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Sustaining Health Care Interventions to Achieve Quality Care: What we can learn from Rapid Response Teams

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Abstract

Rapid response team (RRT) adoption and implementation is associated with improved quality of care of patients who experience an unanticipated medical emergency. The sustainability of RRTs is vital to achieve long-term benefits of these teams for patients, staff, and hospitals. Factors required to achieve RRT sustainability remain unclear. This study examined the relationship between sustainability elements and RRT sustainability in hospitals that have previously implemented RRTs.

Keywords

Innovation adoption; Medical Emergency Team; Rapid Response Team; Sustainability

The adoption and implementation of innovative interventions provide organizational leaders one way to address system problems and improve the quality of care.^{1,2} Their adoption and implementation are often associated with improved patient safety and organizational efficiencies.^{3,4} However, the implementation of innovative interventions in healthcare does not necessarily lead to improved outcomes or sustained, long-term change.⁵ Some argue that the ineffective and infrequent use of innovative interventions often result in the failure of innovative interventions to result in benefits to patients and organization.⁶ The outcomes achieved following adoption often depend on the degree to which the innovative interventions are sustained, and without sustainability the full benefits to patients, staff members, and the organization may never fully be realized.

Rapid Response Teams

One program that was implemented in hospitals to improve the quality of care provided to patients on acute care units is rapid response teams (RRTs). RRTs consist of a group of medical experts who respond and care for a patient experiencing an unexpected medical emergency.⁷ These teams are a key component of a hospital's Rapid Response System (RRS), a system that focuses on reducing failure-to-rescue events and meeting the needs of patients experiencing an unexpected medical emergency.⁸ At the time of their introduction to hospitals, RRTs were an innovative approach to patient care on acute care units.

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Since their introduction in 2004, as part of the Institute for Healthcare Improvement's *100 000 Lives* Campaign, RRT implementation has been widespread in U.S. hospitals. Yet, research indicates that barriers to RRT use⁹ and delayed RRT activation still exist, reducing the likelihood for the long-term sustainability of these teams.^{10,11} Sustaining RRTs is, however, critical because of the benefits they offer to hospitals, staff, and patients.¹² including reduced hospital mortality, intensive care unit (ICU) days, unintended ICU admissions, and cardiac arrest rates outside of the ICU.^{7,13-16} Sustaining RRTs may enhance patient safety and the quality of care on acute care units.^{11,12}

Sustaining RRTs is particularly important to nursing because nurse leaders are often at the forefront of implementation efforts by providing staffing, developing policies and procedures to support implementation efforts, and providing RRT training to frontline staff. Nurse leaders also serve as champions of implementation efforts by “selling” RRTs to staff and obtaining their buy-in. RRT implementation requires organizational change. Yet, the changes that are necessary and elements needed to achieve the long-term sustainability of RRTs remain relatively unexplored. Therefore, the purpose of this study was to examine the relationship between sustainability elements and RRT sustainability in hospitals that have previously implemented RRTs. Because both a sustainability score and the presence of sustainability elements were determined in the current study, an opportunity existed to also explore the relationship between sustainability elements and achieving RRT sustainability.

Objectives

The aims of this study were to (a) determine if certain sustainability elements were present in hospitals that have previously implemented RRTs, and (b) explore the relationship between sustainability elements and RRT sustainability.

Conceptual Framework

Mancini and Marek¹⁷ posit that 6 sustainability elements are important to achieve both middle-range program outcomes and the long-term outcome of sustainability. The sustainability elements are leadership competence, effective collaboration, demonstrating program results, strategic funding, staff involvement and integration, and program responsiveness. Middle-range program results refer to short-term objectives and the intermediate results prior to a program becoming sustained. These results include planning for sustainability and having confidence in the survival of the RRT program.

Mancini and Marek identify sustainability as the dependent variable, but they did not clearly define sustainability. For this reason, the more recent view of Slaghuis, Strating, Bal, and Nieboer¹⁸ was adopted, defining RRT sustainability as both routinization and institutionalization of RRTs in healthcare organizations. Routinization refers to work practices becoming a part of organizational routines through the reinforcement of principles and practices. Institutionalization refers to the “gradual adaptation of the organizational context, including structures and processes, to the new work practice” (p3)¹⁸.

Methods

Study design

A cross-sectional design was used to conduct this study. A self-reported web-based survey was used to collect the data.

Setting and sample

Hospitals that have participated in a statewide RRT Collaboration (n=56) were invited to participate. The 56 hospitals included both community and teaching hospitals, and they varied in size. All participating hospitals received a RRT toolkit to establish, implement, measure, evaluate, and sustain RRTs at acute care hospitals in the state. The collaborative was successful with the majority of hospitals having implemented RRTs (n=53, 91%) and providing 24/7 RRT coverage (n= 41, 73%).¹⁹

Earlier research with hospitals in the collaborative (N=56) indicated variation in sustainability scores across the participating hospitals, and a subsequent case study analysis indicated differences in the presence of sustainability factors.²⁰ One limitation of the previous work was that only 4 hospitals were selected for inclusion in the case study analysis, and associations between sustainability elements and scores were not examined. This study improves on the previous case-study analysis of sustainability factors by examining the sustainability elements in all participating hospitals and determining associations between sustainability elements and scores.

Measurement

Sustainability elements were measured using the RRT-Program Sustainability Index (RRT-PSI); middle-range program results were measured using 2 questions previously developed and used by Mancini and Marek¹⁷ and RRT sustainability was measured using the Measurement Instrument for Sustainability of Changed Work Practices (MISWP) (Short version). Also, some descriptive questions surrounding RRTs were included in the survey.

Sustainability elements were measured using the RRT-PSI, a modified version of the original Program Sustainability Index Instrument.¹⁷ The RRT-PSI consists of 35 items across 5 subscales scored on a 7-point Likert scale (1= strongly disagree to 7=strongly agree). Subscales include Leadership competence (n=5) ($\alpha = .81$), Effective collaboration (n=10) ($\alpha = .88$), Demonstrating program results (n=4) ($\alpha = .85$), Strategic funding (n=4) ($\alpha = .76$), Staff involvement and integration (n=8) ($\alpha = .76$), and Program responsiveness (n=4) ($\alpha = .67$). The complexity of the RRT program and potential involvement of various staff members in the planning and implementation of the RRT program in hospitals required the addition of some questions. Additional questions were added to capture RRT members' involvement and integration. One other question was added to the Strategic funding subscale to capture the availability of funding for staff overseeing the RRT program and for hiring RRT members.

Two questions were asked to measure middle-range program results: "To what extent does the RRT project meet the needs of patients?" and, "How confident are you that the RRT

project will be active in 5 years?" Response options were measured on a 4-point Likert scale (not at all, somewhat, moderately, and fully).

RRT sustainability was measured by the MISWP¹⁸. The MISWP consists of 30 items across 7 subscales including Routinization I ($\alpha = .85$), Routinization II ($\alpha = .75$), Routinization III ($\alpha = .71$), Institutionalization of skills ($\alpha = .92$), Institutionalization of documentation ($\alpha = .89$), Institutionalization of practice materials ($\alpha = .81$), and Institutionalization of team reflection ($\alpha = .87$). Items were scored on a 5-point Likert scale (1=I don't agree at all to 5=I agree very much). The wording of some questions and sentence construction were changed to enhance the clarity of questions as they relate to RRTs.

Descriptive questions asked participants about the characteristics of their RRTs such as the composition of the team, specification of RRT calling criteria and an RRT order set, presence of an RRT oversight committee, extent of RRT coverage in the organization, and if RRT calling was limited to staff members or if patients and families could activate RRT calls.

Procedures

Upon Institutional Review Board approval, the researcher sent a recruitment letter and link to the electronic survey to Chief Nursing Officers (CNOs) of participating hospitals. Using the Tailored Design Method,²¹ a follow-up email was sent within 1 week and a hard copy of the recruitment letter and survey was mailed within 2 weeks from the initial contact completed the electronic survey to non-responder hospitals. Due to poor recruitment, an IRB modification was submitted and upon approval, a second mailing of the recruitment letter and survey occurred 2 weeks following the first mailing. A final contact occurred 1 week after the second mailing. The electronic survey remained active for a period of 6 weeks from the date of initial contact.

Data analysis

Data were analyzed using descriptive and inferential statistics. Cronbach alpha statistics were generated for each of the subscales and the composite scale scores to summarize the internal consistency (reliability) of each measure. Descriptive statistics were used to summarize and inspect the distributions of study measures for making the appropriate choice of statistical procedure.

Descriptive summaries were generated for all subscales of the RRT-PSI and MISWP (Short version), and for the 2 items of the middle-range program result scale. A composite score was generated for the RRT-PSI, middle-range program results, and MISWP (Short version). Spearman rank correlation analyses assessed the association between each of the RRT-PSI subscales representing the sustainability elements and both the middle-range program results and MISWP (Short version) composite scores.

Results

Sample characteristics

Of the 56 hospitals that participated in a statewide 9-month collaborative to implement and sustain RRTs, 26 (46%) completed the survey. Twenty-one (81%) of hospitals have specified RRT calling criteria, 18 (68%) have implemented an RRT order set, 24 (92%) have adopted an RRT policy, and 14 (54%) have an RRT oversight committee in place. Only 5 (19%) hospitals have an early warning system in place, and 15 (58%) participated in the Institute for Healthcare Improvement's *100 000 Lives* Campaign. All hospitals provided 24/7 RRT coverage, and the majority (n=20, 77%) had 2 to 3 staff members serving on the team. Only a small number of hospitals had a dedicated RRT nurse who responded to calls and also rounded on patients (n=7, 27%).

Sustainability elements

Variation existed in the RRT-PSI sub-scales representing the various sustainability elements in the sample of hospitals (Table 1). Of the 6 sustainability elements, Demonstrating Program Results was most highly present in hospitals (M=6.24; Median= 6.75; IQR=5.5, 7.0), followed by Staff Involvement and Integration (M= 6.21; Median=6.69, IQR=6.0, 7.0) and Leadership Competence (M=6.21; Median=6.25; IQR=5.69, 7.0). The sustainability element that was weakest in hospitals was Effective Collaboration (M=4.92; Median= 4.96; IQR=4.1, 7.0). Some variation existed in hospitals' RRT-PSI scores with a mean RRT-PSI composite score of 5.84 (SD=.788).

Middle-range program results

The majority of participants strongly agreed that RRTs meet the needs of patients (n=19, 76%) and were confident that the RRT project would still be active in 5 years (n=19, 79.2 %, missing data = 2, 7.7%). The median middle-range program results composite score was 7.0 (IQR=6.5,7).

RRT sustainability

RRT sustainability in participating hospitals was measured by the MISWP (Short version).¹⁸ Hospitals achieved a high level of RRT sustainability, with a mean score of 3.30 (SD=.458) out of 4.0. Subscale scores were also evaluated with Routinization II being the highest reported score (Median=4.0, IQR=3.58, 4.0) followed by Routinization I (Median = 3.8, IQR=3.6, 4.0). Practice Materials (Median=3.0; IQR=2.67, 3.25) and Team Reflection (Median=3.0; IQR=2.73, 4.0) scores were the lowest (Table 1).

Associations between sustainability elements and RRT sustainability

Statistically significant correlations were observed between some sustainability elements, middle-range program results, and RRT sustainability (Table 2). Several sustainability elements were strongly associated with achieving middle-range program results. These elements include Leadership Competence ($r=.529$, $p=.005$), Demonstrating Program Results ($r=.549$, $p=.004$), Strategic Funding ($r=.555$, $p=.003$), and Staff Involvement and Integration ($r=.400$, $p=.043$). Collaboration and program responsiveness were not important. Several

sustainability elements were significantly associated with achieving RRT sustainability, including Leadership Competence ($r=.473$, $p=.015$), Strategic Funding ($r=.438$, $p=.025$), and Staff Involvement and Integration ($r=.526$, $p=.006$), with the latter being most critical to RRT sustainability. An evaluation of the association between the composite scores indicated that the RRT-PSI score was statistically significant correlated with middle-range program results ($r=.575$, $p=.002$) and with RRT sustainability ($r=.468$, $p=.016$). Middle-range program results also were correlated with RRT sustainability ($r=.561$, $p=.003$).

Discussion

This study demonstrates that some proposed elements of sustainability were associated with hospitals' sustainability scores. Organizational leaders need to demonstrate RRT program results by generating evaluation plans and conducting evaluations on a regular basis. Evaluation is important because it allows for program feedback to staff members of successful program outcomes and for leaders to make program adaptations to better fit with the needs of the organization. This finding is in alignment with other researchers who have demonstrated that a key component for ensuring sustainability of innovations is the “fit” of the innovation with the organization and the need for organizational members to perceive benefits from implementation of the innovation.^{22,23} The second most important element was involving staff members in the design and implementation of the RRT program. This supports previous research indicating that involving staff members helps to obtain innovation buy-in and increases staff knowledge of the innovation.²⁴ This study also found that leadership competence, as demonstrated by leaders establishing a vision for the RRT program, developing plans within the first 2 years following adoption to sustain RRTs, generating project plans and strategies for the survival of the RRT program, and continually planning for sustainability, was associated with RRT sustainability. Leaders play an important role in facilitating organizational change and the implementation of innovations as they make resources available to continue the RRT program and provide visible support for the RRT program.²⁰

Some study limitations must be recognized. The sample size limits the generalizability of the findings. The use of a web-based survey with self-report may have resulted in nonresponse and response bias.²⁵ However, these limitations were mitigated by ensuring participants of the confidentiality of the study and carefully stating survey questions to avoid leading responses. Future studies on RRT sustainability should include a power analysis to determine the sample size. Employing different data collection methods (eg, surveys, interviews, and documentation) will also allow for triangulation of the data to increase the validity of the study findings and to achieve power in the study.²⁵

Implications for Nursing

To achieve innovation sustainability, nurse leaders should develop an evaluation process to determine the effectiveness of programs. This will enable them to provide feedback to staff on outcomes which, in turn, will help to generate program buy-in and support. The involvement of staff members in the planning and implementation of innovations is imperative, but it may be difficult to achieve when staff shortages exist in the organization.

However, nurse leaders should evaluate the cost of hiring temporary staff to allow nursing staff to be involved in implementation against the investment and opportunity costs that will likely result when failing to sustain innovations such as RRTs. Furthermore, when innovations are adopted, nurse leaders need to articulate the vision and objectives for adopting the innovation and plan upfront for the sustainability.

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Table 1
Descriptive statistics of Sustainability Elements, Middle-range Program Results, and RRT Sustainability

	Median (IQR)
Sustainability elements (RRT-PSI Composite Score)	5.88 (5.51; 6.43)
Leadership Competence	6.25 (5.69; 7.0)
Collaboration	4.96 (4.08; 6.35)
Program results	6.75 (5.50; 7.0)
Funding	5.88 (4.0; 6.63)
Staff involvement	6.69 (6.0; 7.0)
Program responsiveness	6.19 (5.69; 6.75)
Middle-Range Program Results (Composite Score)	7.00 (6.5; 7.0)
Program meet needs	7.00 (6.5;7.0)
Program active for 5 years	7.00 (7.0; 7.0)
RRT sustainability (MISWP Composite Score)	3.31 (2.96; 3.72)
Routinization I	3.80 (3.6;4.0)
Routinization 2	4.00 (3.58;4.0)
Routinization 3	3.25 (3.0;4.0)
Skills	3.54 (2.8;4.0)
Documentation	3.20 (2.8;3.64)
Practice Materials	3.00 (2.67;3.25)
Team Reflection	3.00 (2.73;4.0)

IQR = 25th and 75th Interquartile Range; RRT= Rapid Response Teams; MISWP=Measurement Instrument for Sustainability of Changed Work Practices

Table 2
Correlations between Sustainability Elements, Middle-range Program Results, and RRT Sustainability

	Middle-Range Program Results	RRT Sustainability (MISWP Composite Score)
Sustainability elements (RRT-PSI Composite Score)		
Leadership Competence	.575 ^a	.468 ^a
Collaboration	.529 ^b	.473 ^a
Program results	NS	NS
Funding	.549 ^b	NS
Staff involvement	.555 ^b	.438 ^a
Program responsivity	.400 ^a	.526 ^b
Program responsivity	NS	NS
Middle-Range Program Results (Composite Score)	-	.561 ^b

RRT=Rapid Response Teams; RRT-PSI=Rapid Response Team Program Sustainability Index; MISWP=Measurement Instrument for Sustainability of Changed Work Practices.

^a p<.05

^b p<.01

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