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Original article

Cardiac rehabilitation knowledge in patients with coronary heart disease in Baoding city of China: A cross-sectional study



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ABSTRACT

Objective: The purpose of this study is to assess the awareness on cardiac rehabilitation (CR) in patients with coronary heart disease (CHD).

Methods: Inpatients diagnosed with coronary heart disease were recruited from 3 hospitals in this study. The study employed a cardiac structured questionnaire to assess respondents' level of awareness, and bivariate to analyze the sociodemographic factors that influence the awareness on CR.

Results: Of all 500 participants, 66.40% were male and the mean age was 62.51 ± 9.96 years. The mean score of knowledge was 44.00 ± 17.00 (score range: 0–93), and the mean level of awareness was 47.31% (awareness range: 0–100%). The highest mean level of awareness was in the reexamination subscale (98%) and the lower were in the basic information about CR program, SP optimized medication and heart rate subscale. Bivariate analysis showed that higher age was associated with less knowledge. Patients with higher education level and better income status had better knowledge. And patients who lived in rural and had no jobs had less knowledge.

Conclusions: This study showed low levels of awareness on CR program in CHD patients in Baoding. Therefore, the need for health education is indicated in this study to improve the awareness on CR among CHD patients.

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1. Introduction

Cardiovascular disease (CVD) is the first cause of death in China, accounting for 2 in every 5 deaths each year. The mortality in rural area is 44.60% and in city 42.51% [1]. Coronary heart disease (CHD) is the most common type of CVD. Patients with CHD are at high risk of recurrent events and bear the large financial burden. Secondary prevention (SP) has been proved to be effective, however, many factors such as patients' adherence and medical intervention can influence the rehabilitation progression of CHD [2,3].

Cardiac rehabilitation (CR) is a comprehensive SP program, delivered by a multidisciplinary team [4]. The core components of CR include baseline assessment, nutritional counseling, risk factor management (i.e., blood pressure, obesity, diabetes mellitus, smoking, and lipids etc), physical activity counseling and training,

and psychosocial interventions [5]. A recent Cochrane systematic review and meta-analysis showed that excise-based CR reduced the mortality of cardiovascular as well as medical cost, and improved the health-related quality of life [6]. It has also been showed that patients with CHD can benefit from CR programs in China [7,8].

Health education is the main intervention in SP program for CHD worldwide. The benefits had been studied by researches [9–12], which was associated with increased patients' knowledge [13]. Studies also suggested that the education on CR should be taken into consideration in developing CR program [14,15]. Hence, educators need to address patient's awareness level of CR before they participate in CR program in order to promote effectiveness of CR [16]. In this context, given the recognition of potential benefits of health education on CR program, investigating the awareness level of CR is necessary.

Unlike other counties, the awareness level of CR has not been sufficiently investigated in China. Hence, the aim of this study is to assess it, and explore the potential factors that influence this condition. This study may provide an evidence to promote health education of cardiac rehabilitation for discharged patients with coronary heart disease in China.

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2. Methods

2.1. Study design, setting and samples

This cross-sectional survey was conducted at three general hospitals in Baoding, the Affiliated Hospital of Hebei University, Baoding First Central Hospital, and Chinese PLA 252 hospital. Eligible participants were included if they met the following criteria: (1) diagnosed with coronary heart disease (CHD) by the physician; (2) would discharge from the hospital; (3) had ability to read and write; (4) informed consent. Participants were excluded if they were confused and unable to participate because of their disease condition (for instance, were mechanically ventilated or deemed too ill by the interviewer to participate). Sample size was calculated by a significance level of 0.05, acceptable error 0.1, and standard deviation 1.12 obtained in preliminary experiment. Considering the lost ration, 500 participants would be required for this survey.

2.2. Data collection

Consecutive patients were recruited during 5-month period from March to August in 2015. When participants signed informed consent, research assistants conducted a face-to-face interview to collect data. A total of 500 participants answered the questions read by the interviewers. All of research assistants accepted training about this survey design, purpose, and instruments before the interview. These clinic survey procedures were approved by the hospital review boards.

2.3. Measures

Two self-administered questionnaires developed by the research group were administered in this survey. The first questionnaire contains questions on socio-demographic (e.g. age, gender, marital status, education attainment, income status, type of medical insurance, and residence in city or rural area) and clinical characteristics (e.g. family history of CHD, first time of diagnosed with CHD, number of hospitalization for CHD and comorbidities).

The second questionnaire: cardiac rehabilitation knowledge questionnaire was used to assess CHD patients' CR knowledge. According to the core components of CR/SP programs recommended by the American Heart Association (AHA) and the content of Chinese specialists consensus on CR/SP programs, we examined the 13 domains of this questionnaire. It includes basic information about CR, risk factor of CHD, blood lipid management, blood pressure management, blood glucose management, diet, weight, medication management, emotion, exercise, sleep, reexamination, and heart rate. The Cronbach's alpha coefficient in this study was 0.945, indicating adequate internal consistency. Content validity of the questionnaire was examined by five physicians who were specialist in coronary heart disease research and practice. The average of content validity index of all items was 0.82. It ascertained 17 single-choice and 12 multiple-choice. Each correct answer was counted 1 score in single-choice. Each correct answer, or no choosing false answer was counted 1 score. Scores ranged from 0 to 93, with higher scores indicating higher CR knowledge. The awareness rate was equal to the median/total scores. It took approximately half of an hour to complete this questionnaire.

2.4. Data analysis

Descriptive statistics was reported as median and quartile range, frequencies and percentages. To evaluate the relationship between demographic, clinical characteristics and awareness of cardiac

rehabilitation, we performed *t*-test, separate variance estimation *t*-test, analysis of variance and Pearson correlation. All data analysis was performed using SPSS19.0.

3. Results

3.1. Participants characteristics

The mean age of participants was 62.51 years (SD = 9.96) and the majority (66.4%) were male. 68.80% reported junior high school as their highest education level. Approximately half of patients lived by agriculture and only 12.20% had a good income status. Most patients (97.2%) accepted medical insurance assists from government and 55.5% have family history of CHD. Two thirds (75.2%) of the participants had gone hospital more than twice for CHD attack and 44.88% combined other diseases. Sociodemographic and clinical characteristics of participants included in this study were shown in Table 1.

3.2. The awareness rate on cardiac rehabilitation knowledge

Table 2 showed that the median was 44.00 ± 17.00 (95%CI: 42.00–45.00). The highest was in the reexamination subscale. The lower awareness rate were in the basic information about CR, SP optimized medication and heart rate subscale. The awareness rate of blood pressure, blood glucose, blood lipid, diet, weight and sleep management was in the middle. The basic information about CR program contained three aspects: have you heard of CR program, core components and benefits. Only 10.2% patients have heard CR program, thus they didn't know the core components or benefits. The median of basic information about CR program was 0. In exercise management, although the mean awareness rate was 66.67%, only 48.2% patients knew the appropriate exercise frequency and 59% knew the appropriate duration time. And only 48.7% knew how to identify the appropriate exercise strength. The items with lower awareness rate were shown in Table 3.

Table 1 indicated that higher age was associated with lower cardiac rehabilitation knowledge ($r = -0.167, p < 0.001$). Patients with lower education attainment and poorer income status had less cardiac rehabilitation knowledge. Both patients lived by agriculture or unemployed had less knowledge than other professions, however, there were no significant differences between them. Patients who had gone to hospital once for heart attack had more knowledge than twice or three times. But it had no differences between once and four times or more.

4. Discussion

4.1. CR/SP program should be developed in patients with CHD

The overall awareness rate on CR (47.31%) was low among inpatients with coronary heart disease in our study [17,18]. Moreover, our study found that patients had less awareness on basic information about CR and SP optimized medication. CR had been well established in developed countries in 1980s, while it just started at that time in China [19]. At present, CR/SP program has not been sufficiently administered in hospital in our country. On one hand, it is possible that lack of professional multidisciplinary team and facilities for CR program. On the other hand, health-care professionals still focused on medical treatment, and had less concern on disease prevention and rehabilitation so that they had less knowledge on CR program. Hence, Chinese CHD patients were unfamiliar with the content of CR program. With the higher and higher morbidity and mortality of CVD in China, systematic CR/SP program needs to be popularized. In particular, the core

Table 1
Bivariate analysis of the factors that influence knowledge score (n = 500).

Characteristics	n (%)	Mean (SD)	t	P
Demographic				
Age		62.51 (9.96)	-0.167	<0.001 ^a
Gender				
Female	168 (33.60%)	44.46 (14.62)	-0.194	0.847
Male	332 (66.40%)	44.19 (14.42)		
Marital status				
Single (includes divorced, widowed, separated)	47 (9.40%)	45.49 (15.20)	-0.600	0.549
Married	453 (90.60%)	44.16 (14.41)		
Education attainment				
Less than junior high school	344 (68.80%)	40.25 (12.59)	9.654	<0.001
Senior high school/college/equivalent	156 (31.20%)	53.18 (14.42)		
Employment				
Agriculture	247 (49.40%)	39.85 (12.98)	-	<0.001 ^b
Non-agriculture	247 (49.40%)	48.91 (14.39)		
Unemployed	6 (1.2%)	36.33 (18.16)		
Place of residence				
Country	267 (53.40%)	40.73 (13.35)	6.074	<0.001 ^c
City	233 (46.60%)	48.35 (14.67)		
Self-reported income status				
Good	61 (12.20%)	52.43 (14.23)	-	0.001 ^b
Fair	356 (71.20%)	44.28 (13.87)		
Poor	83 (16.60%)	38.29 (14.45)		
Type of medical insurance				
Government assisted	486 (97.20%)	44.39 (14.48)	0.954	0.341
Private or other	14 (2.80%)	40.64 (14.28)		
Clinical				
Family history of CHD				
Yes	278 (55.60%)	44.09 (14.13)	-0.332	0.740
No	222 (44.40%)	44.52 (14.93)		
Years diagnosed with CHD				
4 or less	394 (78.8%)	43.93 (14.31)	-1.036	0.300
5 or more	106 (21.2%)	45.58 (15.06)		
Comorbidities				
Yes	275 (55.00%)	44.88 (15.07)	-1.021	0.308
No	225 (45.00%)	43.55 (13.71)		
Numbers of hospitalization for CHD				
1	124 (24.80%)	47.25 (15.20)	-	0.027 ^b
2-3	258 (51.60%)	43.06 (13.94)		
4 or more	118 (23.60%)	43.84 (14.52)		

Abbreviations CHD = coronary heart disease; a: Pearson correlation; b: analysis of variance; c: separate variance estimation t-test.

components of CR and the optimized medication strategy of SP should be systematically transmitted to patients with CHD, just like interventional therapy, bypass surgery.

4.2. Heart rate recommended should be suggested in CR/SP program

Many studies have demonstrated that heart rate was associated with prevention on cardiovascular events [20]. 2012 American College of Cardiology (ACC) and AHA guidelines for diagnosis and

management of patients with stable Ischemic heart disease recommended that the target of resting heart rate is 55–60/min [21]. However, the majority of patients knew a little about the goals of heart rate management. The education on heart rate and its self-management should be strengthened in CR/SP program.

4.3. The basic elements of exercise prescription should be strengthened

Although the awareness rate of exercise management is 66.67%,

Table 2
Patients' awareness rate on cardiac rehabilitation across the 13 domains and the total scale.

Domain of knowledge	Total score	Median (Q)	Awareness rate (%)
Basic information about cardiac rehabilitation	22	0.00 (0.00)	0.00
Risk factor	9	6.00 (5.00)	66.67
Blood lipid management	7	4.00 (4.00)	57.14
Blood pressure management	9	6.00 (5.00)	66.67
Blood glucose management	5	3.00 (4.00)	60.00
Diet management	6	5.00 (2.00)	75.00
Weight management	4	3.00 (0.00)	75.00
Medication management	2	-	6.60
Emotion management	1	-	75.00
Excise management	21	14.00 (5.00)	66.67
Sleep management	5	3.00 (3.00)	60.00
Reexamination	1	-	98.00
Heart rate management	1	-	20.40
Total scale	93	44.00 (17.00)	47.31

Table 3

The items with lower awareness rate.

Items	Awareness rate
Secondary prevention optimum medication	6.6%
Awareness on CR as a treatment	10.2%
Measurement of blood lipid	15.4%
Recommended rest heart rate	20.4%
Waist circumference	21%
Potassium-containing food intake	47.4%

some patients still were not clear what the appropriate exercise type, frequency, strength and duration time is. However, exercise is the core content of cardiac rehabilitation program, which can reduce the rate of cardiovascular events and improve quality of life [22]. In addition to the four basic elements of exercise prescription, precautions about exercise also should be included. Hence, health-care professionals should make more effort to emphasize the importance and enhance the knowledge of it.

4.4. More specific information on the management of risk factors should be provided

Furthermore, our results also showed that patients' awareness level in the diet, weight, risk factors, emotion, reexamination management and blood pressure, blood glucose, blood lipid and sleep management was better, which indicated basic health education was effective. However, CR/SP education needs to focus more on some details in these managements, such as measurement of blood lipid, waist circumference and potassium-containing food intake, the awareness rate of which was low in our study. It indicated that health-care professionals should underline these self-management details on CR/SP education for CHD patients.

4.5. Effective strategy should be established in CR/SP education based on patients' characteristics

Our results showed that old patients had less CR knowledge. First, with age increasing, it is difficult to accept new knowledge. Second, due to the convenience of network, more and more health education is developed through it. But the majority of old patients are unfamiliar with it so that they cannot obtain effective healthy information. Therefore, health-care professionals should use the different strategy based on different patients. In this study, most patients lived in rural, and had no jobs or lived by agriculture, who had lower education attainment and poorer income level. Our results also showed that those who had higher education or higher income had better knowledge about CR. It is likely that patients with higher educational level had better understanding of the CR program. Many studies had demonstrated that lower educational attainment was associated with poor health literacy, and which was associated with less health knowledge [23–25]. In addition, patients who had a good or fair income status were willing to spend more money on seeing physicians or buying medications [26]. They also have more access to obtain the information of CR program. It is surprising that patients had gone to hospital twice or three times for heart attack had less knowledge than once. The reason is not clear, that needed to be further explored.

Therefore, health-care professionals should establish the targeted educational strategy based on patients' characteristics, in order to promote the effectiveness of education on developing CR/SP program.

4.6. Findings

It was known that the awareness on CR was associated with

patients' participation in cardiac rehabilitation program. Patients who knew better about the benefits from cardiac rehabilitation were more willing to participate in the program. Therefore, our findings suggested that more efforts are needed to promote the popularization of CR/SP program, and the first thing is to make more CHD patients be aware of it. However, our study confirmed the low awareness on cardiac rehabilitation among inpatients with coronary heart disease. Hence, results in this study suggested that efficient and systematic CR/SP education is needed to be developed in the period of hospitalization in China. Furthermore, our findings also suggested that health educators should focus on older patients with lower education attainment and poorer income, and provide targeted education.

4.7. Limitations

Despite the strengths of this study, caution is warranted when interpreting our results. The chief limitation is that participants were recruited by convenient sampling from three general hospitals, which may not accurately reflect the views of general patient population. Further studies ought to be conducted in multi-site, in order to better describe the present situation of patients' knowledge of cardiac rehabilitation in China, thereby establishing foundation for health education.

5. Conclusion

Our study found that patients' awareness on cardiac rehabilitation was low, especially in basic information about CR, SP optimized medication and heart rate. Hence, health-care professionals should promote the development of CR/SP program and strengthen the education on it.

Author contributions

Wang conceived the study, designed the trial and obtained research funding. Wang, Du and Du supervised the trial and data collection. Li, Cao, Zhou and Fu undertook the recruitment participants and quality control. Wang and Du provided the statistical advice. Li and Zhou analyzed the data. Zhou drafted the manuscript, and all authors contribute substantial to its revision. Wang and Zhou take responsibility for the whole paper.

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Conflict of interest

The authors declare that they do not have a conflict of interest.

Appendix A. Supplementary data

Supplementary data related to this article can be found at <http://dx.doi.org/10.1016/j.ijnss.2016.12.011>.

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