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ORIGINAL ARTICLE

Barriers to Rapid Response Team Activation among Nurses and Residents in a Brazilian Teaching Hospital

Barreiras para Ativação do Time de Resposta Rápida entre Enfermeiros e Residentes em um Hospital Universitário Brasileiro

Barreras para la Activación del Equipo de Respuesta Rápida entre Enfermeros y Residentes en un Hospital Universitario Brasileño

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ABSTRACT

Background: The afferent limb of a Rapid Response System (RRS) may fail to identify deteriorating patients and activate the efferent limb. **Aims:** To identify and evaluate barriers to RRT activation in a Brazilian teaching hospital. **Methods:** An anonymous Likert-type survey was applied. Data were collected between July and November 2024. The Index of Agreement (IA) was calculated for each item, and IA between residents and nurses was compared using the chi-square test. **Results:** Of 344 residents and 71 nurses invited, 174 residents (50.6%) and 37 nurses (52.1%) participated. Most respondents (86%) agreed that the RRT can manage clinically deteriorating patients. Additionally, 78% of residents and 89% of nurses agreed that the RRT helps prevent cardiac arrest. A large proportion (85% of residents and 100% of nurses) reported they would contact the assistant team before activating the RRT. However, 79% of residents and 86% of nurses would call the RRT if unable to reach the assistant team. Most respondents (80%) disagreed that they fear activating the RRT. Furthermore, 78% of residents and 62% of nurses disagreed that RRT calls result from inadequate physician care. Finally, 75% of residents and 86% of nurses agreed that the RRT contributes to learning how to manage deteriorating patients. **Conclusion:** Residents and nurses perceive the RRT as valuable for preventing clinical deterioration and as an important educational resource. Although they do not fear activation, most staff report a tendency to contact the assistant team before calling the RRT.

Keywords: rapid response team; afferent limb failure; nurses; residents; deteriorating patient.

RESUMO

Introdução: A via aferente de um Sistema de Resposta Rápida (SRR) pode falhar na identificação de deterioração clínica e na ativação do Time de Resposta Rápida (TRR). O objetivo deste estudo foi identificar e avaliar as barreiras do braço aferente entre enfermeiros e médicos residentes em um hospital universitário brasileiro. **Métodos:** Estudo transversal com a aplicação de um questionário anônimo do tipo Likert entre julho e novembro de 2024. O Índice de Concordância (IC) foi calculado para cada item. **Resultados:** Do total de 344 residentes e 71 enfermeiros, participaram 174 residentes (50,6%) e 37 enfermeiros (52,1%). A maioria dos respondentes (86%) concordou que o TRR é capaz de manejar pacientes com deterioração clínica. Uma grande proporção (85% dos residentes e 100% dos enfermeiros) relatou que contataria a equipe assistente antes de ativar o TRR; no entanto, 79% dos residentes e 86% dos enfermeiros acionariam o TRR caso não conseguissem contatar a equipe assistente. A maioria dos participantes discordou que tem receio de ativar o TRR. 78% dos residentes e 62% dos enfermeiros discordaram que os acionamentos do TRR decorrem de assistência médica inadequada. 75% dos residentes e 86% dos enfermeiros concordaram que o TRR contribui para o aprendizado no manejo de deterioração clínica. **Conclusão:** Enfermeiros e médicos residentes percebem o TRR como valioso para a prevenção da deterioração clínica e como um importante recurso educacional. Embora não relatem receio em acioná-lo, a maioria da equipe indica uma tendência a contatar a equipe assistente antes de chamar o TRR.

Descritores: Time de Resposta Rápida; Falha da Via Aferente; Enfermeiros; Médicos Residentes; Paciente em Deterioração.

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RESUMEN

Introducción: La vía aferente de un Sistema de Respuesta Rápida (SRR) puede fallar en la identificación de deterioro clínico y en la activación del Equipo de Respuesta Rápida (ERR). Este estudio tuvo como objetivo identificar y evaluar las barreras de la vía aferente entre enfermeros y médicos residentes en un hospital universitario brasileño. **Métodos:** Estudio transversal mediante una encuesta anónima tipo Likert entre julio y noviembre de 2024. Se calculó el Índice de Concordancia (IC) para cada ítem. **Resultados:** De 344 residentes y 71 enfermeros, participaron 174 residentes (50,6%) y 37 enfermeros (52,1%). La mayoría de los encuestados estuvo de acuerdo en que el ERR es capaz de manejar pacientes con deterioro clínico. Una gran proporción informó que contactaría al equipo asistente antes de activar el ERR; sin embargo, el 79% de los residentes y el 86% de los enfermeros activarían el ERR si no pudieran contactar al equipo asistente. La mayoría de los participantes discrepó en que teme activar el ERR. 78% de los residentes y 62% de los enfermeros discreparon en que las llamadas al ERR se deban a una atención médica inadecuada. 75% de los residentes 86% de los enfermeros coincidieron en que el ERR contribuye al aprendizaje sobre cómo manejar deterioro. **Conclusión:** Los enfermeros y médicos residentes perciben al ERR como valioso para la prevención del deterioro clínico y como un importante recurso educativo. Aunque no temen activarlo, la mayoría del personal informa una tendencia a contactar al equipo asistente antes de llamar al ERR.

Palabras claves: Equipo de Respuesta Rápida; Falla de la Vía Aferente; Enfermeros; Médicos Residentes; Paciente en Deterioro

Introduction

Rapid Response Systems (RRS) are hospital organization models designed to identify and treat early deteriorating patients in the wards.[1] Many studies have suggested that these models may reduce serious adverse events, such as cardiac arrest and unplanned admissions to the intensive care unit (ICU).[2,3]

An RRS encompasses four structural components: an afferent limb, an efferent limb, an administrative limb, and a quality limb. For the system to function properly, the afferent limb must correctly identify patients at risk for deterioration and then activate the efferent limb – commonly referred to as the Rapid Response Team (RRT), Medical Emergency Team (MET), or Critical Care Outreach Team (CCOT) – for early review and intervention.[1,4]

The afferent limb may fail to identify deteriorating patients and to call the RRT, leading to a delay or even absence of efferent limb activation.[4,5] Failure to identify deterioration may result from several factors, including prolonged intervals between vital signs assessments or the absence of assessment of vital signs such as respiratory rate.[4,6] Even when deterioration is correctly identified, complex barriers may still prevent RRT activation. These barriers include communication issues, local protocols, fear of criticism, allegiance to the treating team, and misunderstanding of the role of the RRT.[4,5,7]

To identify such barriers, some hospitals have implemented surveys for nurses and physicians working in the wards.[7] However, most studies using this approach have been conducted in the United States, Europe, and Australia.[7] To date, no study in Latin America has explored these barriers. Our study aimed to use a survey to identify and evaluate the barriers to calling the RRT in a Brazilian teaching hospital.

Methods

We conducted a transversal unicentric study in a Brazilian teaching hospital in the city of Botucatu, in the state of São Paulo. The institution's Research Ethics Committee approved the study (protocol code: 79100724.0.0000.5411).

The hospital

The Clinical Hospital of Botucatu Medical School (Hospital das Clínicas da Faculdade de Medicina de Botucatu – HCFMB) is a tertiary hospital affiliated with São Paulo State University. Its services cover a region with over 2 million people, and it is a referral centre for emergency and critical care. The hospital is also a referral centre for cardiac and renal transplantation.[8,9] The hospital has 400 ward beds and 50 ICU beds for adults. It is estimated that the hospital receives more than 20.000 hospitalizations each year.

The Rapid Response System

The hospital has had an RRT since 2018, operating 24 hours a day and led by physicians with critical care expertise. During business hours, the team consists of one consultant doctor exclusively assigned to the team, one resident doctor, one final-year medical student, and one critical care nurse. Outside of business hours, the RRT includes only one consultant and one resident.

The RRS has two activation codes: the yellow code and the red code. The red code corresponds to the traditional 'blue code' and is used for suspected or confirmed cardiac arrest. Red was chosen because it conveys a greater sense of urgency and emergency to healthcare professionals than blue. The yellow code is equivalent to the traditional 'MET call' and is activated when a patient is deteriorating. It may also be used when the clinical team is concerned about a patient, even if the

patient does not meet objective criteria. Box 1 shows all the criteria adopted for activating the RRT.

Box 1. Criteria for activating Rapid Response Team on Clinical Hospital of Botucatu Medical School

Criteria for activating Rapid Response Team on Clinical Hospital of Botucatu Medical School	
Red code	**Yellow code**
• Suspected or confirmed cardiac arrest	• RR < 5 or > 30 ipm
	• HR < 40 or > 140 bpm
	• SpO_2 < 90%
	• SBP < 100 mmHg
	• Lowering of level of consciousness
	• Severe agitation
	• Focal neurological deficit
	• Subjective worry about the patient

Legend: bpm: beats per minute; HR: Heart Rate; ipm: inspirations per minute; mmHg: millimeters of mercury; RR: Respiratory Rate; SBP: Systolic Blood Pressure; SpO_2: Peripheral Oxygen Saturation.

RRT activation is carried out by phone. Any member of the clinical team may initiate the call. Once an activation criterion is identified, the afferent limb contacts the RRT by phone and answers two or three default questions: 1) which code is being activated, 2) where the code is located, and 3) which criterion applies (in the case of a yellow code). After the activation, the RRT proceeds to the location immediately.

The survey

We applied an anonymous Likert-type scale survey to nurses and residents working in the wards. The survey was based on a study designed by Jones et al.[10] and consisted of 17 items Item 1 assessed the degree to which the afferent limb agreed that the hospital cares for complex and sick patients. Items 2, 3, and 11 explored the afferent limb's perception of the usefulness of the RRT. Items 4 and 15 evaluated the afferent limb's understanding of and perceived benefits from the RRT when assessing deteriorating patients in the wards. Items 5, 6, 10, and 16 assessed under which conditions the afferent limb would or would not activate the RRT. Items 7, 12, and 14 investigated the barriers that restrict the afferent limb from calling the RRT. Items 8 and 9 evaluated the factors considered responsible for the need for an RRT. Finally, items 13 and 17 explored the effects of the RRT on the afferent limb's ability to manage unwell patients. Because our RRT does not include a nurse working 24 hours a day, we added a specific item to the nurse's survey to evaluate whether nurses would activate the RRT more frequently if there were a full-time nurse (item 18).

In addition to the 18 items, we included specific questions to categorise the participants' profiles. For the residents' survey, we added direct questions about the participant's specialty in training, the year of graduation, and whether the participant had previously called the RRT. For the nurses' survey, we included questions about the year of graduation, the ward in which they worked, and whether they had ever called the RRT.

The 17 original items from the Australian study were translated into Portuguese by the principal researcher (DM). A change was made to items 5 and 6, substituting "covering doctor" with "medical assistant team." We believed this term would better encompass the meaning of "covering doctor" (in the nurses' survey) and "responsible senior doctor" (in the residents' survey). Finally, all questions were transcribed into an electronic form using the Google Forms app. The app was configured to allow only one response per item. Only a few members of the research team (DM, PHSK, MFA, GBA, and MJFU) had access to the form.

Study population

We applied the survey to nurses and residents. This decision was based on the subjective perception that these professionals activate the RRT more frequently than other health workers. Although consultants, medical students, and other nursing staff (such as nursing assistants and technicians) also work on the wards, we believe that they rarely activate the RRT.

To apply the survey to residents and nurses, we obtained a complete list of all names registered in the hospital. The nurses' list was obtained from the hospital's nursing administration. The residents' list was retrieved from the official website of Botucatu Medical School. We received 71 names of nurses working in the wards and 408 names of registered residents. However, not all residents provide care to in-hospital patients in the wards (for example, residents in anaesthesiology and radiology). Additionally, some specialties, such as paediatrics, do not attend to the adult population. Therefore, we included only the names of specialties that work in adult wards, resulting in a total of 344 residents.

We collected at least 50% of each group to obtain a representative sample, totalling 208 surveys (36 from nurses and 172 from residents).

Application of the survey

After developing the survey and selecting the study population, the interviewers visited the wards and clinics to invite each eligible participant to answer the survey. The invitations were made during the first 30 min-

utes of the working day. After the standard invitation and the signature of the informed consent form, the interviewer opened a new form using the app on a personal smartphone and handed it to the participant. Each participant completed the survey in the presence of the interviewer, although no communication occurred with the research team or any nearby colleagues during completion. After the participant submitted the answers, the responses were automatically stored in a Microsoft Excel spreadsheet generated by the Google Forms app.

The first 10 participants were asked to provide feedback to the main researcher (DM) to allow possible adjustments and assess understanding. However, no adjustments were needed. The mean time to complete the survey was approximately 5 minutes.

To avoid duplicate responses, the interviewers marked each participant's name after survey completion on a shared list containing all names of the target population. Only research team members had access to this list. The study was conducted between July and November 2024.

Statistical analysis

After completing data collection, a spreadsheet was generated by the app. No assumptions were made for missing data. A descriptive analysis was performed. The proportions of responses for each item were presented in a table for both resident and nurse populations.

To compare the responses, an Index of Agreement (IA) was calculated by adding the proportions of "totally agree" and "partially agree" responses. The IA between residents and nurses was compared using the Chi-square test. A two-sided p-value < 0.05 was considered statistically significant.

Results

Details of respondents

During the survey application, 37 nurses and 175 residents were invited to participate in the study. Only one resident declined to participate, resulting in a final sample of 211 completed surveys.

Among the participants, 131 (75.3%) residents and 36 (97.3%) nurses had already called the RRT at least once before answering the survey. Nurses appear to have more experience, as 75.7% graduated before 2020, while only 17.3% of residents had graduated before that year. Additionally, 52.6% of the residents were in the first year of their residency program. The characteristics of the participants are summarised in Table 1.

Table 1: **Characteristics of participants**

Characteristic	n (%)
Residents (n=174)	
Had already called RRT	131 (75,3%)
Graduation year (n=173)	
Graduated in 2023	38 (22,0%)
Graduated in 2022	36 (20,8%)
Graduated in 2021	42 (24,3%)
Graduated in 2020	27 (15,6%)
Graduated before 2020	30 (17,3%)
First year of residence program (n=173)	
Started at 2024	91 (52,6%)
Started at 2023	65 (37,6%)
Started before 2023	17 (9,8%)
Nurses (n=37)	
Had already called RRT	36 (97,3%)
Graduation year	
Graduated from 2020	9 (24,3%)
Graduated before 2020	28 (75,7%)

RRT: Rapid Response Team.

All 666 items (18 for each of the 37 nurses) were answered in full. Among residents, only 2 out of 2,958 items (17 for each of the 174 residents) were left unanswered. The items and the proportions of responses for residents and nurses are presented in Tables 2 and 3, respectively. :contentReference[oaicite:0]index=0

Complexity of patients and utility of RRT in the hospital (items 1, 2, 3 and 11)

When asked about the complexity of inpatients, 100% of both residents and nurses totally or partially agreed that the hospital treats complex cases (item 1). In this context, approximately 86% of participants totally or partially agreed that the RRT is useful in evaluating deteriorating patients in the wards (item 2). About 89% of residents and 73% of nurses totally or partially agreed that they can call the RRT when they are concerned about a patient (item 3). However, only 30% of residents and 38% of nurses totally or partially agreed that the RRT is overused in managing ward patients (item 11).

Benefits of RRT (items 4 and 15)

Regarding the potential benefits of the RRT, approximately 78% of residents and 89% of nurses totally or partially agreed that the RRT can prevent cardiac arrest (item 4). Furthermore, about 88% of residents and 92% of nurses totally or partially agreed that the RRT is capable of preventing minor problems from worsening (item 15).

Table 2: **Proportion of answers from 174 residents**

Statement	Totally agree	Partially agree	Do not agree or disagree	Partially disagree	Totally disagree
01: Patients in the hospital have complex medical problems.	87,9%	12,1%	0,0%	0,0%	0,0%
02: The RRT is helpful in managing sick patients on the ward.	65,5%	21,3%	6,9%	4,0%	2,3%
03: The RRT allow me to seek help for my patients when I am worried about them.	65,5%	23,0%	7,5%	4,0%	0,0%
04: The RRT prevents unwell patients from having an arrest.	57,5%	20,7%	16,1%	2,9%	2,9%
05: When one of my patients is sick, I call the medical assistant team before calling the RRT.	50,0%	34,5%	12,1%	2,9%	0,6%
06: If I cannot contact the medical assistant team about my sick patient, I call the RRT.	52,3%	26,4%	12,6%	6,3%	2,3%
07: I am reluctant to call a RRT on my patients because I will be criticized if they are not that unwell.	1,7%	10,9%	7,5%	24,1%	55,7%
08: RRT calls are required because management of the patients by the doctors has been inadequate.	2,3%	8,0%	11,5%	39,7%	38,5%
09: RRT calls are required because management of the patients by the nurses had been inadequate.	1,7%	9,8%	16,7%	32,8%	39,1%
10: I would call a RRT on a patient I am worried about even if their vital signs are normal.	6,3%	24,1%	27,0%	25,9%	16,7%
11: I think that the RRT is overused in the management of hospital patients.	7,5%	22,4%	28,2%	23,0%	19,0%
12: I don't like calling RRT because I will be criticized for not looking after my patient well enough.	1,7%	7,5%	6,9%	23,0%	60,9%
13: RRT calls reduce my skills in managing sick patients.	1,1%	1,1%	4,0%	21,3%	72,4%
14: Using the RRT system increases my workload when caring for a sick patient*.	0,6%	4,6%	4,0%	17,2%	73,0%
15: The RRT can be used to prevent a minor problem from becoming a major problem*.	60,9%	27,6%	4,6%	4,0%	2,3%
16: If my patient fulfils the listed RRT criteria but does not look unwell, I would not make a RRT call.	1,7%	10,9%	17,8%	30,5%	39,1%
17: RRT calls teach me how to better manage sick patients in my ward.	44,3%	31,0%	14,9%	6,3%	3,4%

*Data referred to 173 residents. RRT: Rapid Response Team.

Conditions that afferent limb activate or not the RRT (items 5, 6, 10, 16 and 18)

Regarding the situations in which the RRT is activated, 100% of nurses and 85% of residents totally or partially agree that they call the assistant team when they are worried about a patient (item 5). However, about 79% of residents and 86% of nurses also totally or partially agree that they call the RRT in the absence of contact with the assistant team (item 6).

Only 30% of residents and 27% of nurses totally or partially agree that they would call the RRT if they were worried about a patient, even if the observations were relatively normal (item 10). Conversely, about 70% of residents and 73% of nurses totally or partially disagree that they would refrain from calling the RRT if the patient met activation criteria but did not appear to be sick (item 16).

In addition, if the hospital had more nurses working in the RRT, only 38% of nurses totally or partially agree that they would call the RRT more often (item 18).

Barriers of afferent limb on activating the RRT (items 7, 12 and 14)

Regarding the barriers to activating the RRT, about 80% of participants totally or partially disagree that they avoid calling the RRT due to fear of being criticised for how they manage the patient (item 7). Furthermore, about 84% of residents and 97% of nurses totally or partially disagree that they dislike activating the RRT due to fear of criticism (item 12).

Approximately 90% of residents and 95% of nurses totally or partially disagree that the RRT increases their workload when caring for sick patients (item 14).

Table 3: **Proportion of answers from 37 nurses**

Statement	Totally agree	Partially agree	Do not agree or disagree	Partially disagree	Totally disagree
01: Patients in the hospital have complex medical problems.	81,1%	18,9%	0,0%	0,0%	0,0%
02: The RRT is helpful in managing sick patients on the ward.	73,0%	13,5%	2,7%	2,7%	8,1%
03: The RRT allow me to seek help for my patients when I am worried about them.	32,4%	40,5%	8,1%	8,1%	10,8%
04: The RRT prevents unwell patients from having an arrest.	64,9%	24,3%	2,7%	5,4%	2,7%
05: When one of my patients is sick, I call the medical assistant team before calling the RRT.	81,1%	18,9%	0,0%	0,0%	0,0%
06: If I cannot contact the medical assistant team about my sick patient, I call the RRT.	70,3%	16,2%	2,7%	0,0%	10,8%
07: I am reluctant to call a RRT on my patients because I will be criticized if they are not that unwell.	5,4%	8,1%	5,4%	10,8%	70,3%
08: RRT calls are required because management of the patients by the doctors has been inadequate.	2,7%	24,3%	10,8%	13,5%	48,6%
09: RRT calls are required because management of the patients by the nurses had been inadequate.	0,0%	10,8%	2,7%	8,1%	78,4%
10: I would call a RRT on a patient I am worried about even if their vital signs are normal.	2,7%	24,3%	10,8%	21,6%	40,5%
11: I think that the RRT is overused in the management of hospital patients.	10,8%	27,0%	10,8%	16,2%	35,1%
12: I don't like calling RRT because I will be criticized for not looking after my patient well enough.	0,0%	0,0%	2,7%	5,4%	91,9%
13: RRT calls reduce my skills in managing sick patients.	0,0%	0,0%	0,0%	10,8%	89,2%
14: Using the RRT system increases my workload when caring for a sick patient.	2,7%	2,7%	0,0%	0,0%	94,6%
15: The RRT can be used to prevent a minor problem from becoming a major problem.	67,6%	24,3%	5,4%	2,7%	0,0%
16: If my patient fulfils the listed RRT criteria but does not look unwell, I would not make a RRT call.	8,1%	13,5%	5,4%	16,2%	56,8%
17: RRT calls teach me how to better manage sick patients in my ward.	45,9%	40,5%	0,0%	5,4%	8,1%
18: If RRT had more nurses, I would call more often.	16,2%	21,6%	8,1%	21,6%	32,4%

Reasons for requiring RRT on the wards (items 8 and 9)

Regarding the reasons for RRT activation in the wards, about 78% and 72% of residents totally or partially disagree that the RRT is activated due to inadequate care by, respectively, doctors and nurses. On the other hand, about 62% of nurses totally or partially disagree that the RRT is activated due to inadequate care provided by doctors (item 8), while 86% totally or partially disagree that it is called due to poor management by nurses (item 9).

Effects of RRT on ability to manage sick patients (items 13 and 17)

About 94% of residents and 100% of nurses totally or partially disagree that the RRT reduces their ability and skills to manage sick patients (item 13). Moreover, about 75% of residents and 86% of nurses totally or partially agree that the RRT helps them learn how to manage sick patients in the hospital (item 17).

Comparison between residents and nurses' answers

Differences between residents and nurses were observed in three items (Table 4). More residents agreed with items 3 ("The RRT allows me to seek help for my patients when I am worried about them") and 8 ("RRT calls are required because management of the patients by the doctors has been inadequate"), and fewer residents agreed with item 5 ("If I cannot contact the medical assistant team about my sick patient, I call the RRT").

Discussion

Summary of major findings

We conducted a survey with medical residents and nurses from a Brazilian teaching hospital to understand their attitudes and perceptions regarding the RRT. The responses were mostly similar between the two groups. Most residents and nurses believe that the RRT is useful in managing and preventing clinical deterioration. Few

Table 4: **Comparison of index of agreement (IA) between residents and nurses**

Item	IA Total	IA Residents	IA Nurses	p-value
Q01	100,0%	100,0%	100,0%	–
Q02	86,7%	86,8%	86,4%	0,962
Q03	85,8%	88,5%	73,0%	0,014
Q04	80,1%	78,2%	89,2%	0,127
Q05	87,2%	84,5%	100,0%	0,010
Q06	80,1%	78,7%	86,5%	0,284
Q07	12,8%	12,6%	13,5%	0,886
Q08	13,3%	27,0%	10,3%	0,007
Q09	11,4%	11,5%	10,8%	0,905
Q10	29,9%	27,0%	30,5%	0,679
Q11	31,3%	29,9%	37,8%	0,343
Q12	7,6%	90,8%	100,0%	0,055
Q13	1,9%	2,3%	0,0%	0,352
Q14	5,2%	5,2%	5,4%	0,954
Q15	89,1%	88,5%	91,9%	0,548
Q16	14,2%	12,6%	21,6%	0,156
Q17	77,3%	75,3%	86,5%	0,140

participants believe that the RRT increases their workload, and only a minority reported fearing criticism when activating the RRT.

However, approximately one third of nurses and residents would not call the RRT if the patient meets objective activation criteria but appears clinically well. Likewise, about one third would not activate the RRT when concerned about a patient in the absence of abnormal clinical findings. Additionally, the afferent limb seems to prefer contacting the assistant team before activating the RRT. :contentReference[oaicite:0]index=0

Interpretation

Our study suggests that hospital ward staff hold a positive view of the RRT. Participants apparently understand its importance and believe in its ability to prevent clinical deterioration. Fear of being criticised was not highlighted as a major barrier. Additionally, most participants recognise the educational role of the RRT. These findings are probably due to standard recommendations provided to RRT members.[11] We always emphasise the importance of maintaining clear and friendly communication to avoid worsening stressful situations. We also highlight to all RRT members the importance of supporting the assistant team rather than assuming full responsibility for the patient. If a procedure is required (for example, orotracheal intubation), the opportunity is offered to the resident or junior doctor of the afferent limb. This behaviour encourages more appropriate calls and helps reduce the perception that the RRT undermines the skills of frontline staff.

The main barriers identified were related to the conditions under which the RRT is activated. A significant portion of respondents would not call the RRT when patients meet activation criteria but appear clinically stable. One explanation is that residents and nurses prefer using clinical judgment over objective criteria. This finding is consistent with other studies.[10,12] However, only one third of respondents would call the RRT if they were concerned in the absence of abnormal findings. This proportion is lower than the 50% reported in previous studies.[10,13] It suggests that, even while recognising the value of the RRT, residents and nurses may prefer to address patient issues independently.

Another major barrier identified is a possible hierarchical culture. Most participants would call the assistant team first. Before RRT implementation, residents and nurses typically called their supervisors to manage clinical deterioration. Even after six years of implementation, this behaviour persists. This cultural barrier has also been highlighted in other studies.[?,5,10] Another possible explanation is our emphasis on always contacting the assistant team during RRT calls, since they are formally responsible for the patient's hospital care. In our study, fear of criticism and beliefs about inability to manage sick patients do not appear to explain this behaviour.

Three other studies have used a similar survey in Australia, Canada, and Italy.[10,12,13] To our knowledge, no other studies have used this survey in a Latin country. Most of the results were similar, even when considering different respondent categories. A cultural barrier related to hierarchical structure may be present in many hospitals with RRS and could influence the frequency of activations.

Strengths, limitations and future research

Our study has several strengths. It was the first Brazilian study to assess the opinions of nurses and residents regarding an RRS. It provides novel information that can support our centre in improving patient care. Furthermore, it may assist other centres, especially in Latin

countries, in implementing RRS by identifying potential barriers and facilitators. In addition, it highlights the relevance and prevalence of certain common barriers, particularly cultural factors, that have also been reported in other hospitals.[10,12,13] Our survey had a very high response rate, and minimal missing data.

However, our study also has some limitations. First, the target population, especially nurses, may have changed during the survey period. To define the nurse population, we obtained a list from the hospital's nursing administration prior to data collection. However, the nursing workforce is dynamic, and staff assignments across wards may have changed during the study period. Therefore, we were unable to determine the exact number of nurses working in each ward at the time of the survey.

Another limitation is the potential bias related to the interpretation of items after their translation into Portuguese. Some English words may convey different meanings when translated, which could have led to variation in participant understanding. For example, the word "sick" in English, when translated into Portuguese, may refer to someone who has a disease, rather than someone whose clinical condition is deteriorating.

A final limitation is that this was a single-centre study and may not reflect the opinions of staff in other institutions. It is important to consider contextual factors such as hospital type (e.g., teaching or tertiary centre), RRS model, and patient complexity.

Future research is needed to determine whether these barriers are prevalent, particularly in Latin countries. It is important to consider the possibility of replicating this study in a multicenter design involving other secondary and tertiary hospitals. Additionally, it remains uncertain whether a continuous educational programme for the afferent limb is effective in mitigating these barriers.

Conclusion

Our survey of residents and nurses at the Clinical Hospital of Botucatu Medical School found that both groups do not fear calling the RRT. They believe that the RRT is useful for managing deteriorating patients and plays an educational role in supporting the afferent limb. Additionally, we found evidence suggesting the presence of cultural barriers that influence RRT activation.

Conflict of Interest

The authors declare that there is no conflict of interest.

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Declaration of Use of Artificial Intelligence

During the preparation of this work the authors used OpenAI ChatGPT 4.0 to review and improve the language. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the published article.

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No funding was received for this study. The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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