RESEARCH LETTER

Cardiac Rehabilitation Knowledge, Attitudes, and Practice among Patients with Heart Failure and Cardiology Healthcare Providers

Yuxiang Chu[1,2], Bingxue Song[1], Linlin Guo[3], Haiyan Li[4], Luxin Feng[1], Zhen Lu[1], Junjie Guo[1,5] and Haichu Yu[1,3]

[1]Department of Cardiology, The Affiliated Hospital of Qingdao University, Qingdao University, Qingdao, Shandong 266003, China
[2]Department of Cardiology, Pingdu Third People's Hospital, Pingdu, Shandong 266700, China
[3]Department of Cardiology, The Affiliated Cardiovascular Hospital of Qingdao University, Qingdao, Shandong 266000, China
[4]Department of Nursing, The Affiliated Hospital of Qingdao University, Qingdao, Shandong 266003, China
[5]Qingdao Municipal Key Laboratory of Hypertension (Key Laboratory of Cardiovascular Medicine), Qingdao, Shandong 266003, China

Cardiac rehabilitation (CR) typically consists of physical activity supplemented with lifestyle modifications, including smoking cessation, adherence to a healthful diet, stress management, medication adherence management, risk factor reduction, psychosocial support, and education [1]. Because CR involves important changes in lifestyle and physical activity, self-management is central to successful CR [2]. Proper knowledge regarding, and attitudes toward, CR are key to effective self-management [3]. Consequently, identifying knowledge gaps, misconceptions, and misunderstandings regarding CR could improve attitudes and practice. Therefore, this study examined CR knowledge, attitudes, and practice (KAP) among patients with HF and cardiology healthcare providers.

Correspondence: **Junjie Guo**, Department of Cardiology, The Affiliated Hospital of Qingdao University, Qingdao University, Qingdao, Shandong 266003, China; and Qingdao Municipal Key Laboratory of Hypertension (Key Laboratory of Cardiovascular Medicine), Qingdao, Shandong 266003, China, Tel.: +86-18661805902, E-mail: guojunjie@qdu.edu.cn; **Haichu Yu**, Department of Cardiology, The Affiliated Hospital of Qingdao University, Qingdao University, Qingdao, Shandong 266003, China; and Department of Cardiology, The Affiliated Cardiovascular Hospital of Qingdao University, Qingdao, Shandong 266000, China, Tel.: +86-18661809671, E-mail: yuhaichu@yeah.net

> **What is the scientific question being addressed?**
>
> **What is the status of cardiac rehabilitation (CR) knowledge, attitudes, and practice among patients with heart failure (HF) and cardiology healthcare providers?**
>
> **What is the main novel finding?**
>
> **Patients with HF had poor CR knowledge, unfavorable attitudes, and active practice, whereas cardiology healthcare providers had good CR knowledge, unfavorable attitudes, and active practice.**

This cross-sectional study was conducted at the Affiliated Hospital of Qingdao University from February to May of 2023, and enrolled patients with HF and cardiology healthcare providers. The study was approved by the ethics committee of the Affiliated Hospital of Qingdao University.

All participants provided informed consent before completing the questionnaire. Two questionnaires including four dimensions (demographic data, knowledge, attitudes, and practice) were designed for patients with HF and healthcare providers. A small pre-trial (in 26 nurses [Cronbach's $\alpha = 0.902$] and 25 patients [Cronbach's $\alpha = 0.821$]) conducted before the official study launch suggested the questionnaire's high internal consistency. All questionnaires were distributed as online surveys through the WeChat-based Questionnaire Star Mini Program.

This study included 210 questionnaires from healthcare providers. The mean provider age was 38.63 ± 9.98, and the knowledge, attitude, and practice scores were 8.01 ± 0.74 (/10, 80.10%), 38.95 ± 2.13 (/55, 70.82%), and 37.80 ± 6.71 (/45, 84.00%), respectively, indicating good knowledge, unfavorable attitudes, and active practice. Among healthcare providers, the knowledge scores were not correlated with the attitude ($r = 0.086$, $P = 0.217$) or practice ($r = 0.113$, $P = 0.102$) scores, whereas the attitude scores correlated with the practice scores ($r = 0.328$, $P < 0.001$). Among healthcare providers, the attitude scores (OR = 1.238, 95% CI: 1.081–1.417, $P = 0.002$) were independently associated with the practice scores. Sex, age, educational level, hospital grade, job title, department, years of service, occupation type, and training in CR were not associated with the practice scores.

A total of 458 questionnaires were collected from patients, whose mean age was 61.21 ± 12.55 years. The patients' knowledge, attitude, and practice scores were 6.82 ± 1.80 (/10, 68.20%), 37.24 ± 3.52 (/55, 67.71%), and 41.59 ± 6.61 (/55, 75.62%), respectively, indicating poor knowledge, unfavorable attitudes, and active practice. The knowledge scores correlated with the attitude ($r = 0.370$, $P < 0.001$) and practice ($r = 0.261$, $P < 0.001$) scores, whereas the attitude scores correlated with the practice scores ($r = 0.280$, $P < 0.001$). Among patients, the knowledge scores (OR = 1.246, 95% CI: 1.100–1.411, $P = 0.001$), the attitude scores (OR = 1.130, 95% CI: 1.061–1.203, $P < 0.001$), and alcohol consumption (OR = 0.428, 95% CI: 0.229–0.799, $P = 0.008$) were independently associated with the practice scores. Sex, age, place of residence, educational level, work status, income, marital status, and smoking status were not associated with practice. In structural equation modeling analysis, knowledge directly affected attitudes ($\beta = 1.014$, $P < 0.001$); knowledge directly affected practice ($\beta = 0.815$, $P < 0.001$); and knowledge indirectly affected practice through attitudes (i.e., attitudes directly influenced practice, $\beta = 0.419$, $P < 0.001$) (Figure 1).

Previous studies have reported poor knowledge of CR among both patients [3, 4] and physicians [4, 5]. The present study demonstrated that the patients with HF had poor knowledge, unfavorable
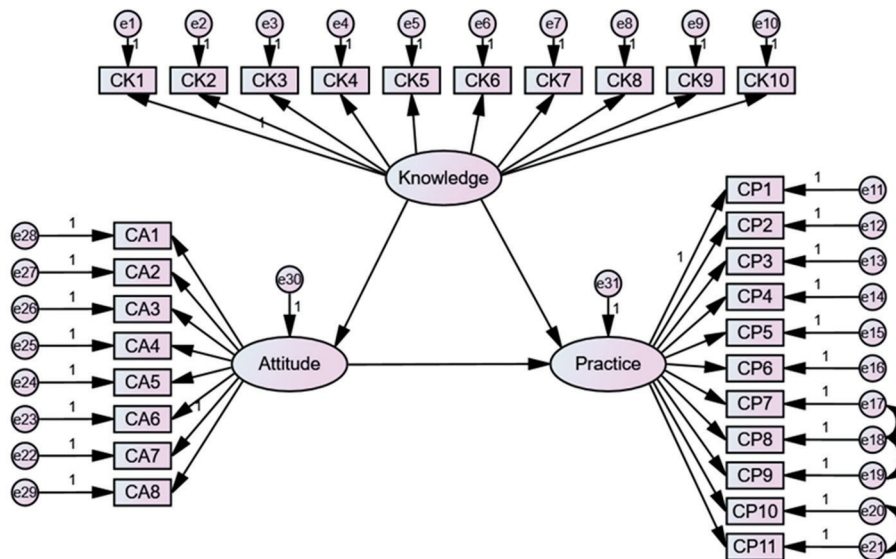

Figure 1 Structural Equation Modeling Analysis of Knowledge, Attitudes, and Practice among Patients.

attitudes, and active practice regarding CR. Successful CR requires profound changes in lifestyle habits, as well as knowledge of, and willingness to make, these necessary changes (i.e., positive or favorable attitudes). Poor knowledge has been described in several studies [3, 4]. Herein, the knowledge and attitude scores were independently positively associated with the practice scores, whereas alcohol consumption was independently negatively associated with the practice scores. Changing lifestyle habits is notoriously difficult, particularly regarding consumption of comforting foods and addictive substances, such as tobacco and alcohol, as well as increasing physical activity; this difficulty may at least partly explain the patients' unfavorable attitudes toward CR. Patients who continue to consume alcohol despite an HF diagnosis might be unwilling to change their habits, even if those habits are known to be detrimental. Hence, improving patients' knowledge of CR should result in more favorable attitudes and practice. Cognitive behavioral therapy for drinking cessation might also be beneficial. CR performance and benefits can vary among HF types. Therefore, patients with different HF types might potentially require different guidance regarding CR; this possibility must be explored in future studies.

Only the attitude scores were independently associated with the practice scores among cardiology healthcare providers. The available data do not provide insights into the factors influencing practice among providers. Our results suggest that, given the high knowledge levels among cardiology healthcare providers, their practice was influenced not by knowledge but by their willingness to apply the knowledge. Nonetheless, previous studies have suggested moderate CR KAP among healthcare providers, thus generally supporting the present study findings [4, 5]. Not all healthcare providers believe in the effectiveness of CR for all patients, and their level of CR recommendation can be highly variable [4]. The availability of resources for offering CR can also influence healthcare providers' attitudes [4], although this aspect was not examined in the present study.

This study has several limitations. First, it was performed at a single hospital (three sites), thereby resulting in a relatively small sample size. The participants were from a single geographical area, thus leading to limited generalizability of the findings. The questionnaires were designed by the authors according to their experience, local practice, local policies, and guidelines. The original questionnaire was developed and validated in Chinese. The cross-sectional design prevented analysis of causality. In addition, the results represent a single point in time; however, the findings could potentially provide a historical baseline for evaluating the effects of future educational interventions. All KAP studies are at risk of social desirability bias. Another limitation is that a behavioral scientist was not included in the research team in this study.

In conclusion, this study sheds light on CR KAP among patients with HF and cardiology healthcare providers, thus providing valuable information for enhancing clinical management and patient care in the context of cardiac rehabilitation. This study identified KAP items that might warrant educational interventions among patients and healthcare providers.

Funding

Data Availability Statement

All data generated or analyzed during this study are included in this published article.

Ethics Statement

This work was performed in accordance with the Declaration of Helsinki (2000) of the World Medical Association. This work was approved by the ethics committee of the Affiliated Hospital of Qingdao University (QYFY WZLL27570). Informed consent was obtained from all individual participants included in the study.

Authors' Contributions

CYX and SBX performed the studies, participated in collecting data, and drafted the manuscript. GLL, LHY, FLX, and LZ performed the statistical analysis and participated in study design. YHC analyzed the results and supervised the work. GJJ designed the study and wrote the manuscript. All authors read and approved the final manuscript.

Consent for Publication

Not applicable.

Conflict of Interest

The authors declare that they have no competing interests.

REFERENCES

1. Patel L, Dhruve R, Keshvani N, Pandey A. Role of exercise therapy and cardiac rehabilitation in heart failure. Prog Cardiovasc Dis 2024;82:26–33.
2. Tutor A, Lavie CJ, Kachur S, Dinshaw H, Milani RV. Impact of cardiorespiratory fitness on outcomes in cardiac rehabilitation. Prog Cardiovasc Dis 2022;70:2–7.
3. Williamson TM, Rouleau CR, Aggarwal SG, Arena R, Hauer T, Campbell TS. The impact of patient education on knowledge, attitudes, and cardiac rehabilitation attendance among patients with coronary artery disease. Patient Educ Couns 2021;104(12):2969–78.
4. Servio TC, Britto RR, de Melo Ghisi GL, da Silva LP, Silva LDN, Lima MMO, et al. Barriers to cardiac rehabilitation delivery in a low-resource setting from the perspective of healthcare administrators, rehabilitation providers, and cardiac patients. BMC Health Serv Res 2019;19(1):615.
5. Farah R, Groot W, Pavlova M. Knowledge, attitudes, and practices of cardiopulmonary rehabilitation among physiotherapists in Lebanon. Bull Fac Phys Ther 2022;27(1):2.