ISSN: 2966-4837

Brazilian Journal of Respiratory, Cardiovascular and Critical Care Physiotherapy
Jornal Brasileiro de Fisioterapia Respiratória, Cardiovascular e em Terapia Intensiva

Importance and implementation strategies of a rapid response team in non-critical hospital units: review and experience report of a philanthropic hospital

Importância e estratégias de implementação de um time de resposta rápida em unidades hospitalares não críticas: revisão e relato de experiência de um hospital filantrópico

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How to cite: Pereira Neto WC, Azevedo FM, Paiva LC, Sena LA, Americano CV, Evangelista DG, et al. Importance and implementation strategies of a rapid response team in non-critical hospital units: review and experience report of a philanthropic hospital. Brazilian Journal of Respiratory, Cardiovascular and Critical Care Physiotherapy. 2026;17:e00242025. https://doi.org/10.47066/2966-4837.e00242025en

Submitted on: February 15, 2025
Accepted on: January 08, 2026

Study carried out at: Santa Casa de Misericórdia de Juiz de Fora, Juiz de Fora, MG, Brasil.

Ethical approval: CAAE: 83393924.2.0000.5139, Santa Casa de Misericórdia de Juiz de Fora, nº 7.150.485.

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Abstract

Background: In recent years, healthcare institutions have been dedicated to improving the quality of care and patient safety. However, adverse events are still common. In this context, the Rapid Response Team (RRT) emerges as a promising intervention to improve patient safety and enable early interventions. **Aim:** The objective of this study was to review research on the composition, activation criteria, and impact of RRTs in healthcare institutions, as well as to report the experience of implementing an RRT composed of a physiotherapist, physician, and nurse in a philanthropic hospital. **Methods:** This study was conducted using a combined methodology, which included a narrative review and an experience report. The review covered studies on the structure, activation criteria, and impact of RRTs. The experience report described the strategies implemented, such as quality indicators and technological tools. **Results:** In 2022, the RRT at the analyzed hospital conducted 3,586 calls, with 83.41% of patients remaining in the ward, 8.39% awaiting an ICU bed, and 6.78% being admitted to the ICU. Only 0.75% of cases resulted in death. These findings demonstrate a significant reduction in unplanned ICU transfers, highlighting the importance of early intervention. **Conclusion:** RRTs can improve hospital management and patient safety. Their implementation and adaptation to the local context are essential to ensure their effectiveness.

Keywords: Multidisciplinary Care Team; Patient Safety; Rapid Response Team.

Resumo

Introdução: Nos últimos anos, instituições de saúde têm se dedicado a aprimorar a qualidade assistencial e a segurança do paciente. No entanto, eventos adversos ainda são frequentes. Nesse contexto, o time de resposta rápida (TRR) surge como uma intervenção promissora para melhorar a segurança do paciente e possibilitar intervenções precoces. **Objetivo:** Revisar pesquisas sobre a composição, os critérios de ativação e o impacto dos TRRs em instituições de saúde, além de relatar a experiência da implementação de um TRR composto de fisioterapeuta, médico e enfermeiro em um hospital filantrópico. **Métodos:** Estudo conduzido com metodologia combinada, incluindo uma revisão narrativa e um relato de experiência. A revisão abordou estudos sobre a estrutura, os critérios de ativação e o impacto dos TRRs. O relato de experiência descreveu estratégias implementadas, como indicadores de qualidade e ferramentas tecnológicas. **Resultados:** Em 2022, o TRR do hospital analisado realizou 3.586 atendimentos, dentre os quais 83,41% dos pacientes permaneceram na enfermaria, 8,39% aguardaram leito de UTI e 6,78% foram admitidos na UTI. Apenas 0,75% dos casos resultaram em óbito. A implementação do TRR contribuiu para a redução significativa de transferências não planejadas para a UTI, melhorando a segurança do paciente. **Conclusão:** Os TRRs podem otimizar a gestão hospitalar e a segurança do paciente. Sua implementação e adaptação ao contexto local são fundamentais para garantir sua efetividade.

Palavras-chave: Equipe Multiprofissional; Segurança do Paciente; Time de Resposta Rápida.

INTRODUCTION

In recent years, healthcare institutions have been committed to improving the quality of care and patient safety. However, adverse events are still common in hospital environments, contributing to unfavorable outcomes. The literature shows that up to 80% of critically ill patients show signs of clinical deterioration up to eight hours before fatal events, and healthcare teams fail to recognize hemodynamic and respiratory instabilities[1-3].

The quality of hospital care is often hindered by incomplete assessments, interprofessional communication problems, and limitations in patient management in non-critical units, which are aggravated by overcrowding or a shortage of beds in intensive care units (ICU)[4-6]. Thus, strategies are needed to address these issues and ensure early intervention in patients at risk of clinical deterioration[7].

In this context, rapid response teams (RRT) emerge as a promising intervention. These teams were first implemented in 1994 in Australia, and they perform specialized interventions in the face of early signs of deterioration in hospitalized patients, especially in non-critical hospital units[8]. Although the RRT is widely adopted in several countries, including Brazil and the United States, the literature lacks information about its impact on clinical outcomes[9-11].

Thus, this study aimed to review the available evidence on Rapid Response Teams (RRTs) and to report on the implementation experience in a tertiary hospital in Brazil, highlighting adopted strategies, challenges faced, and contributions to patient safety. The underlying hypothesis is that the presence of the RRT can influence relevant clinical outcomes by enabling early identification of patient deterioration and reducing adverse events during hospitalization.

METHODS

This study employed a combined methodology, consisting of a narrative review and an experience report, to analyze the implementation and results of the Rapid Response Team (RRT).

A literature review was conducted using the PubMed, SciELO, Scopus, and Lilacs databases with the descriptors "rapid response team," "clinical deterioration," and "patient safety," and their Portuguese counterparts: "time de resposta rápida," "deterioração clínica," and "segurança do paciente." The search strategy included articles published between 2000 and 2024. Regarding the types of studies, for the narrative review, all study designs available in the databases were considered. The selection of studies was based on their relevance to the topic and the availability of the full text, regardless of the year of publication. Studies were excluded if they were duplicates or did not directly address the central themes of the research, such as activation criteria or triggers for RRTs, outcomes related to RRT performance, patient safety, RRT organization, and aspects related to automation and vital signs monitoring.

The experience report was based on data collected at the Santa Casa de Misericórdia de Juiz de Fora Hospital, in Minas Gerais, Brazil, focusing on the implementation of the RRT and its outcomes. Data from RRT care provided between January and December 2022 were analyzed, including the frequency of calls, outcomes, and indicators related to cardiopulmonary arrest, decreased level of consciousness, acute respiratory insufficiency, sepsis, and shock. RRT procedures were described, and absolute values and percentages were provided. Ethical approval was granted by the research ethics committee of the Santa Casa de Misericórdia de Juiz de Fora (No. 7.150.485).

RESULTS

The search in the databases resulted in 359 studies; two duplicates were removed. Next, the titles and abstracts were reviewed, and 339 studies were excluded because they lacked thematic relevance (lack of use of RRT in non-critical units), focused on inappropriate populations (patients in ICU or emergency services), or did not analyze clinical outcomes. As a result, 18 studies were selected for full reading; all were included in the review. Further details regarding the article selection strategies can be seen in the PRISMA flowchart (Figure 1).

Literature review

Patient safety: Patient safety is fundamental to the quality of healthcare and involves practices to prevent adverse events, hospital-acquired infections, professional errors, and communication failures[12-15]. In the United States, preventable failures caused up to 100,000 deaths annually in the early 2000s[16]. In response, the Institute for Healthcare Improvement launched the "100,000 Lives Campaign" in 2004, which saved more than 122,300 lives in two years and inspired the "5 Million Lives Campaign"[17,18]. Among the strategies, the RRT stood out by its early and standardized intervention on signs of clinical deterioration, reducing unexpected deaths, especially in general wards[19]. Thus, RRT ensures care similar to that of the ICU, strengthening patient safety. In Brazil, the *Programa Nacional de Segurança do Paciente* (Ordinance no. 529/2013) was developed in partnership with Fiocruz and ANVISA to create essential safety protocols according to Ordinances no. 1377 and 2095, promoting safe practices in public and private institutions[20]. The RRT reduced unexpected deaths and improved clinical outcomes by quickly identifying and managing critical conditions, which became an essential strategy for raising standards of care and ensuring patient safety[17,21].

RRT: The RRT comprises healthcare professionals (nurses, doctors, and physiotherapists) with certification in Advanced Cardiac Life Support, experience in intensive care or emergency, and skills in communication and teamwork[22,23].

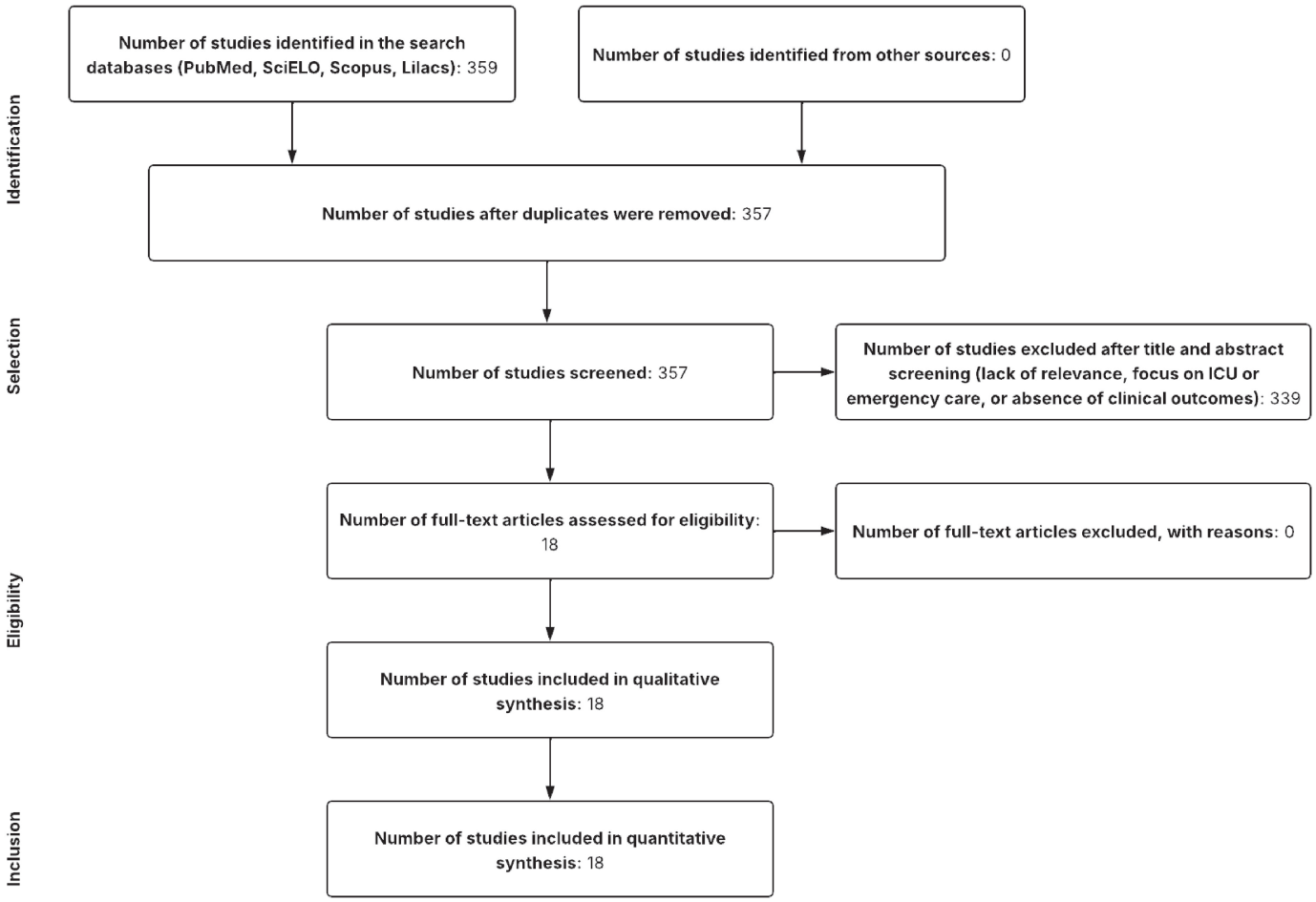

Figure 1. PRISMA flowchart of article selection in the review.
Source: Elaborated by the authors.

Although the ideal leadership or composition of RRT is not a consensus, nurse leadership is more cost-effective, while physician leadership offers greater autonomy. Rapid action is crucial for success, with ideal times of 2 to 5 minutes for activation and up to 25 minutes to define conduct. RRT conducts interventions, such as ventilatory support, prescribing medication, central punctures, and preventive actions in risk groups (post-surgical patients), reducing cardiac arrests and increasing patient safety[24-27]. The work of RRT also involves ethical decisions and palliative care, prioritizing symptom relief in some cases. Given the difficulty in distinguishing avoidable deaths from those unavoidable, mortality is not the only performance indicator. In these cases, alternative indicators (e.g., early identification of clinical deterioration and appropriateness of ICU referrals) are more appropriate[28-31]. Effective implementation of RRT requires three main components: early detection, response, and stabilization[17,32,33].

Characteristics of RRT: RRT is essential to patient safety and preventing hospital adverse events. Their effectiveness is linked to fundamental characteristics, such as action throughout the organization, the ability to bypass traditional hierarchies, and focus on the needs of patients. Front-line doctors manage the RRT, which works independently with the help of managers and organizational policymakers to align institutional objectives. Moreover, RRT operates in real-time to identify and manage critical conditions, regardless of the initial clinical cause, to prevent serious outcomes. They also measure response time and clinical outcomes to ensure agile and standardized interventions and improve quality and safety in the hospital environment[19].

Trigger criteria of the RRT: Early warning scales (EWS), such as the Modified Early Warning Score (MEWS) and National Early Warning Score 2 (NEWS2), are essential tools for detecting signs of clinical deterioration and triggering the RRT, attributing scores that indicate risk levels based on blood pressure, heart rate, respiratory rate, and peripheral oxygen saturation. MEWS recommends activating RRT for scores ≥ 4, while NEWS2 suggests emergency response for scores > 7, focusing on intensive care. These tools help identify early patients at risk and make urgent decisions; however, professional inexperience and fear of criticism may limit their effectiveness. Studies confirm that EWS is useful for predicting complications in patients recently discharged from the ICU, promoting more precise and effective interventions[34,35].

Automation and continuous monitoring of vital signs: Technology use in the continuous monitoring of vital signs is effective in the early identification of clinical deterioration, allowing rapid responses using automated alert systems that analyze blood pressure, respiratory rate, and level of consciousness. At OSF St. Joseph Medical Center in Illinois (USA) in 2007, the implementation of an automated report integrated with electronic medical records increased calls to the RRT and reduced serious complications outside the ICU[36]. In the Netherlands, a study of 2,303 patients showed that wearable devices connected to hospital systems reduced unplanned ICU admissions and RRT calls, highlighting the effectiveness of automation in early detection and intervention[37].

Experience report of an RRT in a large hospital

The Santa Casa de Misericórdia de Juiz de Fora Hospital is a philanthropic hospital and a reference for a macro-region. Of its 508 beds, more than 70% are allocated to the Unified Health System, and 50 are ICU beds distributed between general, surgical, cardiology, and one is for the pediatric population.

The project to implement the RRT began in 2011 after the growing number of patients waiting for ICU admission was noticed. In 2012, the RRT was launched as a pilot project, consisting of a coordinating doctor, nurse, resident doctors, and hospitalists operating from 1 to 7 p.m., Monday to Friday. The main metrics evaluated included the call numbers, time response, call results, hospital mortality rate, and how the RRT was activated. The main milestones in the implementation and evolution of the RRT at Santa Casa de Misericórdia de Juiz de Fora can be seen in the figure below (Figure 2).

Given the initial success and positive results, the RRT was permanently incorporated into the hospital in July 2013, operating 24 hours a day, seven days a week. The team comprised a coordinating doctor, four nurses, five physiotherapists, resident doctors, and hospitalists. New indicators were established to measure the quality of care, including frequency and types of care, routes and places of call, response time, the reason for the call (cardiopulmonary arrest, decreased level of consciousness, acute respiratory insufficiency, sepsis, and shock), associated comorbidities, and outcomes of care (ICU referral, stay in a ward, or death).

The RRT at the Santa Casa de Misericórdia Hospital in Juiz de Fora serves all the beds of the institution, except the ICU. The team is activated by an exclusive extension from the switchboard, which communicates with team members via corporate telephones. According to the quarterly indicators, the ideal time to start the service is up to three minutes, which is usually achieved. When this time is not reached, the causes are assessed, and measures are implemented to improve the process.

The RRT is triggered based on a table (Figure 3) adapted from the MEWS, which was trained and disclosed to the entire care team. The table establishes clear criteria for triggering: patients with zero points remain under observation; with 1 point, a nurse assesses and triggers the RRT if needed; with 2 points or any other clinical change indicating instability, the RRT is triggered immediately.

Most patients treated by the RRT at the institution in 2022 were older adults, with 42.66% aging over 75 years, 20.71% between 65 and 74 years, and 36.63% under 65 years, reinforcing the profile of high severity of care. In addition,

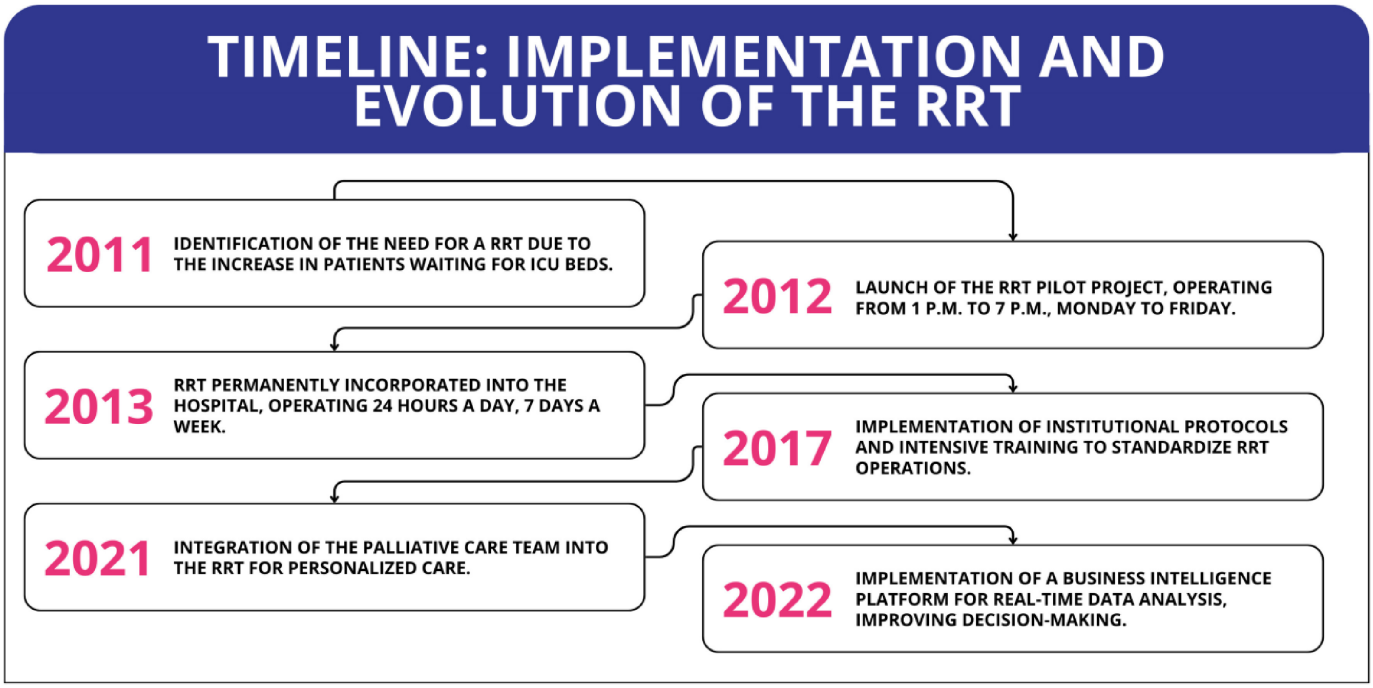

Figure 2. Timeline of the implementation and evolution of the RRT at the institution (2011-2022).
Source: Elaborated by the authors.

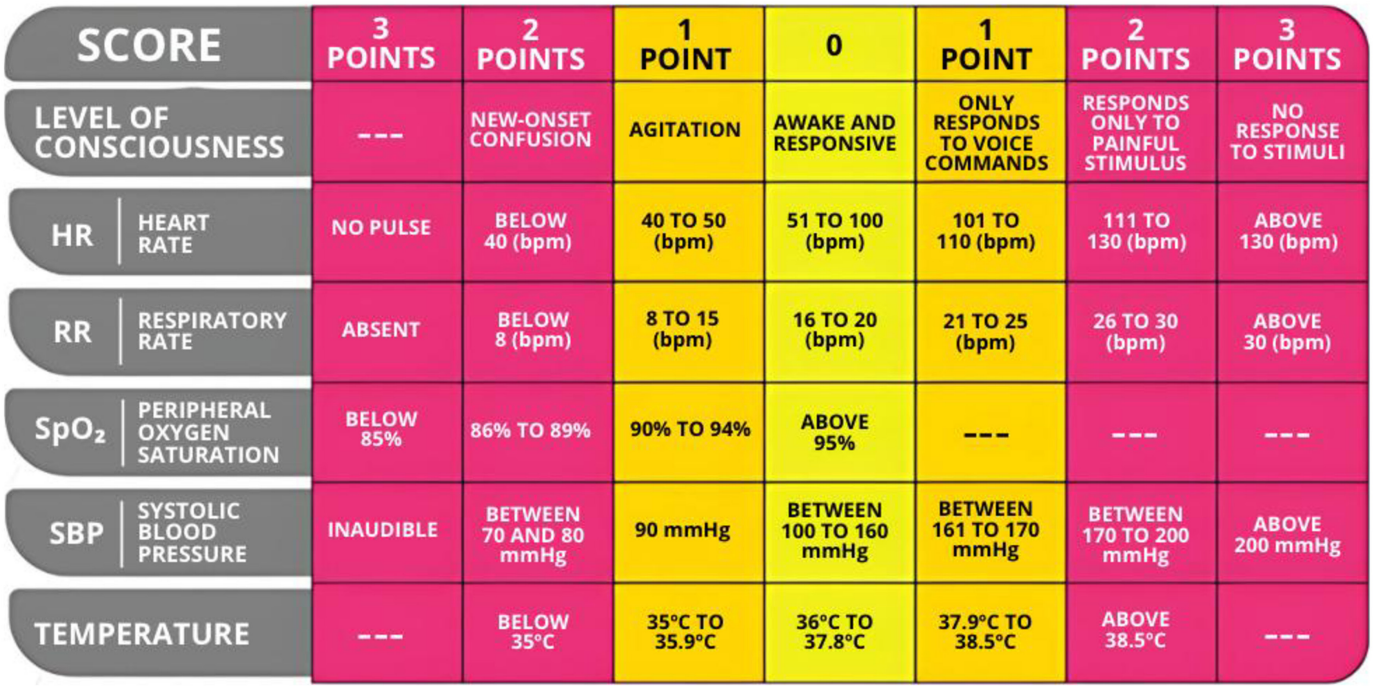

Figure 3. Criteria for triggering RRT in hospital.
Source: Elaborated by the authors.

many patients had significant comorbidities, including systemic arterial hypertension (28.76%), diabetes mellitus (15.16%), cardiovascular diseases (14.08%), and neurological diseases (12.27%). Other conditions included kidney disease (8.66%), cancer (3.97%), chronic obstructive pulmonary disease (5.78%), and 8.06% classified as "other" (Table 1).

Professionals responsible for caring for potentially serious patients often deal with situations of clinical instability and must assess whether the deterioration is reversible. Data from the National Confidential Inquiry into Patient Outcome and Death report showed that 62.00% of patients hospitalized with cardiac arrest had physiological instability for six hours or more before the event[2].

At the institution, a survey of the main etiologies of care resulted in the creation of the CDASS mnemonic (Figure 4), which includes cardiopulmonary arrest, decreased level of consciousness, acute respiratory insufficiency, sepsis, and shock as central criteria for identifying and managing clinical deterioration.

Specific protocols, prescriptions, and evolutions for each CDASS component have been developed and disclosed to all healthcare professionals. Since the second half of 2022, these protocols have included online training to improve qualification and standardize care. The training improved the early identification of cases, resulting in more effective and higher-quality care. Moreover, less than 20% of patients were referred to ICU after CDASS care. This finding highlights the importance of timely identification and rapid response to critical deterioration, which may reduce mortality, ICU admissions, and cardiac arrest rates[38].

Table 1. Characteristics of patients treated by RRT (n=3.586).

Characteristic	Value
Age	68,8 ± 12,2
Systemic Arterial Hypertension	1,031 (28.76%)
Diabetes Mellitus	543 (15.16%)
Cardiovascular Diseases	504 (14.08%)
Neurological Diseases	439 (12.27%)
Renal Diseases	310 (8.66%)
Cancer	142 (3.97%)
Chronic Obstructive Pulmonary Disease (COPD)	207 (5.78%)
Other Comorbidities	288 (8.06%)

Legend: Values are expressed as mean ± standard deviation or absolute frequency (percentage). The table presents the distribution of the main clinical characteristics of patients treated by the RRT.
Source: Elaborated by the authors.

Of the 3,586 treatments conducted by the RRT in 2022, 83.41% of patients remained in the ward after treatment, 8.39% waited for an ICU bed, and 6.78% were admitted to the ICU. Only 0.75% of cases resulted in death, and 0.67% had ICU requests suspended. These data show the efficiency of RRT in the early identification and management of clinical deterioration, reducing the need for ICU referrals.

The RRT is also responsible for several types of care, including monitoring patients in the first 48 hours after discharge from the ICU. This follow-up, which corresponds to 82.97% (1739) of the care provided, is essential to ensure continuity of care, reduce the risk of early readmission,

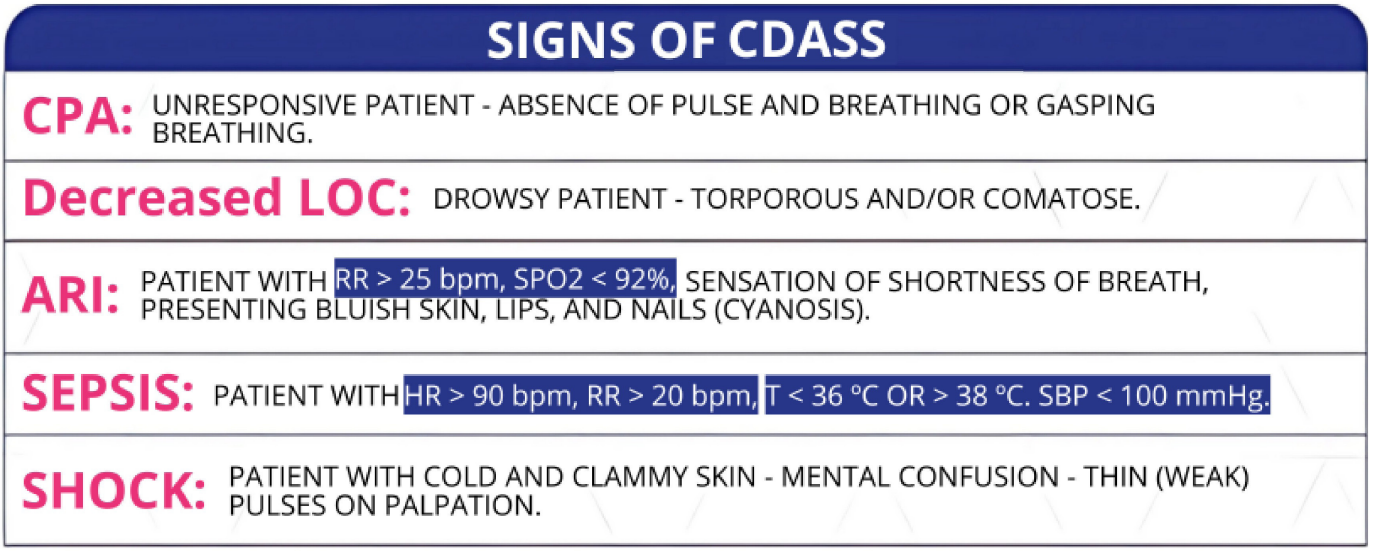

Figure 4. CDASS tool of RRT.

Legend: Cardiopulmonary arrest, decreased consciousness, respiratory failure, sepsis and shock (CDASS), cardiopulmonary arrest (CPA), level of consciousness (LOC), acute respiratory insufficiency (ARI), respiratory rate (RR), and heart rate (HR).

Source: Elaborated by the authors.

and identify reversible changes promptly, promoting greater patient safety[39]. In addition, the RRT performs other procedures, such as venous access (3.82%), electrocardiogram (3.58%), airway suction (2.34%), transport monitoring (2.34%), connection of ventilation with two levels of positive airway pressure (1.15%), bedside monitoring (0.86%), and other miscellaneous care (2.96%).

In 2022, the RRT incorporated the Business Intelligence platform, allowing data and indicators to be collected in real time. This technology helped with the early identification of problems, improved decision-making, and reduced prolonged ICU stays. Since 2012, quarterly meetings between the RRT, the quality team, and senior management have evaluated results and implemented improvements, reinforcing the efficiency of the service.

The consolidation of the RRT included creating institutional protocols, developing an activation table based on MEWS, and hiring specialized nurses and physiotherapists with an exclusive focus on the general wards. The RRT team led the standardization of emergency trolleys, training (Advanced Cardiac Life Support and intensive care training), and structuring forms for analyzing results. In 2021, a palliative care team was integrated into the RRT to care for patients with specific needs, strengthening the individualized intervention.

DISCUSSION

This study consisted of a narrative review and an experience report analyzing the implementation and outcomes of the Rapid Response Team (RRT) at Santa Casa de Misericórdia de Juiz de Fora Hospital. The findings reinforce the importance of RRTs in improving patient safety and reducing adverse events in general hospital wards.

One of the main contributions of this study is the development of an activation table for patients with clinical deterioration, adapted from the MEWS and NEWS2[34,35]. This table was designed to standardize RRT activation, ensuring timely interventions and optimizing clinical decision-making. Additionally, an important characteristic of the RRT at Santa Casa is its composition, which includes not only physicians and nurses but also physiotherapists. This multidisciplinary approach provides a comprehensive response to critically ill patients, enhancing both early detection and management of clinical deterioration.

Although this study did not perform a direct comparative analysis with units that do not use RRTs, the inclusion of studies with varied methodologies was necessary to provide a broad perspective on the impact of RRTs in different clinical settings. This diversity in the literature selection allowed for a more comprehensive discussion of the benefits and challenges associated with RRT implementation.

Although the experience at Santa Casa de Misericórdia de Juiz de Fora has shown positive results, these findings cannot be directly generalized to other contexts due to institutional, cultural, and resource-related differences. Studies conducted in different regions have reported varying impacts of Rapid Response Teams (RRTs), influenced by differences in healthcare infrastructure and team composition[40-42]. For example, the presence of palliative care teams, continuous monitoring, and high staff-to-patient ratios can significantly affect the effectiveness of RRTs in reducing adverse events.

The main limitation of this study is its retrospective design, which restricts access to more comprehensive data on patient hospitalization and limits the follow-up of outcomes after hospital discharge, as would be possible in a prospective study. Additionally, data were collected

from a single institution, limiting the generalizability of the results. However, the inclusion of diverse patient profiles and extensive follow-up data provides valuable insights into the potential benefits of implementing RRTs. Future studies should consider multicenter designs and prospective data collection to strengthen the evidence base on the effectiveness of RRTs.

CONCLUSION

This study reviewed the literature on the importance of RRT, described its implementation in a large hospital in Brazil, and highlighted the benefits associated with improving quality of care and hospital management. RRT was essential for patient safety in non-critical hospital units, offering agile and effective interventions to prevent unfavorable outcomes in cases of unexpected clinical deterioration.

The results showed that institutional support, interdisciplinary involvement, and continuous monitoring of indicators were fundamental to RRT success. Although they cannot be generalized, the lessons learned provide valuable input for the implementation of RRT in similar contexts, promoting patient safety and the efficiency of hospital services.

FUNDING

Nothing to declare.

CONFLICT OF INTEREST

Nothing to declare.

ACKNOWLEDGEMENTS

The authors thank Santa Casa de Misericórdia de Juiz de Fora for the institutional support and the collaborators of the Rapid Response Team for their contribution to the development of the actions described in this study.

RESEARCH DATA AVAILABILITY

Research data is available in the body of the article.

ARTIFICIAL INTELLIGENCE USE STATEMENT

Not applicable.

AUTHOR CONTRIBUTIONS

Wilson Coelho Pereira Neto: Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Project administration; Resources; Supervision; Validation; Visualization; Writing (original draft); Writing (review and editing). Felipe Meirelles de Azevedo: Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Project administration; Resources; Supervision; Validation; Visualization; Writing (original draft); Writing (review and editing). Luciano Côrtes Paiva: Writing (review and editing). Lucas dos Anjos Sena: Writing (review and editing). Caroline Valle Americano: Writing (review and editing). Deborah Gollner Evangelista: Writing (review and editing). Daniel Angelo de Mattos: Writing (review and editing). Thatiane Luci Freire: Writing (review and editing). Susana Ribeiro Chaves Pinheiro: Writing (review and editing). Eduardo da Silva Nascimento: Writing (review and editing).

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