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SYSTEMATIC REVIEW

Critical care nurses' role in rapid response teams: A qualitative systematic review

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Abstract

Aim: To analyse the qualitative evidence on the role of critical care nurses in rapid response teams.

Design: Qualitative systematic review.

Methods: This qualitative systematic review employed Bettany-Saltikov and McSherry's guidelines and is reported according to the Enhancing Transparency in Reporting the Synthesis of Qualitative Research checklist. Two pairs of blinded researchers screened the articles. The data were synthesised using a thematic analysis approach.

Data Sources: A systematic literature search was conducted using the CINAHL, Embase and MEDLINE databases.

Results: Seven studies were included, and three main roles were identified: (1) balancing between confidence and fear in clinical encounters, (2) facilitating collaboration and (3) managing challenging power dynamics in decision-making.

Conclusion: Critical care nurses possess extensive knowledge and skills in providing critical care to patients experiencing deterioration on general wards. They play a vital role in facilitating collaboration between team members and ward staff. Furthermore, within the rapid response team, critical care nurses assume leadership responsibilities by overseeing the comprehensive coordination of patient care and actively engaging in the decision-making process concerning patient care.

Implications for the Profession: Highlighting the central role of critical care nurses in rapid response teams as well such a team's benefits in healthcare organisations can promote applications for funding to support further quality assurance of rapid response teams and thus enhance patient safety.

Impact: Health care organisations can assure the quality of rapid response team by providing economical resources and training. The education providers should facilitate and standardise curriculum for critical care nursing students to achieve necessary knowledge and skills as members in rapid response teams.

Patient or Public Contribution: No patient or public contribution.

KEYWORDS
critical care, critical care nurse, critical care outreach team, nursing role, rapid response team, systematic review

1 | INTRODUCTION

Undetected clinical deterioration is a major cause of high mortality events in hospitalised patients, and optimising the management of inpatient complications and reducing the incidence of adverse events are critical goals for healthcare providers worldwide (Burke et al., 2022; Mora et al., 2016). Hospitalised patients often display physiological and clinical abnormalities within 24 h prior to the occurrence or cardiopulmonary arrest or unexpected death (Munroe et al., 2021; Walston et al., 2016). Although such adverse events are often preventable when the right care is delivered in a timely manner, healthcare providers sometimes fail to rescue patients from avoidable deaths (Connell et al., 2021; Considine et al., 2021).

To identify patients at risk of developing physiological instability outside of critical care units, multidisciplinary groups, such as rapid response teams (RRTs), are designed to support wards with extra clinical resources, thereby providing additional professional support at the patient bedside (Christopher-Dwyer et al., 2022). Typically, RRTs consist of a critical care nurse (CCN) or advanced clinical practice nurse (ACPN), a physician and a respiratory therapist (Alshehri et al., 2015; Williams et al., 2011). These teams respond to various critical conditions in ward-based patients, addressing issues such as respiratory distress, chest pain and acute mental changes (Kwong et al., 2021). They also exercise critical care skills, including assessing the potential need for intubation, administering complex pharmacological therapies and ensuring the appropriate transfer of patients to the proper level of care (Tracy et al., 2023; Won & Kang, 2022). Recent years have seen an increase in RRT activations that involve situations at the interface of critical care resuscitation and palliative care provision, and previous research indicates that palliative care accounts for approximately 30% of RRT interventions (Kim et al., 2020).

RRTs were first launched in Australia during the early 1990s (Chan et al., 2010). Today, these teams are established worldwide under various models, including medical emergency teams, critical care response teams and critical care outreach teams (Bingham et al., 2020; Currey et al., 2018). The underlying principle of RRTs is centred on the belief that early recognition of warning signs and timely intervention can prevent patient deterioration and mortality (Bellew et al., 2017). The RRT model encompasses three key components: (1) The afferent limb, responsible for systematic patient monitoring and deterioration detection based on predefined criteria; (2) the efferent limb, comprising the response team with expertise in managing medical emergencies; and (3) the administrative limb, focused on data collection, reporting, feedback provision and system improvement (Olsen et al., 2019). Further implementation of RRT systems requires a continuous assessment of the quality they provide. Essential to the quality and effectiveness of RRTs is the CCN, who plays a vital role in addressing medical emergencies and administering prompt critical care to patients experiencing decompensation (Massey et al., 2014; Tracy et al., 2023).

What does this paper contribute to the wider global community?

- This qualitative systematic review highlight the central role of critical care nurses in rapid response teams. Such a team's benefits in healthcare organisations can promote applications for funding to support further quality assurance of rapid response teams and thus enhance patient safety.
- Undetected clinical deterioration is a major cause of high mortality events in hospitalised patients. Rapid response teams represent a novel career pathway in critical care and may contribute to retaining critical care nurses in a field currently experiencing a nurse shortage. Synthesised information regarding the role of critical care nurses in rapid response teams may contribute to the development of education programmes, and the preparation of a standardised curriculum for future rapid response team nurses.

2 | LITERATURE REVIEW

Previous systematic reviews have investigated the impact of RRTs on patient outcomes. One systematic review and meta-analysis found inconclusive evidence regarding the effectiveness of RRTs in reducing hospital mortality rates (Chan et al., 2010), while two other systematic reviews revealed no correlation between team composition and patient outcomes (Daniele et al., 2011; Moreira et al., 2018). However, the reviews by Daniele et al. (2011) and Moreira et al. (2018) identified the significance of team members' experience, dedication and proactiveness as important factors for RRTs' performance and patient outcomes. A systematic review by Leppänen et al. (2019) found limited evidence supporting the effectiveness of simulation team training in improving the performance of RRT nurses and the team's impact on patient outcomes. Previous reviews have also investigated ward nurses' experience in collaboration with RRTs. A literature review found that ward nurses generally feel supported by RRTs but that their own level of experience influences their promptness in calling for help (Alshehri et al., 2015). Another literature review identified eight barriers impacting RRT

activation (Tilley & Spencer, 2020), for example, lack of consistent RRT education among nurses, the hospital's established hierarchy and uncertainty about when to call the RRT if the clinical deterioration is subtle or gradual rather than abrupt.

In summary, while there is considerable knowledge about healthcare providers' experience and barriers in collaborating with RRTs, there is still a significant gap in understanding CCNs specific role within these teams. Given their central position as primary responders with specialised skills (Azimirad et al., 2022), CCNs are crucial for ensuring timely interventions during medical emergencies within RRTs. A focused review on CCNs' contributions to RRTs could unveil strategies to streamline processes and optimise resource allocation, enhancing responses to urgent patient situations and understand perspectives of frontline caregivers to maximise RRT effectiveness and the quality they provide. A systematic review can bridge this knowledge gap by consolidating insights from various studies, providing a comprehensive understanding of CCNs' nuanced role within RRTs.

2.1 | Aim

The aim of this qualitative systematic review was to analyse the qualitative evidence on CCNs' role in RRTs.

3 | METHODS

3.1 | Design

A systematic qualitative review was chosen as the best design to bring together primary research regarding CCNs' role in RRTs. This systematic review employed Bettany-Saltikov and McSherry (2016) guidelines and is reported according to the Enhancing Transparency in Reporting the Synthesis of Qualitative Research checklist (Tong et al., 2012). The review protocol was not registered or published.

3.2 | Search methods

To identify qualitative studies, a systematic database search was conducted in CINAHL, Embase and MEDLINE from 1 March through 30 April 2022. The same search strategy was employed again on 22 March 2023. To enhance the review's trustworthiness (Aveyard et al., 2021; Green & Thorogood, 2018), the first author collaborated with an experienced librarian to develop a systematic literature search using a 'population, exposure and outcome' format in CINAHL, later adapting the search strategy to Embase and MEDLINE. The literature search strategy included combinations of keywords and medical subject headings and was peer reviewed by both a librarian and the last author to reduce bias (Aromataris & Pearson, 2014), see Files S1 and S2. Additionally, a manual search was conducted in the reference lists of the included articles.

3.3 | Inclusion and exclusion criteria

Table 1 shows the eligibility criteria. The qualitative studies included in this review were required to provide information regarding the role of CCNs within RRTs from the perspective of CCNs themselves.

3.4 | Search outcome

All four authors participated in screening articles to limit research bias and enhance the credibility and dependability of the findings (Harris et al., 2014). The process of screening articles was performed using Rayyan, a web-based tool that facilitates the blinding of the study selection process (Ouzzani et al., 2016). The abstracts and titles were independently screened by two pairs of authors, and then the same pair of authors assessed the full-text reports against the eligibility criteria (Table 1). Conflicts were resolved between the pairs of authors, and there was no need to consult a third author.

TABLE 1 Inclusion and exclusion criteria.

Criteria	Inclusion	Exclusion
Type of participants	Critical care nurses, intensive care nurses, advanced practice nurses, nurses or nurse specialists in rapid response teams Studies with several professions that present results from nurses separately will be included	Wards nurses. Other health professionals that participate in rapid response team
Phenomenon of interest	Critical care nurses' role when participating in rapid response teams caring for critically ill adult patients at hospital wards	Paediatric, psychiatric, other health personnel perspectives of rapid response team nurses' role
Period	From 2000 to updated search	After up dated search
Language	English, Norwegian, Swedish or Danish	All other languages

We retrieved 1609 reports after the removal of duplicates and excluded 1577 reports based on the title and abstract, leaving 32 reports that were assessed for eligibility by reviewing the full text. No reports were found through manual searches. Seven studies were included in the review. The reasons for exclusion of full-text reports are shown in Figure 1.

3.5 | Quality appraisal

The methodological quality of the included articles was assessed independently by the first and last authors using the Critical Appraisal Skills Program (CASP, 2022). The assessments made by each author were discussed, and consensus was reached (see File S3). No articles were excluded based on the quality assessment.

3.6 | Data abstraction

The first and last authors developed a standardised data extraction form in Microsoft Word that included the following data: authors, year and location; aim; design and methods; participants and setting; and findings regarding CCNs' role in RRTs. The first author extracted the data, and the last author checked for accuracy against the reports. Only text that reported CCNs' role in RRTs from CCN team members' perspective was extracted for thematic analysis (Braun & Clarke, 2022).

3.7 | Synthesis

The data set from the included reports was analysed using a inductive thematic analysis approach (Braun & Clarke, 2022), which follows a six-step process: (1) data set familiarisation, (2) data coding, (3) initial theme generation, (4) theme development and review, (5) theme refining, defining and naming and (6) writing up. Table 2 presents the steps of the synthesis. See Table 3 for examples of the thematic analysis.

4 | RESULTS

4.1 | Study characteristics

The included studies were published in the years 2009–2023 and conducted in the United States ($n=3$), Denmark ($n=1$), Canada ($n=1$), the United Kingdom ($n=1$) and Australia ($n=1$). The sample size ranged from 12 to 30 RRT CCNs for a total of 138 RRT CCNs in the seven studies (see Table 4). The study designs applied were grounded theory ($n=4$) (Kwong et al., 2021; Leach et al., 2010;

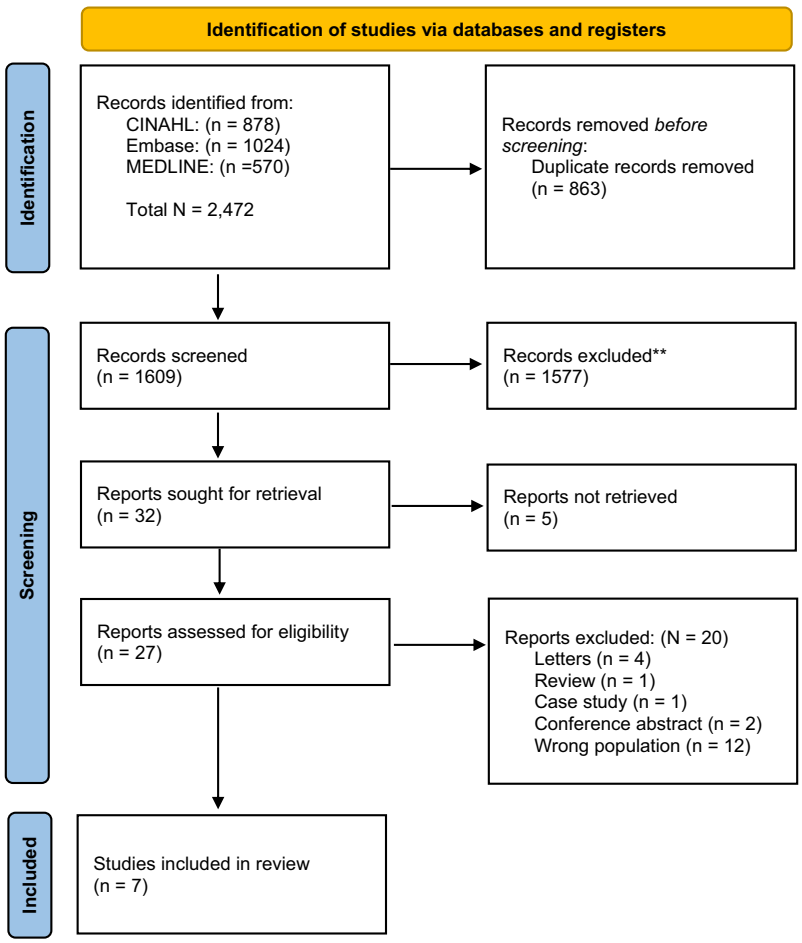

FIGURE 1 PRISMA flow diagram.

TABLE 2 The thematic analysis process.

1. Data set familiarisation	The data material was read and reread several times to ensure a deep knowledge and understanding of the data set. Researcher triangulation enhanced credibility, as the first author had extensive experience as a critical care nurse in the emergency department, and the three coauthors were experienced nurse researchers, all with clinical experience in critical and palliative care.
2. Data coding	The first author began the process of data coding. Meanings were generated from each article, and excerpts with similar meanings were clustered together to an amount of 40 codes.
3. Initial theme generation	The whole data set was examined again to search for better pattern development. The process generated 14 initial themes.
4. Theme development and review	The initial themes were re-evaluated and processed several times by the first and last author to bring out the richness and diversity in the data set.
5. Theme refining, defining and naming	Themes were refined, defined and named in collaboration with all the authors. This step included finalising the order of presenting the themes and connecting compelling examples of data to each theme. All the authors agreed on the names of the final themes.
6. Writing up	In collaboration among all the authors, the overall themes were summarised, which provided a final opportunity to ensure that the themes contributed to answering the research question.

TABLE 3 Examples of the thematic analysis.

Data	Codes	Initial themes	Main themes
'I think they get a much more rapid treatment than waiting on a physician to maybe come from their office. The rapid response team has standing orders that they can initiate, so sometimes you can have several things done before the physician even gets there. You can have blood work. You can have a chest X-ray. You can have blood gases. That's certainly beneficial, and they can transfer [the patient] to the ICU…then that's a much more earlier intervention for the patient'.	Critical care, knowledge and skills	Responding to RRT calls and preventing adverse events	Providing professional support
The RRT RN augmented, reinforced, and supported the bedside nurse. The RRT RNs' clinical expertise supplemented and supported the bedside RN to respond to a changing clinical situation and a patient at risk	Collaboration with ward nurses	Rapid response events provide a rich learning environment and enhance collective wisdom	Facilitating collaboration

Leach & Mayo, 2013; Weatherburn & Greenwood, 2023), ethnographic study ($n=1$) (Pattison et al., 2018) and multiple-case study ($n=1$) (Stolldorf, 2016); one study did not report the study design (Bunkenborg et al., 2022). All the studies employed a qualitative method with semistructured focus group interviews, semistructured individual interviews (in person and by telephone) or in-depth interviews (Table 4).

4.2 | Quality appraisal

Two studies demonstrated strong methodological rigour, with a score of 10 'Yes' answers out of 10 (Bunkenborg et al., 2022; Leach & Mayo, 2013). However, three studies lacked a proper recruitment statement, resulting in three 'Can't tell' ratings (Kwong et al., 2021; Pattison et al., 2018; Stolldorf, 2016). The study by Leach et al. (2010) did not address the researcher–participant relationship, resulting in one 'No' (see File S3).

The data synthesis revealed three themes: (1) balancing between confidence and fear in clinical encounters, (2) facilitating collaboration and (3) managing challenging power dynamics in decision-making (Table 5).

4.3 | Balancing between confidence and fear in clinical encounters

The main role of CCNs in RRTs was to provide professional support to deteriorating ward-based patients (Bunkenborg et al., 2022; Kwong et al., 2021; Leach et al., 2010; Leach & Mayo, 2013; Pattison et al., 2018; Stolldorf, 2016; Weatherburn & Greenwood, 2023). CCNs were expected to quickly respond to RRT calls and address

TABLE 4 Characteristics of the studies included.

Author, year, country	Aim	Sample and setting	Design and methods	Findings	Quality appraisal CASP
Bunkenborg et al. (2022), Denmark	To explore rapid response team RRT nurses' perceptions of what it means being a RRT nurse including their perceptions of the collaborative and organisational aspects of RRT in acute care settings	RRT nurses ($n=27$), ICU experience NR Two regional hospitals and one university hospital	Design not reported Focus group interviews Inductive content analysis	The role of RRT nurses is professionally complex and nurses fluctuate from feeling capable and rewarded to feeling uncertain and deeply challenged. RRT nurses go through professional and personal development to fulfil their role and undertake critical care skills and competencies that benefit the patients and organisation	Y: 10 C: 0 N: 0
Kwong et al. (2021), Canada	To explore the roles and interactions of CCRTs in the provision of EOLC from the perspective of CCRT members	RRT nurses ($n=12$), >5-year experience from ICU Two academic tertiary care hospitals	Modified constructivist grounded theory Semistructured focus group interviews Inductive thematic coding	RRT nurses work in the ICU and possess the skills and resources to provide EOLC during RR events. RRT nurses would benefit from having care plans and protocols for advance care planning, documentation and transitions to palliation, as these are elements that complement the role as a RRT nurse	Y: 9 C: 1 N: 0
Leach et al. (2010), United States	To investigate how RNs rescue patients in hospitals where RRTs are in place	RRT RNs ($n=16$) Six acute care hospitals	Grounded theory Semistructured individual interviews Data analysed using constant comparison methods	RRT nurses provide critical care skills, has role authority in decision-making, determine the right level of care and coach RN's during RR events	Y: 6 C: 3 N: 1
Leach and Mayo (2013), United States	To describe effectiveness of RRTs in a large teaching hospital in California that has used such teams for five years	NR ($n=17$) RRT nurses One university hospital	Grounded theory Descriptive qualitative method Semistructured individual interviews Axial coding	The role of RRT nurses involves being responsible for developing a plan of action, stabilise the patient, improve patient management and determine the right level of care. Role clarification within the team is important for the team to operate effective	Y: 10 C: 0 N: 0

TABLE 4 (Continued)

Author, year, country	Aim	Sample and setting	Design and methods	Findings	Quality appraisal CASP
Pattison et al. (2018), United Kingdom	To explore how critical care outreach team decision-making processes affect the management of transition points for critically ill, ward-based patients with a life-limiting illness	CCOT ($n=20$) Informal interviews ($n=20$) Formal interviews ($n=10$) 32 observations ($n=20$) Two hospitals	Ethnographic study In-depth interviews Thematic analysis	CCOT nurses provide critical care, participate in decision-making and determine the right level of care. CCOTs have an important role in shared decision-making, which is associated to emotional costs in relation to conflict with parent medical teams.	Y: 8 C: 2 N: 0
Stolldorf (2016), United States	To explore and compare the perceptions of nurse leaders, RRT members and RRT users regarding the benefits of RRTs	RRT nurses ($n=20$) Four community hospitals	Multiple-case study design Semistructured interviews	RRT nurses perform critical care to the patient's bedside, and RR events serve as 'teach-back' moment for RRT users	Y: 9 C: 1 N: 0
Weatherburn and Greenwood (2023), Australia	To describe and explain the role of intensive care nurse within the medical emergency team (MET) of a tertiary-level hospital to develop understanding of the intensive care nurse role, the way it is enacted, and their responsibilities within the team	Intensive care nurses ($n=13$) 6–25 years of experience One ICU unit Tertiary-level public hospital	Charmaz's constructivist grounded theory Semi structured interviews Constant comparative analysis	A fundamental part of the intensive care nurses' role in METs, is to 'keep the patient's safe', which is derived from four key concepts: (1) systematic framework for decision-making, (2) figuring it out, (3) directing care and (4) patient safety	Y: 10 C: 0 N: 0

Abbreviations: C, Can't tell; CC, critical care; CCOT, critical care outreach team; CCRT, critical care response team; EOLC, end-of-life care; MET, medical emergency team; N, NO; NR, not reported; RN, registered nurse; RR, rapid response; RRT, rapid response team; Y, YES.

TABLE 5 Findings categorised into main themes and subthemes.

Main themes	Balancing between confidence and fear in clinical encounters	Facilitating collaboration	Manage challenging power dynamics in decision making
Subthemes	Responding to rapid response team calls and preventing adverse events	Interprofessional collaboration	Leading the initial- and final part of the rapid response events
	Performing rounds consulting for high-risk patients	Rapid response events provide a rich learning environment and enhance collective wisdom	Making decisions to determine the right level of care
	Provide end-of-life care		Communicate plans for patient-centered goals

urgent situations throughout the hospital (Leach et al., 2010). Initially, they expressed fear and apprehension when receiving phone calls from ward nurses: "I thought it was nerve-wracking. I dreaded going around with that phone, and not knowing what they were calling about, I didn't know if it would be something I could handle, and yes, to that extent it took me out of my comfort zone" (Bunkenborg et al., 2022). Throughout the experience of assuming the role of RRT nurses, CCNs transitioned from feeling insecure to gaining confidence and a sense of achievement upon discovering that they could help ward-based patients (Bunkenborg et al., 2022). Another challenging aspect of responding to RRT calls was time management when CCNs were responsible for a patient or other tasks in the intensive care unit (ICU) during an RRT assignment (Bunkenborg et al., 2022).

During rapid response events, CCNs approached medical crises in a consistent and systematic manner, rapidly assessed patients' needs, developed a plan of action and initiated appropriate action to prevent escalation as well as helping to stabilise the patient's condition and document the patient's measurements and treatments (Leach & Mayo, 2013; Weatherburn & Greenwood, 2023). 'I think they get a much more rapid treatment than waiting on a physician to maybe come from their office. The RRT has standing orders that they can initiate, so sometimes you can have several things done before the physician even gets there' (Stolldorf, 2016). Being aware of the urgency and time pressure and initiating rapid action were important to ensuring that patients received necessary care without delay (Leach & Mayo, 2013; Weatherburn & Greenwood, 2023). CCNs were actively involved in performing critical care tasks, such as assessing the potential need for intubation, changing the oxygen delivery method and initiating intravenous access and fluids as well as performing blood gas analysis, monitoring the patient and administering complex pharmacological treatment (Kwong et al., 2021; Leach et al., 2010; Pattison et al., 2018; Stolldorf, 2016). Throughout these interventions, CCNs also strove to maintain the patients' psychological well-being (Weatherburn & Greenwood, 2023).

CCNs also took a proactive role by performing regular rounds on the wards to pre-emptively identify high-risk patients, and they took the initiative to conduct rounds on each shift, which were used for consultation between CCNs and ward nurses (Leach & Mayo, 2013): 'I make rounds with them [bedside nurses]—they're comfortable and able to come to me and discuss [concerns about patients] without feeling intimidated' (Leach & Mayo, 2013). CCNs also aimed to support ward nurses and physicians in feeling confident with care plans and feeling in control of the clinical situation (Bunkenborg et al., 2022).

The provision of end-of-life care (EOLC) was also part of CCNs' role in giving professional support. The CCNs felt that they possessed the experience and skills to provide EOLC and felt confident in knowing when to proceed from critical care treatment to EOLC (Bunkenborg et al., 2022; Kwong et al., 2021; Pattison et al., 2018). Although CCNs often managed situations that proceeded to EOLC, however, they were uncertain as to whether this was part of their mandate in the RRT (Bunkenborg et al., 2022; Kwong et al., 2021; Pattison et al., 2018).

4.4 | Facilitating collaboration

CCNs played a role in facilitating collaboration within RRTs, working closely with other RRT members, ward nurses and physicians (Bunkenborg et al., 2022; Kwong et al., 2021; Leach et al., 2010; Leach & Mayo, 2013; Pattison et al., 2018; Stolldorf, 2016; Weatherburn & Greenwood, 2023). The CCNs acknowledged the importance of contributing to the cultivation of a positive, respectful relationship with RRT members (Weatherburn & Greenwood, 2023). When responding to emergencies, CCNs described approaching ward nurses with an open mind and respecting and valuing their judgement in patient situations (Bunkenborg et al., 2022). CCNs and ward nurses complemented one another in their collaboration to provide critical care and to understand patients' wishes (Leach et al., 2010; Weatherburn & Greenwood, 2023). This collaborative approach benefited patient care and gave CCNs a sense of fulfilment (Bunkenborg et al., 2022).

Teaching and coaching were integral parts of the CCNs' role in the RRT. CCNs used emergencies as opportunities for learning (Leach et al., 2010; Pattison et al., 2018). A CCN compared rapid response events to a 'live lab':

> It's not a simulation, it's the real thing, and even if [RRT members] are not talking and doing a didactic teaching, the [RRT user] nurses are watching them and they're watching how they do an assessment, and they watch the communication. They hear the communication with the physician, so it is a very rich

learning environment for the next event, next patient (Stolldorf, 2016).

4.5 | Providing leadership by challenging power dynamics in decision-making

CCNs played a crucial role in providing leadership during rapid response events, sharing responsibility with physicians and taking charge of the events' initial and final phases (Kwong et al., 2021; Leach & Mayo, 2013; Pattison et al., 2018; Stolldorf, 2016). When faced with a physician's discomfort in a given situation, CCNs frequently assumed a leadership role, providing suggestions and guidance for patient care (Kwong et al., 2021): 'The CCOT nurse continued to lead, in a gently assertive way, reassuring the patient throughout' (Pattison et al., 2018). However, according to the nurses, this shift in leadership made some physicians feel threatened, leading to reluctance in calling for RRTs for deteriorating patients (Leach & Mayo, 2013).

Another element of CCNs' role was engagement in decision-making in relation to patient treatment, rescue efforts and determining the right level of care (Bunkenborg et al., 2022; Leach et al., 2010; Leach & Mayo, 2013; Weatherburn & Greenwood, 2023). Although CCNs felt empowered to influence and make decisions, they sometimes encountered differing perceptions from physicians, who expected them to provide care without questioning treatment intentions (Pattison et al., 2018). Challenging power dynamics had a strong emotional impact on CCNs (Pattison et al., 2018). During rapid response events leading to EOLC, CCNs often found that physicians had not initiated discussions about EOLC or discussed the patient and family's wishes in advance, prompting CCNs to raise the topic early in such events (Bunkenborg et al., 2022). A CCN stated, 'Some teams already have a plan in place and openly discuss that with you, but quite often we come up against hurdles where we have to instigate the discussion, which is often brushed under the carpet' (Pattison et al., 2018). Challenging power dynamics and initiating discussions regarding EOLC treatment significantly affected CCNs emotionally (Pattison et al., 2018).

Clearly communicating patient-centred goals constituted an integral part of CCNs' role in RRTs. They provided information on critical illness prognosis, accurately explained the implications of critical care interventions and effectively communicated realistic, patient-centred care plans (Bunkenborg et al., 2022; Kwong et al., 2021; Weatherburn & Greenwood, 2023). The CCNs emphasised the importance of clearly conveying to family members the nature of treatments, particularly the discomfort and invasiveness associated with certain procedures (Kwong et al., 2021), so as to help families make informed decisions (Pattison et al., 2018). Said one CCN:

> I've often said this to residents, is, 'You know, you can't just say, we're going to help them. Do you want us to help your family member?' Because everyone is going to say yes, we do. But if you say, you know, we're going to put them on life support, they may never come off life support. They will not be able to talk to you or eat. When you start saying those words, then suddenly [the] family, oh wait a minute, no they wouldn't want this. No, no, no. (Kwong et al., 2021).

5 | DISCUSSION

This qualitative systematic review synthesised evidence regarding the role of CCNs in RRTs. Three novel themes emerged: (1) balancing between confidence and fear in clinical encounters, (2) facilitating collaboration and (3) managing challenging power dynamics in decision-making.

Our review suggests that CCNs in RRTs play an important role by providing professional support to deteriorating ward-based patients when responding to RRT calls as well as in preventing adverse events. Won and Kang (2022) developed a comprehensive model of the RRT nurse's role that includes screening patients with acute clinical conditions, providing professional support for emergencies, offering consultation and managing high-risk patients. Currey et al. (2018) emphasise skills in responding to clinical deterioration as the most vital competence in caring for decompensated ward-based patients. Although the present review's findings indicate that CCNs possess excellent critical care knowledge and skills, the results also highlight their feelings of insecurity and stress when transitioning into the role of RRT nurses. CCNs expressed fear and apprehension when receiving phone calls from ward nurses, as they were uncertain about the nature of the calls and whether they would be able to manage the situation. The presence and support of an ICU physician and the assurance of receiving assistance emerged as vital elements in shaping CCNs' positive perceptions of their role in RRTs (Currey et al., 2018).

Our findings also suggest that responding to RRT assignments could pose conflicts in which CCNs had to leave patients and other responsibilities in the ICU to manage emergencies on the wards. An integrative review by Fildes et al. (2022) found that CCNs often had to provide patient care in the ICU while simultaneously responding to RRT calls throughout the hospital. Although the CCN's presence on the wards was important to prevent adverse events, the CCN's absence from the ICU could result in its understaffing. Such a dual role may challenge CCNs' capacity to provide professional support to ward nurses and could lead to adverse incidents in the ICU. The dual role as ICU and RRT nurse suggests a need to carefully examine future staffing models for both ICUs and RRTs, a consideration that seems crucial to ensure effective support and prevent negative outcomes in both settings.

The CCNs emphasised the importance of taking ward nurses' concerns seriously, and they bore in mind that their world in the ICU looked different to that of general wards. Astroth et al. (2013) explored ward nurses' decision-making process when activating RRTs and found that RRT nurses validated the concerns of ward nurses regarding patients' conditions and offered their expertise.

Most of the RRT nurses were perceived as supportive and empathetic in the meeting with ward nurses, and they occasionally used humour to defuse tense situations and minimise ward nurses' feelings of stress (Astroth et al., 2013). In contrast, Astroth et al. (2013) report that some ward nurses expressed reluctance to activate RRTs. When RRT members asked questions to obtain information about the patient, the ward nurses perceived their communication style as abrupt and disconcerting. Further, some RRT members informed the ward nurses that the ICU was at capacity, with no available beds for patient transfers. Consequently, the ward nurses hesitated to divert CCNs from critically ill patients in ICUs. Additionally, unrealistic expectations, demands and complaints from RRT nurses deterred ward nurses from calling RRTs again (Astroth et al., 2013; Olsen et al., 2019). This communication process should be underpinned by the assurance that the RRT will respond with professionalism and mutual respect as highlighted by Moriarty et al. (2014). Providing up-front RRT mentorship to ward nurses appears to be crucial for establishing a foundation of guidance and acceptance.

Our findings suggest that CCNs in RRTs also play the role of facilitating collaboration with ward nurses and physicians during rapid response events by assisting in assessment, intervention, stabilisation and, if needed, transferring patients to a higher level of care. In contrast, a study by Benin et al. (2012) reports that the implementation of an RRT system increased conflicts between staff nurses and physicians. The physicians perceived the activation of RRTs as inappropriate, deeming themselves to be better suited to care for the patient. Staff nurses, however, viewed the activation of RRTs as an opportunity to have another set of experienced eyes and hands examine the patient, but tension emerged from physicians' perceptions that a call to the RRT implied a failure on the physician's part. Astroth et al. (2013) found that, fearing reprimands, ward nurses would not call for the RRT if a physician was close by. However, ward nurses experienced situations in which they could not contact physicians or felt that the situation was too critical to wait for the physician to respond.

Another important finding of this review concerns CCNs' role as teachers and coaches during RRT events. When emergencies occurred on the wards, the CCNs perceived the situation as a learning opportunity for both ward nurses and ward physicians. Seeing evidence of learning, as when ward nurses had already stabilised the patient by the time of the RRT's arrival, gave CCNs great professional satisfaction. Previous studies support CCNs' significant role of teaching and coaching ward staff during clinical cases (Benin et al., 2012; Topple et al., 2016; Williams et al., 2011). Ward nurses and ward physician profited from continual exposure to emergencies, allowing them to maintain up-to-date skills, and ward nurses used rapid response events to enhance knowledge and improve nursing skills (Benin et al., 2012; Topple et al., 2016; Williams et al., 2011). However, Benin et al. (2012) reveal that, in the fast-paced assessment and treatment environment of RRTs, experienced physicians often assumed leadership, leaving interns feeling excluded and deprived of learning opportunities. The majority of ward nurses in Jackson et al. (2016) study disagreed with the notion that using RRTs would impair the skills necessary to manage critically ill patients. However, ward nurses were uncertain as to whether the RRT members would teach and guide them to handle urgent situations in the future.

The findings of this review suggest that CCNs provided leadership during rapid response events, sharing responsibility with physicians but also challenging power dynamics within the team. Team leadership influences RRTs' effectiveness on patient outcomes (Olsen et al., 2019), and CCNs are expected to demonstrate effective leadership skills and analytical ability to improve patient outcomes (Egerod et al., 2021; Jenkins & Lindsesy, 2010). An RRT leader who was an 'information gatherer and willing to have a dialogue' enhanced the functioning of the RRT, whereas a lack of clear leadership could result in chaos (Olsen et al., 2019). Leadership skills—such as role modelling, advocacy and being approachable, collaborative and supportive—could be essential for CCNs in RRTs (Currey et al., 2018). Colman et al. (2019) report that simulation-based team training improved team members ability to provide leadership by practicing non-technical skills, such as leadership identification, role clarity and communication. Our review also found that CCNs provided leadership if the physician seemed uncomfortable with the situation at hand. Some physicians, however, perceived CCNs' leadership role as threatening, resulting in their avoiding calling for RRTs. Education and simulation-based team training represent one measure to enhance leadership competence, reduce hierarchical culture and eliminate barriers to activating RRTs (Colman et al., 2019).

CCNs' role in RRTs included their engagement in decision-making in relation to patient treatment, rescue efforts and determining the right level of care. A study by Nibbelink and Brewer (2018) found that experience in clinical practice influenced perceptions of decision-making regarding patient treatment and the right level of care, leading to increased self-confidence and enhancing nurses' ability to ask questions, consider options for patient care, implement interventions and trust their competence. Nevertheless, not knowing the patient and medical history in advance of an RRT call was sometimes perceived as a barrier in relation to decision-making (Olsen et al., 2019). Situations in which the RRT served to escalate patient care to the most experienced physicians caused physician learners to miss opportunities to gain experience in decision-making processes, which is a central part of learning to be an independent doctor (Benin et al., 2012).

Whenever a rapid response event proceeded to EOLC treatment, an important role of the RRT nurse was to support the patient and family through palliative care (Bouley, 2011). However, RRT nurses faced various challenges regarding early discussions and treatment. Kim et al. (2020) found that recommendations from the RRT did not always match patients' and families' wishes. Furthermore, the patient's capacity to make informed decisions about EOLC was sometimes compromised due to a general reluctance to disclose the disease due to fear of the potential significant impact, which could burden the patient.

5.1 | Strengths and limitations

A strength of this review was the comprehensive search for published articles in close collaboration with an experienced librarian. Further, the study selection and data extraction were independently screened by two pairs of authors. The three databases used (CINAHL, Embase and MEDLINE) are widely recommended for international nursing research. Another strength is that we made a concerted effort to mitigate criticisms of qualitative reviews by providing rich, detailed descriptions of the phenomena under investigation. Additionally, we employed a rigorous data analysis to enhance the credibility and trustworthiness of our findings.

The inclusion criteria were limited to studies published in the Norwegian, Swedish, Danish and English languages, potentially omitting important reports and introducing reporting bias. The included studies were conducted in Western countries, so factors such as socioeconomic conditions, politics and culture may have influenced the data collection and interpretation in the included studies. This review was limited to the role of CCNs within RRTs from the perspective of CCNs themselves. However, other healthcare providers and patients may have other views regarding the role of CCNs within RRTs. We choose not to include grey literature as it often lacks the rigorous peer review process; however, it can be considered a limitation as this kind of publications may contain insights and information not captured in peer-reviewed publications. Another limitation may be that the protocol was not registered in PROSPERO. However, the inclusion and exclusion criteria were defined before the database search, and the study selection process were performed.

6 | CONCLUSION

RRT systems aim to meet and address complex health issues, requiring quality assurance for successful development and implementation. CCNs play a key role in RRTs, navigating between confidence and apprehension in clinical encounters and managing decision-making dynamics. Despite their expertise, CCNs face challenges and uncertainties, particularly in responding to RRTs calls.

Support from hospital management is essential for efficient RRT operation, including adequate staffing, role clarification and interdisciplinary collaboration. Regular simulations sessions enhance critical care skills and teamwork. However, further research may explore the need for additional education among RRT members to improve intervention quality and mitigate negative stressors. CCNs with a master's degree are educated to initiate practice change, lead quality improvement projects, and can thus be leveraged in the work of developing and implementing RRT systems.

7 | RELEVANCE TO CLINICAL PRACTICE

Insights into the involvement of CCNs within RRTs could facilitate development of educational programs and the establishment of standardised training curricula for future RRT nurses. Additionally, RRTs offer a career progression pathway in critical care, potentially contributing to the retention of CCNs amidst the ongoing nursing shortage. By emphasising the significance of CCNs in RRTs and their positive impact on healthcare organisations, there is potential to gather funding support for further quality assurance initiatives and ultimately enhance patient safety.

AUTHOR CONTRIBUTIONS

CH was responsible for conceptualisation, methodology, formal analysis, investigation, writing the original draft and visualisation. MHL and SAS contributed to methodology, formal analysis, investigation, writing (review) and editing. MTS contributed to conceptualisation, methodology, formal analysis, investigation, writing (review), visualisation, editing and supervision.

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CONFLICT OF INTEREST STATEMENT

The authors have no conflict of interest to declare.

DATA AVAILABILITY STATEMENT

All the data are publicly available, as they were generated from published qualitative studies in peer-reviewed scientific papers.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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