

Rapid response team nurses' attitudes and barriers to the rapid response system: A multicentre survey

Eetu Loisa^{1,2}  | Sanna Hoppu² | Sari-Marja Hytönen³ | Joonas Tirkkonen^{2,4} 

¹Medical School, Faculty of Medicine and Life Sciences, University of Tampere, Tampere, Finland

²Department of Emergency, Anaesthesia and Pain Medicine and Emergency Medical Service, Tampere University Hospital, Tampere, Finland

³Pirkanmaa Hospital District, Tampere University Hospital, Tampere, Finland

⁴Department of Intensive Care Medicine, Tampere University Hospital, Tampere, Finland

Correspondence

Eetu Loisa, MD, Medical School, Faculty of Medicine and Life Sciences, Tampere University, FI-33014, Tampere, Finland. Email: eetu.loisa@tuni.fi

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Abstract

Background: Despite wide implementation of rapid response teams (RRTs), no published data exist on RRT nurses' attitudes and barriers to the rapid response system (RRS).

Methods: We piloted a 5-point Likert-type scale questionnaire among all Finnish university hospitals' RRT nurses with optional open-ended comments. The impact of more frequent RRT participation was further investigated.

Results: The response rate was 46% ($n = 176/379$, 34%–93% between hospitals). The respondents median experience on a RRT was three years (0.8–5) and median participation was two (1–5) RRT activations per month. Over 90% of the RRT nurses felt that RRS prevented cardiac arrests and improved patient safety. Nurses with five or more RRT activations/month believed their critical care skills had improved through these duties (94% vs 71%, $P = .001$), considered their RRT work meaningful (94% vs 76%, $P = .005$) and wanted to continue as RRT nurses (91% vs 74%, $P = .015$) more often than nurses with less than five RRT activations/month. In addition to the infrequent RRT participation, further negative experiences with RRS among the RRT nurses included feeling overworked (68%) or undercompensated (94%) for the RRT duties and conflicts between RRT and ward doctors (25%).

Conclusion: RRT nurses consider their work important and believe it fosters improved critical care skills; these beliefs are emphasized among those with more frequent RRT participation. Infrequent RRT participation, feeling overworked and/or undercompensated and conflicts between RRT and ward doctors may present barriers for successful RRS among RRT nurses.

1 | INTRODUCTION

Implementation of rapid response systems (RRSs) has been associated with improved patient safety in hospitals.^{1,2} Therefore, factors related to successful RRSs have become a focus of interest, and a recent systematic review addressed barriers and facilitators within the afferent limb (ward staff) of the RRS.³ Indeed, several surveys

concerning ward nurses have been conducted to increase understanding on how ward staff perceive the RRS.^{4–9} However, there are no published data on how the efferent limb, the rapid response team (RRT) nurses, experience the RRS. Thus, the aim of this pilot, prospective, multicentre survey was to investigate RRT nurses' attitudes toward the RRS, as well as any barriers to the success of the system that may exist. We hypothesized that more frequent participation in

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RRT duties would be associated with more positive attitudes towards the RRS.

2 | METHODS

2.1 | Setting

Finland has five university hospitals with 43 000-75 000 annual admissions per hospital. These hospitals implemented their RRSs between 2009 and 2016. All hospitals utilize the "track and trigger" type activation criteria¹⁰ and their RRTs operate from intensive care units (ICUs). Table 1 provides details on the hospitals and their RRT's characteristics, as well as differences between the hospitals.

2.2 | Study design and data collection

We piloted a multicentre survey including RRT nurses from all university hospitals' in Finland. We designed a survey with 41 five-point Likert-type scale questions (1 = strongly disagree; 2 = disagree; 3 = uncertain; 4 = agree; 5 = strongly agree), which are presented in Table 3. Since this was a pilot trial, every question included an option for additional open-ended comments to capture important RRS facilitators and barriers not addressed in the 41 survey questions. The survey was a modified version of a previously validated survey concerning ward staff's perceptions of RRTs,^{5-7,9} but some questions required reformatting to specifically reflect RRT nurses' opinions. The survey was conducted in Finnish (the respondents' native language), then the questions were translated into English for publication purposes. The translation was revised by a native English speaker. An independent chief RRT nurse consultant reviewed the questionnaire, after which questions were further revised and spelling clarified according to the chief nurse's comments.

The questionnaire was conducted as a closed Internet-based Webropol survey (Webropol Oy, Huovitie 3, Helsinki, Finland). Participating ICUs' chief nurses provided email addresses for their RRT nurses. After testing that the electronic survey was technically appropriate and usable, a link with a cover letter was e-mailed to RRT nurses' individual institutional email addresses. The cover letter explained the study's purpose and protocol and stated that participation was voluntary and anonymous. The survey platform automatically recorded the respondents' answers. The survey opened on 13 March 2017 and closed on 16 May 2017. The RRT nurses were sent weekly reminder emails about the questionnaire.

2.3 | Ethical considerations

The hospitals' Ethics Committees do not consider studies surveying hospital staff members to be relevant for Ethical Board review in Finland. Therefore, permission to conduct the study was acquired in

Editorial Comment

This study investigates attitudes and barriers towards the rapid response system among rapid response team (RRT) nurses at university hospitals in Finland. Nurses with frequent RRT participation believe their work as RRT nurses is important, and that it fosters improved critical care skills. Poor collaboration with ward doctors may represent a barrier.

each participating hospital according to its institutional policy. The participating ICUs' chief nurses and chief physicians and the physicians directly responsible for each hospital's RRT services all approved the study's protocol. Approval from any kind of data protection agency or ombudsman to conduct this kind of survey was not required, and the nurses' email addresses were not private but work-related, institutional email addresses. Responding to the survey was voluntary and fully anonymized. The privacy of the respondents was protected in all parts of the study. Only the study personnel were able to access the anonymous responses. After the survey results were extracted from the Webropol platform, all Internet-based data were deleted.

2.4 | Statistical analysis

Statistical analyses were performed with SPSS for Windows (IBM SPSS Statistics version 24.0). Data are represented as counts and percentages and continuous data as medians with interquartile range [Q_1 - Q_3]. To evaluate the impact of more frequent RRT participation, the 5-point Likert scale was dichotomized (agree/strongly agree vs strongly disagree/disagree/uncertain) for these analyses. Frequent participation was defined as follows: five or more RRT shifts per month and/or five or more RRT activations per month. These cut-off values were determined from a clinical perspective; we considered that RRT involvement of more than once a week could be considered frequent involvement. The chi-squared test was used for binominal comparisons. All tests were two-sided, and a *P*-value of <.05 was considered statistically significant. Simple content analysis of the open-ended comments was conducted to group comments according to their themes.

3 | RESULTS

3.1 | Study cohort

The response rate was 46% ($n = 176/379$, 34%-93% between the hospitals). The response rates are presented separately for individual study sites in Table 1. One hospital reported that all of their 194 ICU nurses participated in RRT activities, while four other hospitals had sub-groups of ICU nurses designated for RRT duties.

TABLE 1 Hospital and rapid response team characteristics

	Hospital I	Hospital II	Hospital III	Hospital IV	Hospital V
RRT implementation year	2010	2012	2009	2016	2010
Department RRT operates from	ICU	ICU	ICU	CICU + NICU	ICU
Number of RRT nurses	54	9	27	194	95
Response rate (%)	65	78	93	34	46
RRT same as cardiac arrest team	Yes	No	Yes	Yes	Yes
Outreach activity ^a	Yes	Yes	Yes	Yes	Yes
Number of RRT calls in 2016 excluding cardiac arrests and outreach visits	490	122	585	405	596
Hospital admissions per year	50 000	65 000	75 000	52 000	43 000
RRT calls/1000 admissions in 2016-2017	9.8	1.9	7.8	7.8	14

Note: Data are represented as counts (or percentages, where indicated %).

Abbreviations: CICU, cardiac intensive care unit; ICU, intensive care unit; NICU, neurological intensive care unit; RRT, rapid response team.

^aPlanned "outreach" follow-up visits for preselected intensive care unit patients discharged to wards.

3.2 | Respondent demographics

Most respondents were female (76%), and their median age was 41 (35-47) years (Table 2). They had a median of 12 (7-17) years of work experience as intensive care nurses, worked a median of 3 (1-5) RRT shifts monthly, and attended a median of 2 (1-5) RRT calls monthly.

3.3 | RRT nurses believes and attitudes to the RRS

Table 3 presents the 41 Likert questions/statements with the respondents' answers. Almost all respondents felt that RRTs prevented cardiac arrests (96%) and believed that the RRT had improved patient safety (92%) in their hospital.

Three out of four respondents felt that ward nurses can detect patient deterioration, while one out of two nurses felt the same about ward doctors. Four out of five RRT nurses answered that the establishment of an RRT had improved the recognition of critical ill patients in the hospital, and 87% believed that the RRT activation criteria can detect patient deterioration in a timely manner.

One out of three respondents felt that the RRT implementation phase provoked conflicts between ICU nurses and doctors and between ward nurses and doctors. With regard to everyday work, one out of four respondents reported conflicts between ward doctors and RRT.

Four out of five RRT nurses believed that their critical care skills had improved through their RRT duties and that they can determine the severity of patients' illnesses independently.

Most RRT nurses considered their work meaningful (82%) and wanted to continue as RRT nurses (79%). However, 68% felt that their workload had increased because of RRT duties, and only one respondent (0.6%) felt adequately compensated for RRT duties.

3.4 | Effect of more frequent RRT participation

Table 4 presents the differences in answers according to RRT activation frequency. Sixty-eight (39%) nurses worked ≥ 5 RRT shifts per month, and 53 (30%) nurses attended ≥ 5 RRT calls per month. The RRT nurses with more frequent RRT participation expressed the belief that their critical care skills had improved through RRT duties more often, and in general they had a more positive attitude towards the RRS. These differences existed both when the frequency of RRT participation was investigated through the number of RRT shifts per month and when it was based on the number of RRT calls attended per month.

3.5 | Additional open-ended comments

A total of 532 open-ended comments were grouped into 42 different themes. The most common theme was *I feel undercompensated for the RRT work I do/My workload has increased without additional compensation* (n = 85); followed by *RRT shifts/calls are too infrequent to allow me to gain experience because too many ICU nurses do RRT work* (n = 54); and *More regular training for the RRT nurses* (n = 37).

TABLE 2 Respondent (n = 176) demographics

Age; years	41 [35-47]
Sex (female)	133 (76%)
Working experience as a nurse; years	15 [9-20]
Working experience as an ICU nurse; years	12 [7-17]
Number of RRT working shifts per month	3 [1-5]
Number of attended RRT calls per month	2 [1-5]
Number of education periods per year	1 [1-2]
Working experience as RRT nurse; years	3 [0.8-5]
0-6 months	27 (15%)
>6 months but <2 years	47 (27%)
2-5 years	60 (34%)
≥6 years	42 (24%)

Note: Categorical variables are represented as counts (percentages). Continuous variables are presented as medians with interquartile range [Q₁-Q₃].

Abbreviations: ICU; intensive care unit, RRT; rapid response team.

The three most common positive themes were *The RRT prevents cardiac arrests and/or has improved patient safety and/or the treatment of critically ill patients* (n = 28); *RRT duties bring job diversity and positive challenges and/or have improved my critical care skills* (n = 23); and *Recognition and/or treatment of deteriorating patients has improved in wards* (n = 8). Overall, the themes mostly followed the Likert topics and results, and they are presented in Supplementary file A. In addition to the comment on RRT participation being too infrequent, another important theme not captured in the Likert questionnaire was *I do not know if RRT is effective because I have not received any information on the impact of our work* (n = 3).

4 | DISCUSSION

4.1 | Key findings

In this nationwide multicentre trial, we piloted a modified Likert questionnaire for RRT nurses and found that they consider the RRS an effective strategy for improving inpatient safety. RRT nurses consider their RRT work meaningful and think that RRT nurse duties have improved their critical care skills. These experiences are more prevalent among the RRT nurses with more frequent RRT participation. Among the RRT nurses, this study identified infrequent RRT participation, conflicts between RRT and ward doctors, and feeling undercompensated/overworked for RRT work as potential barriers for successful RRS.

4.2 | Interpretation and implications of findings

RRT nurses acknowledged the RRS's potential for preventing cardiac arrests and improving patient safety even more frequently than ward staff did in previous studies.^{5,7} The majority of RRT nurses agreed that ward staff's recognition and treatment of critical ill

patients had improved since RRS implementation, whereas 48%-85% of ward nurses have themselves considered that the RRS has had a positive impact on their skills in recognising and treating critically ill patients.^{5,7}

One out of nine ward nurses had previously reported fears of being criticised by the RRT for making unnecessary RRT calls.^{3,5,7} However, these fears seem unfounded, as only 11% of the RRT nurses considered unnecessary RRT calls to be anything other than rare events. In fact, RRT nurses considered ward nurses more capable of recognizing patient deterioration than ward doctors and found that RRTs had disagreements about patient care with ward doctors twice as often as with ward nurses. Indeed, previous studies concerning ward nurses have acknowledged similar barriers between ward nurses and ward doctors.^{3,11,12} Our results, together with those of previous studies, suggest that ward nurses and RRTs reach consensus on the status of a patient more easily than ward physicians. Unfortunately, our data does not directly answer the most important aspect of this disagreement; according to the RRT, do the ward doctors over- or underestimate a patient's deterioration. An encouraging finding was that conflicts between RRT nurses and RRT physicians did not seem to be an issue; thus, the RRT itself was generally considered a functioning unit.

The main barriers arising specifically from RRT factors were feeling undercompensated and having an increased workload as compared with that of other ICU nurses. More frequent RRT participation led to more positive perceptions about the importance of RRT work, while disappointment with infrequent RRT participation was highlighted in the open-ended comments; over time, these negative experiences may decrease the RRT nurses' commitment to their RRT duties. Finally, the open-ended comments captured the importance of feedback about RRT work, which indeed facilitates a successful RRS.³

On average, every respondent opted for three additional open-ended comments, which suggests that RRT staffs' opinions on the facilitators and barriers to the success of RRS should be further investigated. Because RRT nurses are the front-line workers who encounter the possible problems associated with an ineffective RRS, larger, international trials are warranted.

4.3 | Limitations of the study

As a pilot survey, the questionnaire did not undergo a formal validation process, and only one independent professional revised the survey for face validity. Furthermore, we did not address questions regarding the respondents' perceptions of the survey. Therefore, the questionnaire and its results must be validated in larger trials. In addition, the overall response rate was only 46%. However, this low response rate was mostly due to the situation in one hospital where all ICU nurses participated in RRT activities and those with infrequent participation hardly share any interest in responding the survey. The study results present the opinions and attitudes of RRT nurses towards the RRS, and it remains unknown how these subjective experiences translate into everyday practices. Finally, this study

TABLE 3 The 41 Likert questions with the respondents' answers

	% of respondents				
	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
Importance of RRT in our hospital (n = 175)					
1. RRT prevents cardiac arrests	0.6	1.7	2.3	51	45
2. RRT has improved the care of the critically ill on the wards	0.0	2.3	4.6	44	49
3. RRT has improved inpatient safety	0.6	1.7	5.7	45	47
RRT calls in our hospital (n = 174)					
4. RRT calls are made frequently enough	2.3	29	18	39	12
5. There are delays in RRT activations	11	40	19	29	1.2
6. Futile RRT calls are rare	1.2	10	8.6	40	40
Ward nurses' skills in recognizing patient deterioration (n = 175)					
7. Nurses on the wards can detect patient deterioration	0.0	17	8.1	66	9.8
8. Nurses on the surgical wards can detect patient deterioration	0.0	14	7.4	62	17
9. Nurses on the medical wards can detect patient deterioration	0.0	17	11	63	9.1
Ward doctors' skills in recognizing patient deterioration (n = 173)					
10. Doctors on the wards can detect patient deterioration	0.0	23	24	47	6.4
11. Surgeons on the wards can detect patient deterioration	2.3	21	22	46	8.1
12. Medical doctors on the wards can detect patient deterioration	0.6	15	23	52	9.3
Ward doctors' skills in treating critically ill patient					
13. Doctors on the wards are able to treat critically ill patients	4.6	45	26	24	0.6
14. Surgeons on the wards are able to treat critically ill patients	6.3	40	22	30	1.7
15. Medical doctors on the wards are able to treat critically ill patients	2.9	29	22	44	2.3
Ward staff's RRS skills and perceptions (n = 174)					
16. Ward staff needs more training in detecting and treating critically ill patients	0.0	0.6	10	47	43
17. Ward staff assist RRT after RRT arrival	1.2	6.3	5.2	51	36
18. Ward staff regard RRT activity as beneficial	0.6	1.2	5.2	34	59
Evolution of ward staff skills since RRS started (n = 173)					
19. Since RRT started, ward staff's recognition of the critically ill has improved	0.6	2.3	16	54	27
20. Since RRT started, ward staff's capability to treat critically ill patients has improved	1.2	4.6	27	49	19
RRT implementation-related problems in our hospital (n = 173)					
21. RRT implementation was trouble-free	12	36	30	20	2.3
22. RRT implementation led to conflicts in the ICU between nurses and doctors	14	17	3	31	7.0
23. RRT implementation led to conflicts in the wards between nurses and doctors	5.3	9.9	55	27	2.3
24. RRT implementation led to conflicts between the RRT and ward staff	14	22	41	21	3.0
RRT everyday work-related problems in our hospital (n = 172)					
25. Everyday work of RRT causes conflicts between ward-nurses and RRT	37	35	17	9.9	0.6
26. Everyday work of RRT causes conflicts between ward doctors and RRT	19	37	19	23	1.7
27. Everyday work of RRT causes conflicts between RRT doctors and RRT nurses	38	36	13	10	1.7
Prerequisites of RRS in our hospital (n = 174)					
28. Our RRT criteria can detect patient deterioration in time on the wards	0.0	9.3	3.5	57	30
29. Our RRT criteria cause many unnecessary calls	38	44	11	7.0	0.0
30. Ward staff receives enough education related to RRT service	8.1	38	44	8.7	1.7
31. Our RRT has enough resources for effective action	16	30	5.9	35	12

(Continues)

TABLE 3 (Continued)

	% of respondents				
	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
Working as an RRT nurse (n = 174)					
32. Working as an RRT nurse has improved my ability to treat critically ill patient	2.9	9.3	9.8	43	35
33. As an RRT nurse, I can determine the severity of patient's condition independently	2.3	10	7.5	57	23
34. RRT nurses receive adequate amount of training in treating critically ill patient in our hospital	14	33	11	33	8.6
35. Our RRT doctors are qualified team leaders	2.3	14	11	49	24
36. Working as an RRT nurse increases my workload compared to other nurses	5.8	16	10	31	37
37. I feel adequately compensated working as an RRT nurse	88	6.4	5.2	0.6	0.0
Meaningfulness of RRT duty (n = 175)					
38. I feel working as an RRT nurse meaningful	5.1	6.9	6.3	34	47
39. I want to continue as an RRT nurse	4.6	9.8	6.9	21	57
40. I think that every Finnish hospital should have RRT	0.6	1.1	9.1	16	73
41. If I had to choose between two similar hospital, I would rather work in a hospital with RRT	0.6	2.9	9.8	19	68

Note: The Likert scores are expressed as percentages of the total count of the respondents. The counts in subheadings present the number of respondents answering the item (total count of respondents in the study is 176).

Abbreviations: ICU, intensive care unit; RRS, rapid response system; RRT, rapid response team.

TABLE 4 Respondents' answers (strongly agree/agree) to the 13/41 questions where there were statistical differences according to the frequency of the RRT participation

Question	Number of RRT working shifts per month (four or less [n = 108] vs five or more [n = 68])		Number of RRT calls per month (four or less [n = 123] vs five or more [n = 53])	
	% (strongly agree/agree)	P-value	% (strongly agree/agree)	P-value
5. There are delays in RRT activations	23 vs 43	.007	27 vs 38	.21
22. RRT implementation led to conflicts in the ICU between nurses and doctors	48 vs 24	.002	46 vs 22	.003
25. Everyday work of RRT causes conflicts between ward-nurses and RRT	8.7 vs 13	.45	6.7 vs 19	.028
28. Our RRT criteria can detect patient deterioration in time on the wards	94 vs 77	.003	89 vs 82	.22
32. Working as an RRT nurse has improved my ability to treat critically ill patient	69 vs 93	<.001	71 vs 94	.001
33. As an RRT nurse, I can determine the severity of patient's condition independently	71 vs 93	.001	72 vs 98	<.001
34. RRT nurses receive adequate amount of training in treating critically ill patient in our hospital	28 vs 62	<.001	33 vs 62	.001
35. Our RRT doctors are qualified team leaders	66 vs 82	.023	68 vs 83	.063
36. Working as an RRT nurse increases my workload compared to other nurses	61 vs 78	.021	65 vs 75	.22
38. I feel working as an RRT nurse meaningful	76 vs 91	.015	76 vs 94	.005
39. I want to continue as an RRT nurse	72 vs 90	.007	74 vs 91	.015
40. I think that every Finnish hospital should have RRT	85 vs 96	.044	86 vs 96	.063
41. If I had to choose between two similar hospital, I would rather work in a hospital with RRT	79 vs 99	.001	83 vs 96	.025

Note: Data are represented as percentages of the respondents in each group for agreeing/strongly agreeing with the statement. Statistically significant differences are presented in bold. The 5-point Likert scale was dichotomized (agree/strongly agree vs strongly disagree/disagree/uncertain) for these analyses.

Abbreviations: ICU, intensive care unit; RRT, rapid response team.

was conducted in a single country and included only tertiary hospitals, which lessens the external validity of the results.

5 | CONCLUSIONS

RRT nurses believe the RRS is effective for improving patient safety. They consider their RRT work meaningful and important and feel that their RRT participation has improved their critical care skills. These experiences are more prevalent among RRT nurses with more frequent RRT participation. Feeling undercompensated/overworked for RRT work, conflicts between RRTs and ward doctors, and infrequent RRT participation may be potential barriers for successful RRS.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest.

ORCID

Eetu Loisa  <https://orcid.org/0000-0003-1293-3847>

Joonas Tirkkonen  <https://orcid.org/0000-0001-7081-4227>

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

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