilitation exercise KAP questionnaire for patients with coronary artery disease were used in a cross-sectional survey of 326 patients undergoing percutaneous coronary intervention in the cardiology department of a tertiary care hospital in Luoyang from April to August 2020. correlations. Results: The total rehabilitation exercise KAP score of the 326 patients after percutaneous coronary intervention was (49.52 ± 9.85), which included a score of (10.46 ± 5.99) on the knowledge dimension, (18.52 ± 2.90) on the belief dimension and (20.53 ± 3.47) on the behavioral dimension. The total score for fear of movement was (39.93±4.56), which included (10.63±1.76) for the avoidance dimension, (10.78±1.59) for the fear of movement dimension, (8.34±1.36) for the perception of danger and (10.19±1.76) for the dysfunctional dimension. The results of the Pearson correlation analysis showed that the patient's total KAP score and the scores on each dimension of rehabilitation exercise were mostly negatively correlated with the total score and the scores on each dimension of fear of exercise ($p \leq 0.05$). Conclusion: Patients undergoing percutaneous coronary intervention have higher levels of fear of exercise, lower levels of perception of rehabilitation exercise, and attitudes and actions towards exercise that need to be improved. Exercise fear was negatively correlated with KAP levels for rehabilitation exercise. Health care professionals should improve their knowledge of rehabilitation exercises to help patients develop a positive attitude towards rehabilitation exercises, so that patients' fear of exercise can be reduced and early postoperative rehabilitation exercises can be promoted.*

Key words: *Percutaneous Coronary Intervention (PCI), rehabilitation exercise, knowledge, attitude, practice, kinesiophobia, correlation*

Exercise fear, also known as kinesiophobia, refers to the patient because of the fear of activities or exercise to their own harm, and sports or rehabilitation exercise produced a special psychological state of excessive fear (Liu, et al., 2017). This concept first appeared in patients with chronic pain, such as disc herniation and knee surgery (Svensson, et al., 2011; Kocic, et al., 2011; Liu & Wang, 2015). Exercise fear can cause patients to produce anxiety, resistance or avoidance of exercise, and other negative emotions, affecting early functional rehabilitation exercise, resulting in physical disability or disability (Stewart et al.,2017). Based on Knowledge, Attitude, Practice (KAP), the rehabilitation exercise for CHD patients is a health behavior promotion

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model for CHD patients, which proposes targeted health education measures on the basis of understanding the Knowledge, Attitude, and behavior status of CHD patients. It plays an important role in guiding patients with coronary heart disease to acquire knowledge related to rehabilitation exercise, change their attitude and carry out positive activities (Zhao, 2019). As a common chronic cardiovascular disease, coronary heart disease (CHD) seriously affects the health and quality of life of patients with high morbidity, mortality, and treatment costs (Ma, et al., 2020). Percutaneous Coronary Intervention (PCI), which is an effective treatment for Coronary heart disease at present, mainly dredges stenosis or even occlusion of Coronary arteries through cardiac catheterization technology, thus improving myocardial blood perfusion (Ilves et al., 2017). Studies have shown that stent restenosis can occur in patients after PCI, and cardiac rehabilitation can effectively improve patients' postoperative cardiovascular reserve function (Ding et al., 2020) and improve their postoperative quality of life. Although cardiac rehabilitation has many benefits, patients often avoid activities and exercise due to a lack of knowledge and doubt about the safety of exercise, and their rehabilitation compliance and enthusiasm are low. The purpose of this study was to understand the current situation of movement fear in patients undergoing percutaneous coronary intervention therapy and to explore the relationship between movement fear and rehabilitation, so as to provide a theoretical basis for early movement management and education of patients after surgery.

Objects and methods

Object of the study

In this study, 326 patients who were admitted to the cardiology department of a tertiary care hospital in Luoyang City from April to August 2020 after percutaneous coronary intervention were selected by convenience sampling method for investigation. Inclusion criteria were (i) diagnosis of coronary artery disease according to the 2019 European Society of Cardiology Guidelines for the Diagnosis and Management of Chronic Coronary Syndromes (Huang & Guo, 2019); (ii) patients after percutaneous coronary intervention and patients ≥18 years of age; (iii) some comprehension to administer the questionnaire; and (iv) informed and voluntary participation. The exclusion criteria were: (i) those with New York Heart Association (NYHA) cardiac function class IV and other major diseases in combination; (ii) those with bone, joint, muscle and neurological diseases that prevented exercise; (iii) those with mental disorders, speech and hearing impairments that prevented them from accepting the survey. (iv) Those who refused to participate in this study.

Research methodology

Research tools

a. General information questionnaire

After reviewing the relevant literature, we designed our own questionnaire, which included questions on gender, education, occupation, place of residence, medical payment method, history of alcohol consumption, presence of comorbidities, degree of self-care, number of daily exercises, number of stents, and cardiac function classification, with a total of 21 entries.

b. Exercise fear scale for cardiac patients

The scale was adapted by Dr. Back on the basis of the Exercise Fear Scale for Pain Patients based on the characteristics of cardiac patients (Bäck et al., 2012), and the Chinese version was Chineseized by Lei Mengjie (Lie, et al., 2019). The scale includes 4 dimensions of danger perception, fear of movement, avoidance of movement and dysfunction, with 17 entries. The danger perception dimension is 3, 8, 11, 16, the motor fear dimension is 1, 7, 9, 13, the motor avoidance dimension is 2, 4, 12, 14, 17, and the dysfunction dimension is 5, 6, 10, 15, using a 4-point Likert scale from "strongly disagree" to "strongly agree". The Likert 4-point scale was used, from "strongly disagree" to "strongly agree" with a score of 1-4, respectively, and entries 4, 8, 12, and 16 were reverse scored, with a total score of 17-68, with higher scores representing higher levels of fear of movement. The Cronbach's α coefficient of the scale was tested to be 0.78, with good reliability (Lie, et al., 2019).

c. KAP questionnaire for rehabilitation exercise in patients with coronary artery disease

In this study, the Rehabilitation Exercise KAP Questionnaire for Patients with Coronary Heart Disease, developed by Zhao Mengli (Zhao, 2019) of Guangxi Medical University, was used, including 3 dimensions of knowledge, attitude and behavior, with 23 entries. The knowledge section consisted of 12 entries with a total score of 24; the attitude section had 5 entries using a Likert 5-point scale of "1=completely disagree", "2=disagree", "3=uncertain ", "4=Agree", "5=Strongly Agree"; 6 items in the Behavior section, with each item scoring from 1-5, indicating "definitely would not ", "will not", "not sure", "will", "definitely will" , out of 30 points. The total Cronbach's alpha coefficient of the questionnaire was 0.849, and the three dimensional Cronbach's alpha coefficients were 0.754, 0.687, and 0.786, respectively; the content validity of the questionnaire was 0.956 (Zhao, 2019).

Data collection methods

In this study, a face-to-face survey was used and the investigators were uniformly trained undergraduate nursing students. After seeking the consent of the head nurse of the cardiology department and obtaining the informed consent of the respondents, a uniform instructional language was used to guide the respondents to answer the questions on the spot, and the study participants completed and collected the questionnaires on the spot in 30 min, and the researchers checked the completeness and validity of the questionnaires. A total of 330 questionnaires were distributed, 330 questionnaires were returned, the return rate was 100%, 326 valid questionnaires were returned, and the effective rate was 98.8%.

Statistical analysis

SPSS 26.0 was used to enter and analyze the data in this investigation, and the measurement data were expressed as mean±standard deviation; the count data were described as number of cases and percentage; Pearson correlation analysis was used to analyze the correlation between KAP level of rehabilitation exercise and fear of exercise in patients after percutaneous coronary intervention, and the difference was considered statis-

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tically significant at P<0.05.

Results

General condition of patients after percutaneous coronary intervention

The age of 326 patients in this study was 33-85 (60.06±11.23) years, of which 230 cases (70.6%) were male and 96 cases (29.4%) were female; 69 cases (21.2%) were primary school and below, 118 cases (36.2%) were junior high school, 94 cases (28.8%) were high school or junior college, and 45 cases (13.8%) were college and above; 292 cases were married (89.6%), widowed 27 cases (8.3%), divorced 7 cases (2.1%); medical expenses paid by self-payment 12 cases (3.7%), urban workers 139 cases (42.6%), urban residents 32 cases (9.8%), New Agricultural Cooperative 143 cases (43.9%); BMI 17.10-34.67 (24.95±3.34); years of illness 0.2-23 (4.20±3.60) years; 158 cases (48.5%) with smoking history, 168 cases (51.5%) without smoking history; 112 cases (34.4%) with drinking history, 214 cases (65.6%) without drinking history; 182 cases (55.8%) with comorbidities, 144 cases (44.2%) without comorbidities; 1 stent placed 114 cases (35.0%), 127 cases (39.0%) with 2 stents, and 85 cases (26.1%) with 3 or more stents; 109 cases (33.4%) with class I, 156 cases (47.9%) with class II, 57 cases (17.5%) with class III, and 4 cases (1.2%) with class IV cardiac function classification.

Current status of exercise fear scores in patients after percutaneous coronary intervention

All patients in this study had a total score of 28-52 (39.93±4.56) for fear of movement, and the range of scores, mean scores and entry mean scores for each dimension are shown in Table 1, and the 2 highest scoring entries for each dimension are shown in Table 2.

Table 1

Total exercise fear score and scores for each dimension in patients after percutaneous coronary intervention (n=326, x±s)

Dimensionality	Number of entries	Score range	Total scores	Entry parity score
Total scores for fear of movement	17	17-68	39.93±4.56	2.35±0.27
Campaign avoidance	5	5-20	10.63±1.76	2.13±0.35
Exercise fear	4	4-16	10.78±1.59	2.70±0.40
Hazard perception	4	4-16	8.34±1.36	2.09±0.34
Functional disorder	4	4-16	10.19±1.76	2.55±0.44

Table 2

The two entries with the highest scores on each dimension of fear of exercise in patients after percutaneous coronary intervention (n=326, x±s)

Dimensionality	Entry (in a dictionary, encyclopedia etc)	Entry parity score

Campaign avoidance	17. When a person has heart problems, he/she should avoid physical activity/exercise	2.67±0.63
	2. if I try to do physical activity/exercise, the heart problem gets worse	2.63±0.65
Exercise fear	13. heart problems suggest when I should stop physical activity/exercise so I don't hurt myself	2.84±0.54
	9. I'm afraid I'll hurt myself by accident	2.71±0.64
Hazard perception	3. my body suggests that something is seriously wrong with me	2.70±0.71
	11. I wouldn't have heart problems if there wasn't something dangerous going on in my body	2.47±0.63
Functional disorder	10. By avoiding unnecessary exercise, I can prevent heart problems from getting worse	2.80±0.66
	6. my heart problem will gradually make me weak	2.71±0.69

Current status of rehabilitation exercise KAP scores in patients after percutaneous coronary intervention

The total rehabilitation exercise KAP score of 326 patients after percutaneous coronary intervention was 29-76 (49.52±9.85), with scores of 1-24 (10.46±5.99) for the exercise knowledge dimension, 9-25 (18.52±2.90) for the exercise beliefs dimension, and 13-30 (20.53±3.47) for the exercise behavior dimension. See Table 3 for details and the 2 lowest scoring entries for each dimension.

Table 3

Total KAP score and scores for each dimension of rehabilitation exercise in patients after percutaneous coronary intervention (n=326, x±s)

Dimensionality	Number of entries	Score range	Total scores	Entry parity score
Total scores	23	11-79	49.52±9.85	2.15±0.43
Sports knowledge	12	0-24	10.46±5.99	0.87±0.50
Sports beliefs	5	5-25	18.52±2.90	3.70±0.58
Sports behaviour	6	6-30	20.53±3.47	3.42±0.58

Table 4

The two entries with the lowest scores on each dimension of the KAP for rehabilitation exercise in patients after percutaneous coronary intervention(n=326, x±s)

Dimensionality	Entry (in a dictionary, encyclopedia etc)	Entry parity score
Sports knowledge	9. How often do resistance exercises typically occur per week?	0.31±0.72
	8. Do you know which ones are resistance sports?	0.45±0.64
Sports beliefs	5. You have the perseverance to keep up with your rehab exercise training.	3.58±0.76
	4. You are interested in participating in rehabilitative sports training.	3.65±0.81
Sports behaviour	3 Do you do resistance exercise weekly?	2.97±0.85
	4 Do you do warm-up exercises before exercising?	3.06±0.91

Correlation analysis of rehabilitation exercise KAP and fear of exercise in patients after percutaneous coronary intervention

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Pearson correlation analysis showed that patients' total rehabilitation exercise KAP score and each dimension score had negative correlation ($p \leq 0.05$) with most of the total exercise fear score and each dimension score, risk perception dimension had no correlation with total exercise KAP score and each dimension score, and dysfunction dimension had no correlation with rehabilitation exercise knowledge, as shown in Table 5.

Table 5

Correlation between exercise fear and rehabilitation exercise KAP in patients after percutaneous coronary intervention (r values)

Sports event	Total fear of movement score	Campaign avoidance	Exercise fear	Hazard perception	functional disorder
Total rehabilitation exercise KAP score	-0.207*	-0.296*	-0.173*	0.067	-0.183*
Knowledge of rehabilitative exercise	-0.149*	-0.246*	-0.137*	0.049	-0.056
Rehabilitation Movement Beliefs	-0.133*	-0.183*	-0.133*	0.097	-0.117*
Rehabilitative exercise behaviour	-0.219*	-0.262*	-0.142*	0.025	-0.197*

Discussion

Higher levels of exercise fear in patients after percutaneous coronary intervention

In the present study, 326 patients after percutaneous coronary intervention had a total score of 28-52 (39.93±4.56) on fear of exercise, with the highest score on the fear of exercise dimension and the lowest score on the perception of risk dimension among the dimension scores, and all four dimensions were at a high level. A foreign study investigated with this scale (Acar et al., 2016) showed that the mean score of exercise fear dimension in patients with coronary heart disease was 2.47, which was lower than the present study. The main reasons may be: (i) the implementation and development of cardiac rehabilitation exercise in China is late, and patients have not yet fully understood and accepted early postoperative cardiac rehabilitation exercise; in addition, cardiac rehabilitation requires long-term adherence, and patients have not yet experienced the benefits of rehabilitation exercise, so compliance is poor. (ii) The subjects of relevant foreign studies were patients with coronary heart disease, while the present study mainly focused on postoperative patients with PCI, and the scope of the study subjects was narrowed, and their fears may vary with the severity of the disease. (iii) The mean age of 326 patients in this study was (60.06±11.23) years old. Patients are older and have decreased somatic motor function, so they may be more afraid of accidents such as falling and injuring their bodies during rehabilitation exercise, and therefore their fear of exercise is higher. Therefore, clinical staff should pay attention to the rehabilitation training of post-PCI patients, understand the current situation of patients' exercise fear and its influencing factors, and take active and effective countermeasures, such as strengthening patients' health education for different groups of people to promote their acceptance of and participation in cardiac rehabilitation exercises, so as to effectively reduce their exercise fear.

Overall low levels of KAP for rehabilitation exercise in patients after percutaneous coronary intervention

The total rehabilitation exercise KAP scores of the patients in this study were 29-76 (49.52±9.85), exercise knowledge scores 1-24 (10.46±5.99), exercise belief scores 9-25 (18.52±2.90), and exercise behavior scores 13-30 (20.53±3.47); indicating that the level of rehabilitation exercise knowledge of the patients was low, and exercise beliefs and exercise behaviors were both at an intermediate level, indicating that the patients' attitudes and behaviors towards the implementation of rehabilitation exercise have yet to be improved. The main reasons for the low level of patients' knowledge about cardiac rehabilitation exercise may be that: (i) standardized and effective cardiac rehabilitation has not yet been fully carried out in clinical practice, clinical workers do not recognize the importance of postoperative rehabilitation training to patients' physical recovery, and mostly focus on the observation and care of patients' postoperative complications, thus neglecting the health education of patients in cardiac rehabilitation training, which makes patients lack cardiac (ii) Patients with coronary artery disease are mostly patients with cardiovascular disease. (iii) The health education work of patients after percutaneous coronary artery surgery lacks professionalism and personalization (Zhao et al., 2019), and the busy clinical work and insufficient staffing make the health education function of nurses unable to play effectively and the core content of cardiac rehabilitation training unable to be achieved (Zhao et al., 2019) At the same time, the rehabilitation exercise knowledge acquired by patients themselves through Baidu and other related searches lacks professionalism, individuality, and comprehensiveness, causing patients to have barriers to information acquisition. The lower level of rehabilitation exercise cognition will restrict the implementation of patients' rehabilitation exercise behaviors; therefore, clinical staff should increase the importance of rehabilitation exercise for patients after percutaneous coronary intervention, adopt various methods such as rehabilitation exercise knowledge popularization, peer education, and the Internet to improve patients' cognitive level of rehabilitation exercise, and unite with the community to provide patients with continuous health education and corresponding rehabilitation We also provide continuous health education and corresponding rehabilitation venues and equipment for patients to escort the implementation of rehabilitation exercises.

Exercise fear is negatively associated with rehabilitation exercise KAP in patients after percutaneous coronary interventions

From the results of the Pearson correlation analysis, it was concluded that the total score and the scores of the dimensions of the patients' rehabilitation exercise KAP had a negative correlation with the total score and the scores of the dimensions of motor fear for the most part ($p \leq 0.05$). In other words, when the level of rehabilitation exercise KAP was lower in patients after intervention, their fear of exercise was stronger. The low level of knowledge and acceptance of postoperative rehabilitation exercises led to a decrease in motivation, a decrease in the implementation of actions, and an increase in resistance and fear of rehabilitation exercises. The results of the data analysis showed a negative correlation between the scores on the knowledge dimension and the scores on the avoidance and fear of exercise dimensions. Patients had little knowledge of rehabilitative exercise and were unaware of the types, intensity and frequency of rehabilitative exercise available after surgery and the benefits of early exercise. Most patients had little understanding of resistance exercise. This leads to the perception that physical activity or exercise should be avoided when there is a heart prob-

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lem, that physical exercise can aggravate heart problems or even accidentally injure oneself. They therefore refuse to learn about and participate in all types of exercise. Exercise avoidance and extreme fear are created. The scores on the rehabilitation exercise beliefs dimension were negatively correlated with the scores on the exercise avoidance, exercise fear and dysfunction dimensions. The lower the patient's score on the beliefs about rehabilitation exercise dimension, the lower the patient's interest in rehabilitation exercise and the more resistant he or she is to exercise. This prevents them from exercising effectively and consistently over time. They believe that by avoiding unnecessary exercise they can prevent the worsening of their heart problems. As a result, the optimal time for post-operative cardiac rehabilitation exercise is missed, which leaves the heart in a dysfunctional state and leads to the development of post-operative coronary restenosis. Scores for rehabilitation exercise behaviour were negatively correlated with scores for exercise avoidance, exercise fear and dysfunction. Due to the lack of professional cardiac rehabilitation knowledge and guidance, patients often adopt unreasonable and incorrect exercise behaviors. For example, they do not warm up before exercising or are unable to exercise at the right intensity and frequency, which can lead to a failure to achieve the desired exercise effect or to increased physical weakness. This ultimately increases the patient's fear of exercise and makes them avoid relevant rehabilitation exercises. Therefore, clinical staff should strengthen the assessment of patients' rehabilitation exercise KAP levels, combine PPT, videos, pictures and mobile apps, etc., innovate health education methods, standardize health education formats, standardize health education content and extend health education cycles, in order to improve the effectiveness of health education, raise patients' rehabilitation exercise-related cognitive levels, help patients establish positive coping attitudes, and ultimately make patients' This will ultimately lead to a reduction in the level of exercise fear and an increase in cardiac rehabilitation outcomes.

Conclusion

In summary, patients after percutaneous coronary intervention have a high score of exercise fear, and generally have a low cognitive level of rehabilitation exercise, but their implementation attitude and exercise behavior in rehabilitation exercise are at a medium level, which needs to be improved. There was a negative correlation between patients' exercise fear and rehabilitation exercise KAP. In clinical work, medical workers should take targeted and effective intervention measures to help patients improve their awareness of exercise rehabilitation, so as to reduce their exercise fear, improve the compliance of early cardiac rehabilitation exercise, and ultimately promote the recovery of postoperative physical function.

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