Original Article

Barriers to the Development of Clinical Reasoning Skills among Coronary Care Nurses: A Qualitative Study

Abstract

Background: Clinical Reasoning (CR) is a main professional competency for nurses which have significant contribution to sound clinical performance in critical clinical conditions. Nonetheless, evidence shows that nurses do not have the necessary competencies and thinking skills for managing complex conditions in critical care units. This study aimed at exploring the barriers to the development of CR skills among coronary care nurses. **Materials and Methods:** Using conventional content analysis, this qualitative study was conducted in 2020 in the Coronary Care Unit (CCU) of Heshmat Subspecialty Heart Center in Rasht, Iran. Participants were 15 nurses, head nurses, nursing supervisors, nursing managers, and nursing instructors. Data were collected using semi-structured interviews and were analyzed using conventional content analysis. **Results:** The four main categories of the barriers to CR skill development among nurses were limited professional development, inefficient educational program, ineffective professional interactions, and limited professional self-efficacy. **Conclusion:** There are different personal, educational, professional, and interprofessional barriers to the development of CR skills among CCU nurses. Study findings can be used to develop effective strategies for supporting and developing nurses' CR skills.

Keywords: *Clinical reasoning, Coronary care units, Nurses*

Touba Hosseinzadeh[1], Kian Norouzi Tabrizi[2], Masoud Fallahi-Khoshknab[3], Hamidreza Khankeh[4], Forozan Shokooh[5]

[1]Department of Nursing, University of Social Welfare and Rehabilitation Sciences (USWR), Tehran, Iran, [2]Social Determinants of Health Research Center, Department of Nursing, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran, [3]Department of Nursing, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran, [4]Department of Health in Disasters & Emergencies, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran, Department of Clinical Sciences and Education, Karolinska Institute, Stockholm, Sweden, [5]Department of Basic Sciences, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran

Introduction

Nurses in Coronary Care Unit (CCU) usually provide care to patients with unstable and unpredictable health conditions,[1] and hence, working in this unit confronts them with unpredictable and complex conditions. Accordingly, nurses in CCU need to have adequate Clinical Reasoning (CR) and higher-order thinking skills in order to accurately assess patients' conditions, accurately interpret patient data, make sound clinical decisions, provide safe care, and predict, understand, and effectively manage life-threatening conditions in their units.[1] CR is "a complex process that uses cognition, metacognition, and discipline-specific knowledge to gather and analyze patient information, evaluate its significance, and weigh alternative actions." Based on this definition, CR is a comprehensive context-dependent cognitive process that helps nurses better understand and interpret patient information, identify potential and actual patient problems, and make appropriate clinical decisions to manage patient problems and achieve positive patient outcomes.[2] Assessment of patient outcomes and reflection on the process of CR can also improve nurses' knowledge and give them new insight about patients' conditions. CR is considered as a basic professional competence for nurses.[1-4]

CR has many different outcomes. It enables nurses to provide effective and safe care[2] and make independent clinical decisions.[1-4] Moreover, CR helps nurses interpret new patient information, detect changes in patient conditions, and select the best interventions for safe, quality, and effective care delivery. Contrarily, limited CR skills can be associated with adverse consequences for nurses, patients, and healthcare organizations. For example, nurses with limited CR skills are unable to carefully assess conditions, synthesize and interpret clinical information,[5] and establish appropriate nursing diagnoses, and hence, may endanger patient safety.[6] Therefore, CR skill development for nurses is considered mandatory not optional,[1] and

Address for correspondence:
Mr. Kian Norouzi Tabrizi, Koodakyar St., Daneshjoo Ave., Evin, Zip Code: 1985713834, Tehran, Iran.
E-mail: kian_nourozi@yahoo.com

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nurses are expected to use CR skills to improve patient outcomes in different conditions.[7]

Despite the importance of CR skills to patient outcomes and its significant effects on nurses' professional practice in critical conditions, studies show that nurses do not have adequate CR skills for safe and quality care delivery.[8-10] Many different factors can contribute to the development of CR skills among nurses. Some of the most important factors in this area are lack of quality CR-related education for nurses, their limited understanding of the importance of CR skills, their limited clinical experience, lack of effective interprofessional communications, lack of supervision from experienced nurses for CR, and the unique characteristics of clinical settings.[11-13] Some studies also reported that the most important challenges of CR skill development among nurses were their lack of knowledge and lack of understanding about their conditions.[14-16]

Most previous studies into nurses' CR focused on exploring nursing students' and instructors' perceptions[11,13] and exploring the structure and the process of CR skill development.[17,18] Some studies also explored the challenges of CR skill development among nursing students.[19,20] However, there is limited information about CR skill development and its barriers among nurses. The present study was designed and conducted to narrow this knowledge gap. The aim of the study was to explore the barriers to the development of CR skills among CCU nurses.

Materials and Methods

This qualitative study was conducted in 2020 using conventional content analysis. Study setting was the Coronary Care Unit (CCU) of Heshmat Subspecialty Heart Center in Rasht, Iran. The center was the largest heart center and a referral center for cardiovascular diseases in the north of Iran. Nurses in the CCU of this center provide care through the case method to patients with different cardiovascular problems and patients who undergo coronary angiography, coronary angioplasty, electrophysiological studies, or catheter ablation. Participants were nurses, head nurses, nursing supervisors, nursing managers, and nursing instructors who were purposively selected with maximum variation in terms of their age, gender, organizational position, educational level, and work experience. Inclusion criteria were bachelor's degree or higher in nursing, work experience more than three years in cardiac nursing, and agreement for participation. Exclusion criterion was voluntary withdrawal from the study. Data were collected through semi-structured interviews, during which participants were encouraged to talk about their experiences of the barriers to CR skill development. At the beginning of the interviews, participants were asked to define the concept of CR and then, were provided with information about this concept based on the Hoffman's model, and were asked to share their CR-related experiences. An interview guide

was used for interviews which contained general questions such as, "May you talk about your experiences of CR skill development and its challenges?" "What problems did you experience in CR skill development?" and "What are the barriers to CR skill development?" Based on participants' responses to these questions, they were encouraged to provide more explanations about their experiences using probing questions. All interviews were conducted by the corresponding author of the study in the head nurse room, supervisor room, or conference room of the study setting. The time and the place of the interviews were determined by participants, and the duration of the interviews was 45–60 minutes. All interviews were audio-recorded and immediately transcribed verbatim.

Data were analyzed using conventional content analysis in three main steps, namely open coding, categorization, and abstraction. The transcript of each interview was reviewed for several times in order to obtain a general understanding of the intended participant's experiences. Then, words and expressions in the transcript which were relevant to the study aim were identified as meaning units and coded with primary codes. Then, codes with conceptual similarity were grouped into subcategories, and subcategories with conceptual similarity were grouped into main categories. This process helped identify the latent content of the data as main categories. The MAXQDA 10 software was used to manage the data.

Lincoln and Guba's four criteria were used to establish trustworthiness. These criteria are credibility, dependability, confirmability, and transferability. Credibility was maintained by data source triangulation, member checking, peer checking, and prolonged engagement with the study (for more than six months). Member checking and peer checking by coauthors also helped establish dependability. Moreover, confirmability was ensured through documenting all steps of the study so that others would be able to trace all of our research-related activities. Transferability was ensured through providing clear descriptions about the study setting, participants, sampling process, data collection, and data analysis.

Ethical considerations

The Ethics Committee of the University of Social Welfare and Rehabilitation Sciences, Tehran, Iran, provided ethical approval for this study (code: IR.USWR.REC.1399.073). Permissions for conducting the study were obtained from the above-mentioned university and provided to the authorities of the study setting. Participants were informed of the study aim and ensured of data confidentiality and their freedom to withdraw from the study at will. Written informed consent was obtained from all participants.

Results

Participants were eight CCU nurses, a CCU head nurse, two nursing supervisors, a hospital nursing manager, and

three nursing instructors. Their age range was 26–47 years with a mean of 38.21, and their work experience ranged from 11 months to 10 years. Their educational level also ranged from bachelor's degree to PhD. Table 1 shows participants' characteristics.

Conventional content analysis of the interview data for the barriers to CR skill development resulted in the development of ten subcategories and four main categories. The main categories of the study were limited professional development, inefficient educational program, ineffective professional interactions, and limited professional self-efficacy [Table 2].

1. Limited professional development

Most participants highlighted the undeniable effects of professional development on CR skill development. By professional development, they meant attempt to develop their thinking skills, learning skills, competencies, professional knowledge, and professional interest. Their experiences showed that professional development facilitates the development of CR skills, decision-making skills, and professional competencies, while limited professional development is a major barrier to the development of CR skills and professional competencies. The four subcategories of this category were limited professional expertise, limited professional knowledge, insufficiency in accepting professional roles, and routine-based practice.

1.1. Limited professional expertise
Participants noted that inability to use professional knowledge in clinical practice, limited professional experience, and limited metacognitive skills restrict the development of professional expertise and thereby, act as barriers to CR skill development. They highlighted that nurses' limited professional expertise is associated with the ineffective use of CR during patient care.*"The development*

of CR skills should occur at high levels of cognition. Achieving high levels of cognition in turn depends on high levels of thinking skills. Nonetheless, we see that nurses have limited thinking skills"(P. 3).

1.2. Limited professional knowledge
According to the participants, one of the barriers to CR skill development among nurses is their limited professional knowledge due to their limited interest in improving their professional knowledge and their limited use of clinical guidelines and research findings. They noted that encountering with new clinical conditions does not motivate nurses, particularly novice nurses, to improve their professional knowledge. Moreover, they highlighted that nurses do not frequently use research findings, clinical guidelines, and care delivery protocols or have limited access to research findings.*"Our nurses don't have considerable up-to-date knowledge. Moreover, while research findings can help them develop their CR skills, research findings are not effectively provided to them"(P. 4).*

1.3. Insufficiency in accepting professional roles
According to the participants, nurses who consider nursing as a valuable academic profession more closely adhere to nursing values and goals feel greater commitment and responsibility toward their profession, and more actively engage in developing the status and the efficiency of their profession. They highlighted that limited job motivation, limited professional responsibility, and limited attention to the importance of professional expertise prevent nurses from accepting their professional roles and paying attention to their professional goals and expectations. The major consequences of these problems would be limited development of professional nursing skills, particularly thinking skills, and limited motivation for engaging in activities which develop CR skills and improve nursing knowledge. Thereby, nurses become dependent on

Age (years)	Gender	Education	Employment status	Coronary Care Unit (CCU) work experience (Years)	Work experience in cardiac care (Years)	Position
46	Female	PhD	Permanent official	10	7	Instructor
47	Female	PhD	Contractual	9	7	Instructor
47	Female	PhD	Permanent employment	6	12	Instructor
38	Female	Master's	Permanent official	6	3	Educational supervisor
45	Female	Bachelor's	Permanent official	5	12	Clinical supervisor
45	Female	Bachelor's	Permanent official	5	10	Nursing manager
46	Female	Bachelor's	Permanent official	1	16	Head nurse
28	Female	Bachelor's	Contractual	3	2	Nurse
35	Female	Bachelor's	Permanent official	7	6	Nurse
37	Female	Bachelor's	Permanent employment	9	6	Nurse
32	Female	Bachelor's	Permanent official	7	3	Nurse
27	Female	Bachelor's	Post-graduation mandatory service	0.90	2	Nurse
26	Female	Bachelor's	Post-graduation mandatory service	1.10	2	Nurse
28	Female	Bachelor's	Contractual	1.50	4	Nurse
46	Female	Bachelor's	Permanent official	9	15	Nurse

<p align="center">**Table 1: Participants' characteristics**</p>

Table 2: Barriers to the development of Clinical Reasoning (CR) skills among Coronary Care Unit (CCU) nurses

Subcategories	Categories	Main categories
Inability to use professional knowledge in clinical practice	Limited professional expertise	Limited professional development
Limited professional experience		
Limited metacognitive skills		
Inadequate discipline-specific knowledge	Limited professional knowledge	
Limited use of clinical guidelines		
Limited use of research findings		
Limited interest in improving their professional knowledge		
Limited job motivation	Insufficiency in accepting professional roles	
Limited professional responsibility		
Limited attention to the importance of professional expertise		
Critical conditions of patients	Routine-based practice	
Heavy workload of nurses		
Heavy documentation tasks		
Poor metacognitive skill education	Limited clinical educations	Inefficient educational program
Limited attention to the improvement of metacognitive skills Limited nursing education		
Inappropriate education strategies	Inappropriate educational planning	
Noncompliance educational materials with the nursing situations		
Noncompliance educational materials with the nurses' actual needs		
Limited exchange of information and ideas	Limited professional collaboration	Ineffective professional interactions
Limited development of participatory care		
Weak professional relationships among nurses and patients	Weak professional relationships	
Weak professional relationships among nurses and physicians		
Weak professional relationships among nurses and nursing instructors		
Weak professional relationships among nurses		
Defect in professional knowledge-based care	Limited self-confidence	Limited professional self-efficacy
Uncertain clinical decisions		
Limited self-confidence		
Limited professional autonomy	Inadequate perceived support	
Physicians' limited trust in nurses' abilities and skills		
Inadequate support of nurses		

medical staff and other healthcare providers and turn their practice into mere obedience to medical orders rather than independent practice based on professional nursing knowledge and skills. *"I see that nurses haven't understood the importance of their roles as professionals who can use sound clinical reasoning. Rather, they consider themselves as individuals who should follow medical orders"(P. 2).*

1.4. Routine-based practice

Almost all participants introduced routine-based practice as a major barrier to CR skill development among CCU nurses. According to them, the most important factors contributing to routine-based practice are heavy workload, critical conditions of patients in CCU, and heavy documentation tasks. These factors face nurses with time limitation and require them to resort to routine-based practice instead of deep thinking, CR, and reflection. *"Heavy workload in this unit leaves no opportunity for concentration, careful patient assessment, and CR. We always need to fill many different forms which reduces our interaction with patients and reduces our ability to collect necessary patient data, think about them, and implement the best care plan for patients"(P. 8).*

2. Inefficient educational program

The second main category of the barriers to CR skill development was inefficient educational program. Participants noted that CR skill development depends on educational programs that promote active learning. The two subcategories of this category were limited clinical educations and inappropriate educational planning.

2.1. Limited clinical educations

According to the participants, poor CR skill development is mainly due to the limitations of clinical educations, including poor metacognitive skill education and limited attention to the improvement of metacognitive skills and nursing skills. They highlighted that clinical nursing educations provided to them were not comprehensive and did not enable them to develop their thinking skills and

CR skills. They also highlighted that continuing education programs do not integrate courses on metacognitive skills. *"Their educational programs cannot develop nurses' high-level thinking skills because they mainly focus on main topics and skills such as arrhythmias and their management"(P. 10).*

2.2. Inappropriate educational planning

Participants believed that education about CR skills needs the use of creative and innovative teaching methods and highlighted that educational materials in nursing are not consistent with nursing situations and nurses' needs. Consequently, they recommended revisions to the nursing curriculum based on the needs of nurses and the requirements of nursing practice in clinical settings, particularly in CCU. *"Clinical education is sometimes ineffective. They don't provide educations which enable nurses to use their learning experiences in managing clinical situations in CCU"(P. 9).*

3. Ineffective professional interactions

The third main category of the barriers to CR skill development among CCU nurses was ineffective professional interactions. Participants highlighted that ineffective professional interactions prevent collective thinking, joint decision making, and the use of effective strategies for patient management. The two subcategories of this category were limited interprofessional collaboration and weak professional relationships.

3.1. Limited interprofessional collaboration

Participants reported that limited interprofessional collaboration among different healthcare providers, limited exchange of information and ideas among them, and limited professional support by healthcare providers for each other negatively affect CR skill development among nurses. For example, they considered medical staff's limited collaboration with nurses as a barrier to CR skill development and joint planning for care. *"Exchange of ideas among our physicians and nurses can considerably contribute to the development of CR skills among nurses. However, teamwork and collaboration in treatment and care programs are not strong enough among our physicians and nurses"(P. 15).*

3.2. Weak professional relationships

Participants noted weak professional relationships among nurses, nursing instructors, physicians, and patients as a major barrier to knowledge improvement, participation in care delivery, professional trust building, and professional support. Consequently, they highlighted that weak professional relationships can act as a barrier to CR skill development. According to them, CR skill development largely depends on professional relationships among nurses, nursing instructors, and physicians which help nurses obtain better understanding about patients' conditions and find more effective strategies for managing patient problems. *"Nurses who can't establish good relationships with*

patients are certainly unable to assess and manage their problems. This leads to patients' mistrust in nurses and causes them not to provide careful answers to nurses or tell them about their problems. These problems can cause difficulties in the development of nurses' CR skills" (P. 9).

4. Limited professional self-efficacy

Participants highlighted that CR skill development needs strong professional self-efficacy. By professional self-efficacy, they meant effective coping mechanisms for managing complex clinical situations which lead to better functional abilities for nurses, right clinical decisions, trust building, self-regulation, and interpersonal support. The two subcategories of this category were limited self-confidence and inadequate perceived support.

4.1. Limited self-confidence

Limited self-confidence reduces nurses' ability to have independent professional practice and is associated with inappropriate use of professional knowledge in critical situations and low care quality. Consequently, it is a major barrier to CR skill development. Moreover, limited self-confidence may cause nurses to make poor clinical decisions and commit errors, particularly in critical conditions or when workload is heavy, which can in turn endanger patient safety and reduce care quality. Participants attributed nurses' limited self-confidence to their limited professional knowledge, skills, and experience. According to the participants, limited self-confidence is mostly common among novice nurses. *"Most of our novice nurses have limited self-confidence for CR and effective patient management due to their limited professional knowledge and experience" (P. 9).*

4.2. Inadequate perceived support

Participants reported that they felt inadequate support when they wanted to use CR and make decisions in some critical clinical situations. Such inadequate support for using CR was mainly due to limited professional autonomy and physicians' limited trust in nurses' abilities and skills. *"Sometimes, physicians may see situations in our unit in which nurses have poor practice or have poor reasoning. Such situations reduce physicians' trust in nurses' abilities and cause them not to consider nurses' opinions in clinical decision making. This in turn reduces nurses' confidence in their abilities" (P. 11).*

Discussion

This study explored the barriers to the development of CR skills among CCU nurses. Findings indicated that there are different barriers to CR skill development among CCU nurses which fell into four main categories, namely limited professional development, inefficient educational program, ineffective professional interactions, and limited professional self-efficacy.

Limited professional development was one of the major barriers to CR skill development. Participants noted that

their limited professional expertise limits their ability to use knowledge, experience, and metacognitive skills in their practice, restricts their limited professional development, and hence acts as a barrier to their CR skill development. A former study also showed that in acute care conditions, poor CR skills are characterized by the inability to collect appropriate data or interpret the collected data due to poor metacognitive skills, lack of basic professional knowledge, or lack of professional experience.[21] Through using their knowledge in real practice and developing their professional knowledge through active engagement in clinical situations, nurses can develop their metacognitive skills[22] and their personal and professional expertise.

Findings also showed limited professional knowledge as another aspect of limited professional development and another barrier to CR skill development. Participants noted that nurses do not frequently use research findings and clinical guidelines in their practice and have limited interest in promoting their learning. In line with these findings, an earlier study reported that novice nurses rarely use evidence-based and guideline-based approaches for planning patient care and employing appropriate nursing interventions in real-world clinical situations.[23] Active engagement in learning and willingness to refer to learning resources for developing professional knowledge can significantly contribute to the development of CR skills.[24] Therefore, besides having discipline-specific knowledge, nurses need to eagerly develop their desire for learning[25] and update their professional knowledge based on the latest learning resources and research evidence in order to develop their professional expertise. Adequate professional expertise can in turn enable them to purposively use CR in complex clinical conditions based on adequate up-to-date knowledge.

We also found insufficiency in accepting professional roles as a barrier to CR skill development. Participants attributed such insufficiency to factors such as limited feeling of responsibility, inattention to the need for developing professional expertise, and limited professional autonomy. Two former studies also reported that reaching to an acceptable level of CR skills depends on factors such as having adequate motivation, innovation, and feeling of responsibility regarding care delivery, particularly to patients with acute and critical conditions, because these factors improve the necessary skills for thinking.[12,24] Contrarily, limited job motivation reduces the importance of professional responsibilities and skills and reduces nurses' willingness to accept different care-related responsibilities. These problems not only act as barriers to the development of nurses' professional expertise, but also reduce their interest in continuous learning and knowledge development.

Study findings also showed that critical and emergency conditions in CCU and nurses' heavy workload can reduce their ability to use CR and develop their CR skills and require them to resort to routine-based practice. Previous studies also reported that these conditions reduce the opportunities for deep thinking and reflection,[12,26] prevent the development of thinking skills, and negatively affect care quality.[27] Routine-based practice and mere obedience to medical orders are indicative of nurses' limited role performance, limited professional development, and limited attention to the use of the nursing process and the development of thinking skills.

Inefficient educational program was the second main category of the barriers to CR skill development among nurses. A main aspect of inefficient educational program was limited clinical educations for nurses. In line with this finding, two former studies showed that CR is performed based on metacognitive actions/reactions which are developed through quality education.[23,28] Certainly, CR skill development depends on comprehensive education and close attention to the development of nurses' professional knowledge and thinking skills. Accordingly, any limitation in nursing education prevents the development of professional knowledge and skills and can act as a barrier to the use of metacognitive skills in clinical practice.

Inappropriate educational planning was another aspect of inefficient educational program which acted as a barrier to CR skill development. Participants reported that the use of inappropriate teaching methods and limited congruence between educational materials and nurses' educational needs can prevent CR skill development. In agreement with this finding, several earlier studies found that educations for nurses in Iran were not based on their needs[26,29] and hence, were ineffective in significantly improving their critical thinking skills, CR skills, and clinical judgment.[26,29,30] Inappropriate educational planning, inappropriate teaching strategies, and inappropriate educational materials cannot improve nurses' CR skills, clinical decision-making ability, and clinical judgment,[26] and thereby, reduce their ability to provide quality patient care.

The third main category of the study was ineffective professional interactions. One of the subcategories of this main category was limited interprofessional collaboration. Participants' experiences showed that they had problems in exchanging information and experiences with other healthcare providers. A former study highlighted that the exchange of information and experiences as well as participatory care delivery help nurses make sound clinical decisions and provide quality care services and hence, can develop their CR skills.[13] Another study reported that fostering interprofessional collaboration facilitates the exchange of information and experiences among different healthcare providers, encourages them to provide each other with professional support, empowers them for collective thinking and reflection, improves their thinking skills, and thereby, improves their CR skills.[29]

The other subcategory of the ineffective professional interactions main category was weak professional relationships. Participants' experiences showed that nurses' weak professional relationships with patients, colleagues, physicians, and nursing instructors acted as a barrier to CR skill development. A former study noted that the process of CR needs strong relationships with patients for performing careful patient assessments, collecting adequate data and evidence, having an accurate understanding of patient conditions, and selecting the best care measures.[31] CR skill development should be an ongoing process based on personal attempt for improving skills, abilities, and attitudes and interaction with other healthcare providers. In this process, close collaboration among healthcare providers through information exchange can facilitate the effective use of evidence and appropriate decision making about the most appropriate interventions.[12,22]

The last main category of the barriers to CR skill development was limited professional self-efficacy with the two subcategories of limited self-confidence and inadequate perceived support. Participants highlighted that limited professional knowledge, skills, and experience can lead to hasty clinical decisions by nurses, reduce their self-confidence, and thereby, restrict their CR skill development. Former studies reported that nurses expect themselves to provide care based on up-to-date professional knowledge and thinking skills.[29,32] Incompetence in using professional knowledge in clinical practice not only reduces nurses' self-confidence, but also can result in inaccurate analyses, inferences, and decisions.[29] Low self-confidence can also reduce nurses' ability to perform logical CR, increase the rate of nursing errors, and thereby, undermine the trust of patients, colleagues, physicians, or other healthcare providers in nurses.[29]

Inadequate perceived support due to limited professional autonomy and limited support by physicians was the other subcategory of the limited professional self-efficacy main category. Previous studies also showed that CR skill development among nurses largely depends on their professional autonomy[12,26,29] and professional support by physicians and other healthcare providers.[26,29] Contrarily, inadequate support for nurses' CR by healthcare providers and limited trust of physicians in their metacognitive skills reduce their self-confidence, self-efficacy, and motivation for using CR in actual practice.

Conclusion

This study concludes that there are different personal, educational, professional, and interprofessional barriers to the development of CR skills among CCU nurses. Some of these barriers include limited professional development, routine-based practice, heavy workload, educational insufficiencies, limited professional interactions, limited self-efficacy and self-confidence, and limited professional support. The authorities of nursing education and management can use the findings of the present study to develop strategies for developing CR skills among nurses. Examples of these strategies are developing a coherent educational program to promote effective learning in clinical settings, facilitating nurses' professional development, improving their professional knowledge, promoting their sense of responsibility towards their professional roles, and specializing care services. Promoting interprofessional interactions and improving nurses' communication skills can also help them establish strong relationships with other healthcare providers, exchange information and experiences with them, and participate in joint care delivery. Providing nurses with strong professional support can also improve their self-efficacy. Future studies are recommended to develop programs for improving nurses' CR skills and evaluate their effects. This study was conducted in a single public heart center in the north of Iran, and hence, its findings may have limited generalizability to other settings.

Conflicts of interest

Nothing to declare.

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