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Family Rounds in the Medical Intensive Care Unit: An Intervention to Enhance Communication

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Final Project Report for Doctorate of Nursing Practice

Family Rounds in the Medical Intensive Care Unit: An Intervention to Enhance Communication

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Abstract

Background: In the Intensive Care Unit (ICU) family member satisfaction is an important element of quality patient care. Families of ICU patients value communication with care providers and involvement in their relative's care.

Objectives:

1. To determine if scheduled family rounds each day can improve the satisfaction and feelings of support with decision-making for family members of ICU patients?

2. Evaluate any associations between patient characteristics (hospital length of stay, ICU length of stay, and ventilator days) and family satisfaction?

Methods: This pilot project was conducted in a 12-bed medical ICU led by advanced practice nurses (APRN-MICU). Using the family satisfaction in the ICU survey (FS-ICU), baseline data was collected from family members. Dedicated family rounds each afternoon were then implemented, after which another period of surveying occurred. Performance-importance plots were created to identify individual survey items that were highly correlated with satisfaction but received low scores.

Results: There were a total of 102 family members surveyed in the pre-intervention and post-intervention periods. Although families reported high levels of satisfaction, after the intervention a non-significant decrease in FS-ICU scores (p=0.144) were observed. Satisfaction regarding the ease of getting information decreased after family rounds (p=0.012). Individual items identified using performance-importance plots did not indicate improvement after the intervention. Patient length of stay, ICU length of stay, and ventilator days were not correlated with family member satisfaction with care.

Conclusion: Process measures to track the fidelity of the intervention are crucial to determine effectiveness. Expectations among APRN-MICU families were likely unmet. The FS-ICU alone lacks the sensitivity to assess differences in ICU family satisfaction.

Key words: family satisfaction, intensive care unit, ICU, FS-ICU, communication, rounding

Family Rounds in the Medical Intensive Care Unit: A Communication Intervention

Background

As defined by Donald Berwick (2009), who helped establish the concept, patient-centered care is "the experience of transparency, individualization, recognition, respect, dignity, and choice in all matters…related to one's person, circumstances, and relationships in health care" (p. w560). Patient-centeredness has become an established component of quality care (IOM 2001; Davidson et al. 2017). Satisfaction with care has emerged as the pervasive metric to assess patient-centeredness and is a variable tied to national reimbursement programs and hospital quality initiatives. Importantly, higher patient satisfaction scores have been correlated with improved adherence to clinical practice guidelines (Jha, Orav, Zheng, & Epstein 2008) and better outcomes, such as lower in-hospital mortality and reductions in 30-day readmissions (Glickman et al. 2010). In the intensive care unit (ICU) patients' capacity is often limited so communication with family and/or their surrogate regarding care becomes paramount. As a result, family satisfaction with care in the ICU has become an important measurement tool for improving processes of care and determining whether changes have been effective (Kryworuchko & Heyland 2009). Primary determinants of satisfaction among families in the ICU are related to communication and interactions with staff, including support in decision-making (Heyland & Tranmer 2001; Heyland et al. 2002). Communication-based interventions have demonstrated reductions in family member psychological symptoms (Lautrette 2007; Curtis et al. 2016), reduced resource utilization for patients (Lilly, Sonna, Haley, & Massaro 2003), and decreased non-beneficial treatments (Schneiderman et al. 2003).

To improve family satisfaction utilizing a communication-based intervention, many studies incorporated a multidisciplinary approach. Additional positive effects such as decreased family depressive symptoms and decreased ICU resource utilization were also measured when palliative care providers (Curtis et al. 2008; Kaufer, Murphy, Barker, & Mosenthal 2008), social workers (Curtis et al. 2016), ethics teams (Schneiderman, Gilmer, Teetzel 2000) and care coordinators (Shelton et al. 2010) were added to enhance communication. It was common for end-of-life situations (Curtis et al. 2011; Gerstel, Engelberg, Koepsell, & Curtis 2008) to be included in the evaluations and for formal family conferences to be communication tools (Gries, Curtis, Wall, Engelberg 2008; White, Braddock, Bereknyei, Curtis 2007). This evidence exemplifies the multidisciplinary approach that is a cornerstone to patient- and family-centered care in the ICU, yet these interventions can be cumbersome and may not represent day-to-day ICU care.

A foundational ingredient related to client satisfaction involves the primary ICU team, who orchestrates the daily activities for patients and guides them along their hospital course. The development of rapport and partnership among patients, families, and the ICU team through regular communication directly impacts their experiences (Azoulay, Chaize, & Kentish-Barnes 2014). It is common in the ICU to have multiple consulting services that can confuse patients and families, giving mixed messages. This was evident in a recent study when palliative care-led discussions had the paradoxical effect of increasing symptoms of posttraumatic stress disorder among family members (Carson et al. 2016). Furthermore, consultation services seem to frequently operate at maximum capacity, warranting thoughtful consideration by the primary team before eliciting their services. In this example regarding palliative care, some authors have called for a renewed devotion to "primary" palliative care that should be delivered without

consulting specialists to mitigate the workload (Quill & Abernathy 2013; Aslakson, Curtis, Nelson 2014). An organized ICU culture is influential and teamwork is associated with family satisfaction (Dodek et al. 2012). The ICU team is capable of providing a majority of the care required for patients and overuse of consult services could undermine their therapeutic intentions. Communication among the ICU team, patients, and their families is essential for optimal patient-centered experiences.

Involving patients and their families in daily communication is recognized as a desirable patient-centered strategy, yet no best practice exists. A well-designed study conducted to evaluate the inclusion of families in daily rounding with the primary ICU team increased family satisfaction in domains measuring frequency of communication with physicians and support during decision-making, but families also reported feeling pressure to make decisions quickly (Jacobowski, Girard, Mulder, & Ely 2010). Further evidence evaluating family participation in rounds in adult populations is limited, but there are signals indicating improvements in family-physician relationships and family satisfaction (Mangram et al. 2005; Schiller & Anderson 2003). Studies in pediatric and neonatal populations, where parents are recognized as primary decision-makers, have shown consistently positive associations between bedside rounding and family engagement (Bracht, O'Leary, Lee, & O'Brien 2013; Ladak et al. 2013; Latta, Dick, Parry, & Tamura 2008; Tripathi et al. 2015). Qualitative endeavors among adults highlight the importance to families of timely, clear, and compassionate communication with the care team, while frequency and consistency of communication are areas for improvement (Nelson et al. 2010; Schwarzkopf et al. 2013). Another consideration for improving communication is the use of medical terminology during rounding, which contributes to confusion and frustration for family members (Nelson 2010; Azoulay et al. 2004). Also, ICU staffs perceive that family

inclusion in rounds will perpetuate extended rounding time and could induce stress or anxiety for families (Davidson, 2013). Synthesis of this evidence supports the conclusion that family members should likely be invited to participate in daily rounds, but changes may need to occur to accommodate their participation. Alternatively, additional communication efforts may be geared toward satisfying the needs for communication that patients and families have.

Objectives

A scheduled family rounding time to enhance communication was introduced in the medical intensive care unit led by advanced practice registered nurses (APRN-MICU) at UK HealthCare.

The research questions to be answered are:

1. Will scheduled family rounding improve the satisfaction with care and perception of support with decision-making reported by family members of APRN-MICU patients?

2. Are there correlations between patient characteristics and family satisfaction?

Methods

Study design

This was a pre-and-post intervention study design conducted in three phases. The first phase was the pre-intervention phase that spanned one month of time (December 2016) when survey data was collected from family members of patients admitted to the APRN-MICU. The initiation phase lasted three months (January through March 2017) during which the APRN-MICU nurses were educated on the concepts of family rounds and the providers (nurse

practitioners and attending physicians) underwent training that detailed the structure and components of the family rounding intervention they were to implement and manage. Family rounds then began. Finally, the post-intervention phase was conducted over two months (April and May 2017) to achieve a similar number of responses to compare with the pre-intervention cohort. The study protocol was approved by the institutional review board without the need for documented informed consent because consent was implied by the completion of the survey.

Study setting

UK HealthCare, the academic hospital affiliated with the University of Kentucky, is an 860-bed level 1 trauma center and tertiary referral center. The UK HealthCare medical intensive care unit (MICU) includes 44 beds divided into three separate units, two with 16 beds each and one with 12 beds. The 12-bed unit was the location targeted as the pilot unit for this study and will be referred to as the APRN-MICU. The management of patients in this unit is the responsibility of advanced practice nurses in conjunction with an attending physician. Fellow and resident physicians are not part of the interdisciplinary team in this particular unit of the MICU. The daily rounding process in the entire MICU is usually conducted between 0830 and 1030. There is opportunity for family members to listen during rounds, but there is no established process to include them.

Study population and data collection

Each patient admitted to the APRN-MICU during both survey periods were screened by a dedicated research nurse and a family member was approached after 72 hours for their interest in participating. Other inclusion criteria for family members were: age $\geq$ 18 years and the ability to understand written or spoken English. A family member who was designated as a surrogate

decision-maker was typically approached, but any family member who had regularly been involved in the patient's care could be surveyed. If several family members were involved multiple surveys were allowed for a single patient, provided they were completed on different days. Surveys were entered directly into a Research Electronic Data Capture (REDCap) database using a laptop computer or administered on paper upon the participant's request and then transcribed into REDCap by research staff.

Family rounds intervention

The intervention in this study was to add a daily scheduled family rounding process in the APRN-MICU to facilitate communication among the care team, the patient (when possible), and the patient's family. The intention was to create a specific time for family's concerns to be addressed, questions to be asked, and changes in the plan of care to be considered. Each afternoon at 1400 was chosen as the time for family rounds. Approximately 10 minutes per patient was allotted with the idea that more extensive discussions would need to be scheduled independently if a need was identified. The APRN dedicated to managing care for the patient would visit the room for the family rounds. The bedside nurse, the MICU case manager, the MICU social worker, and the attending physician were also invited. A phone call was offered to interested families that could not be present in the afternoon.

Between the surveying periods there was training conducted during two informal 1-hour sessions with the APRN group led by an attending physician. The content was focused on disseminating and discussing evidence supporting the importance of family engagement and the clinical implications of improving satisfaction. The structure and goals of family rounding were outlined and unit-based logistics were considered collaboratively to encourage uptake by the

staff during these trainings. It was decided, for example, that a specific structure or script would not be utilized for the family rounds to maintain adaptability for different family's needs. Electronic mail with an abbreviated summary of the APRN training information was distributed to the nurses on the unit detailing the goals of the family rounding intervention to engage families, improve satisfaction, and incorporate patient-centeredness. The efficiency of being able to direct families to the afternoon rounds was highlighted. Signs were placed in each patient's room that explained the family rounding process, highlighting the time to plan for it each day.

Measures

The previously refined and validated Family Satisfaction-Intensive Care Unit (FS-ICU) survey was used in this study. The goal of this study was to improve family satisfaction by incorporating dedicated family rounds to enhance communication. The FS-ICU survey tool is a 24-item questionnaire measuring family satisfaction with care in the ICU. It generates an overall score (FS-ICU$_{total}$) and scores of two sub-domains: satisfaction with care (FS-ICU$_{care}$) and support with decision making (FS-ICU$_{dm}$), which consist of 14 and 10 questions, respectively. The reliability performance previously described include a Cronbach's α coefficient for the two sub-scales of 0.92 (FS-ICU$_{care}$) and 0.88 (FS-ICU$_{dm}$), good sub-scale correlation (Spearman's ρ 0.73, $p < 0.001$), and a combined single scale Cronbach's α coefficient of 0.94 (Wall, Engelberg, Downey, Heyland, & Curtis 2007).

Family members in the APRN-MICU provided consent after discussing the study's goals prior to their participation. Family members completed the FS-ICU and were asked to provide the following demographic information: age, sex, relationship to patient, prior involvement with

the family member in the ICU, usual frequency of visits to the patient outside the hospital, and distance to the ICU. Patient characteristics obtained from the electronic medical record included: age, sex, primary discharge diagnosis, discharge disposition, ventilator days, ICU length of stay, and total hospital length of stay.

Data analysis

Demographic data for family member survey respondents and patients for the pre- and post-intervention surveys are included in Tables 2 and 3, respectively. Categorical data are shown as frequencies and proportions. Continuous data are presented as means and standard deviations (SD) and/or as medians with interquartile ranges (IQR) for skewed data. Comparisons of patient and family data between the pre- and post-intervention groups were performed using *t* tests for age and Mann-Whitney U tests for other continuous variables. The chi-squared or Fisher exact test was used for categorical variables.

Participants responded to each item of the FS-ICU using a 5-point Likert scale, which were then transformed to a scale with values between 0 and 100 with higher values indicating increased satisfaction (Heyland & Tranmer 2001; Wall et al. 2007). Overall scores and subscale scores were calculated as previously described with the average of each subscale determined, then added together for the total score (Wall et al. 2007). Differences between the pre-intervention and post-intervention groups among overall and subscale scores as well as each individual item score were examined using Mann-Whitney U tests. Additionally, each individual item was evaluated to identify priority targets for improvement using performance-importance plots (Dodek, Heyland, Rocker, & Cook 2004; Stricker et al. 2009; Pagnamenta et al. 2016). Plots were generated for the pre-intervention and post-intervention periods using the FS-ICU

overall scores and subscale scores to compare. These useful visual representations plot the frequency of excellent (completely satisfied) responses on one axis and the item's correlation with the appropriate overall score on the other axis. This approach aids in targeting items that might rank poorly, but with high correlation to the overall score, by making them easy to identify in the upper left quadrant. The upper right quadrant then would represent the items with high importance and high performance, indicating that these are optimal. The lower left quadrant contains items indicated as having low importance and low performance, so resources dedicated to these items should be minimized if possible. Finally, the lower right quadrant has items that scored highly, but had low correlation with the overall score, which represent overkill and may also benefit from process or resource adjustments.

Three pertinent patient characteristics: total hospital length of stay, ICU length of stay, and days of mechanical ventilation may indirectly reflect the severity of illness and complexity of ICU care. Also, links have been made previously between the utilization of hospital services and client satisfaction as described above. We examined these variables for their association with overall satisfaction scores using the Spearman's rank-order test. All tests were conducted two-sided and p-values were considered significant if <0.05. SPSS Version 24 (IBM Corp. Armonk, New York) was used for all statistical analyses.

Results

Sample characteristics

Response rates for the pre-intervention and post-intervention periods were 96% and 98%, respectively. During the pre-intervention surveying a single patient had more than one family member complete the FS-ICU, while the post-intervention surveying yielded four. Two of the

post-intervention cases had the subsequent surveys obtained five days after the original

respondent. The groups were similar in age (p=0.526) with a majority of respondents having

past experience with patients in the ICU (76% and 73%). The pre-intervention group was made

up of more females, who tended to be daughters of the patient (p=0.107). The vast majority of

respondents lived more than one hour from the ICU (49% and 68%; p=0.131).

Patient groups were similar in age (p=0.917) and had comparable resource utilization

based on length of stay and use of mechanical ventilation (Table 3). Mortality rates differed

between cohorts with more patients dying in the pre-intervention group (36% vs. 18%; p=0.053).

However, families were surveyed while patients were in the ICU and mortality was only

calculated retrospectively. Otherwise the groups were similar.

Family satisfaction

In this study, there was no significant difference in FS-ICU scores detected after the

family rounds intervention (Table 1). The median overall satisfaction scores (FS-ICU$_{total}$) and

subscales scores for satisfaction with care (FS-ICU$_{care}$) and support with decision-making (FS-

ICU$_{dm}$) were 92, 95, and 90, indicating that family members are extremely satisfied with care in

the APRN-MICU. The lowest individual item scores in either the pre-intervention or post-

intervention groups were categorized as "very good," with mean values of 79 and 72 respectively

(Table 4). However, the post-intervention median scores for the FS-ICU$_{total}$, FS-ICU$_{care}$, and FS-

ICU$_{dm}$ were all non-significantly lower than pre-intervention scores. Additionally, the score

from the question (16) regarding the "ease of getting information: willingness of ICU staff to

answer your questions" was significantly lower in the post-intervention group (p=0.012). When

analyzed as pre-intervention and post-intervention groups as well as an entire cohort there were

not significant correlations among patient's hospital length of stay, ICU length of stay, number of ventilator days, and family's overall satisfaction scores (Table 5).

The performance-importance plots (Figures 1-3) show individual items from the FS-ICU survey in the upper left quadrant that had low satisfaction scores, but were correlated highly with the overall score. These indicate where the greatest opportunities for improvement might be. For the overall satisfaction (FS-ICU$_{total}$) scores it is apparent that the items for frequency of communication with physicians (15), consistency of information (20), and honesty of information (18) were persistent in their position despite the family rounding intervention. Additionally, the item for ease of getting information (16) was new to the upper left quadrant after the intervention. Item 15 maintained a high level of correlation to the overall score, which was emphasized in the FS-ICU$_{dm}$ plots. The satisfaction with decision-making plots also demonstrate the reduction in "excellent" ratings for item 20. The plots for the satisfaction with care subscale indicate the persistence of item 7, coordination with care, as a low scoring item. This survey question improved in the overall satisfaction score, but remained in the upper left quadrant for the subscale with a higher correlation to the subscale score. The vertical lines indicating the median distribution regressed following the intervention in all pre-/post-intervention comparisons, demonstrating the decline in relative frequency of excellent ratings.

Discussion

In this before-after pilot study, a family rounds component was added to the daily workflow in the APRN-MICU that did not impact the global measure of family satisfaction. Similarly, other studies using comparable design methods were unable to show significant differences in family satisfaction (Jacobowski et al. 2010, Curtis et al. 2008, Pagnamenta et al.

2016, Shaw et al. 2014). Skewed data with high baseline scores limits the ability to appreciate measurable differences after an intervention unless sample sizes are large. Response bias is inherent to surveys and extreme response tendency is prevalent, especially if a disparity or perceived vulnerability exists (Elliott, Haviland, Kanouse, Hambarsoomian, & Hays 2009). Although our response rate was very high, we surveyed family members while they were still present in the ICU, which may have confounded their responses due to the perception that patient care could be affected. There is a possibility that the FS-ICU lacks sensitivity to measure the variables impacting family member's perceptions of care. In several mixed-methods studies there has been either discordance among qualitative and quantitative results or significant themes detected via qualitative analysis that may have been represented in the FS-ICU where high scores were attainable (Schwarzkopf et al. 2013; Wright et al. 2015; Henrich et al. 2011). It could also be possible that our intervention truly had no effect. Finally, our pilot study was underpowered to detect some differences in satisfaction between groups.

Our study showed that median satisfaction scores were uniformly lower after the family rounds intervention. One reason for this could be that there was unmet anticipation on behalf of family member participants. Nurses were conveying information regarding the timing and purpose of the rounds to families and the signs in each room added to a set of expectations that may not have been satisfied. Only 1/6 of the individual item scores improved after family rounding and a single item concerning the ease of getting information declined significantly, which may be additional signals that we misled family members. Performance-importance plots demonstrated trends that were consistent with these statistical analyses. Unfortunately, the fidelity of daily family rounds is unknown because we did not establish process measures and documentation for its evaluation. Together these findings support the ongoing development of

strategies to frequently and effectively involve family members with the care provided in the ICU. Another factor contributing to the decline in satisfactions scores could be related to the higher proportion of mortality in the pre-intervention group (36% vs. 18%). Evidence demonstrates that family satisfaction scores of non-surviving ICU patients tend to be higher than those of surviving patients (Wall, Curtis, Cooke, Endelberg 2007; Dodek et al. 2012). Finally, the allowance for multiple family members from a single patient to complete surveys was greater in the post-intervention group, which may have biased the results by over-representing that experience.

Implications for research and practice

The study is evidence that family members of ICU patients are sensitive to their ongoing communication with the care providers. Families likely have various needs for their involvement with care, so elucidating the dose of engagement may be challenging. However, with a multi-faceted and flexible approach the ICU team could establish a process with measurable outcomes that fulfills family's needs. As the impact of an ICU stay on family members becomes clearer there will need to be greater attention dedicated to the ways family members are integrated into patient care and the treatment that they, themselves, receive (Davidson, Jones, & Bienvenu 2012; Matt, Schwarzkopf, Reinhart, Konig, & Hartog 2017). Outcomes of critical illness survivors also indicate an emphasis on enhancing communication both during the hospital stay and afterwards to improve satisfaction with care and safety (Dykes et al. 2017).

The family rounds project should move forward into a larger study of longer duration to yield more robust evidence. The following methodologies would be ideal in preparation: conduct formalized communication training for all ICU care providers and develop process measures to

ensure fidelity and enable surveillance for ongoing improvement. Furthermore, to evaluate

effectiveness a more comprehensive approach, such as a mixed-methods analysis should be

utilized.

Conclusion

Family rounds in the APRN-MICU had no significant effect on family satisfaction

scores, but scores were high overall across the entire study population. It is likely that the FS-

ICU alone is not sufficient for measuring differences between groups before and after an

intervention and its results may be bolstered synergistically with other data. The importance of

engaging family members in the ICU continues to become more apparent, warranting further

endeavors to do so.

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Table 1

FS-ICU survey results

Variable	PRE-intervention N=51 Median [IQR]	POST-intervention N=51 Median [IQR]	P-value
FS-ICU$_{care}$	96[81,100]	93[79,98]	0.192
FS-ICU$_{dm}$	93[80,100]	85[73,98]	0.082
FS-ICU$_{total}$	95[83,99]	91[75,97]	0.144

P-values for difference in scores between the pre-intervention and post-intervention surveys were calculated using the Mann-Whitney U test and a two-sided 5% significance level for statistical inferences.

Table 2   Demographic characteristics of family member respondents

Characteristic	Pre	Post	P-value
	n = 51	*n* = 51	
Mean Age (SD)	48.5(13.6)	50 (13.2)	0.526
Indicated 'yes' to past experience as a family member of a patient in the ICU	76%	73%	
Indicated 'yes' to living with the patient	43%	47%	
Gender - No. (%)			0.107
Female	42(82)	35(69)	
Relationship – No. (%)			
Wife	8(15.7)	8(15.7)	
Mother	7(13.7)	4(7.8)	
Daughter	15(29.4)	6(11.8)	
Husband	1(1.2)	4(7.8)	
Father	2(3.9)	0(0)	
Son	2(3.9)	6(11.8)	
Partner	1(1.2)	5(9.8)	
Sister	4(7.8)	5(9.8)	
Brother	4(7.8)	3(5.9)	
Other	7(13.7)	10(19.6)	
Proximity to hospital – No. (%)			0.131
Less than 15 minutes away	7(13.7)	4(7.8)	
15 minutes to an hour away	19(37.3)	12(23.5)	
More than an hour away	25(49)	35(68.6)	

Table 3 MICU patient characteristics

Characteristic	Pre	Post	P-value
	n = 50	n = 45	
Average Age (± SD)	55.7(±18.14)	56.1(±17.8)	0.917
Median ICU length of stay (IQR)	10(7,14)	11(7,18)	
Mean ICU length of stay(SD)	13.1(11.55)	13(8.67)	0.683
Median hospital length of stay (IQR)	14(10,23)	14(10,28)	
Mean hospital length of stay (SD)	21.36(22.19)	18.79(13.07)	0.808
Median ventilator days (IQR)	7(3,11)	7(2,12)	
Mean ventilator days (SD)	10.24(13.63)	8.89(7.9)	0.945
Gender - No. (%)			0.507
Male	28(56)	25(56)	
Female	22(44)	20(44)	
Race – No. (%)			
White	46(92)	45(100)	
Black	4(8)	0(0)	
Disposition – No. (%)		*4(8.9) unknown*	0.053
Death	18(36)	8(18)	
Home	20(40)	20(44)	
Long term acute care (LTAC)	2(4)	5(11)	
Skilled nursing facility (SNF)	2(4)	4(9)	
Rehabilitation facility	8(16)	4(9)	
Diagnosis – No. (%)			0.318
Respiratory failure	22(44)	15(33)	
Sepsis	14(28)	12(27)	
Cardiac	3(6)	2(4)	
Renal failure	1(2)	2(4)	
Cirrhosis	2(4)	1(2)	
Gastrointestinal hemorrhage	0(0)	4(9)	
Other	8(16)	7(16)	

Table 4

FS-ICU individual item scores

Domain	FS-ICU Question	Score at pre-intervention Mean±SD	Score at post-intervention Mean±SD	p-value
Care	1	92.65±20.18	91.18±13.99	.107
	2	92.16±18.36	89.00±16.10	.129
	3	94.90±12.48	90.10±15.25	.060
	4	92.35±15.48	88.24±15.29	.079
	5	88.73±20.80	90.20±15.87	.874
	6	85.29±24.58	85.50±17.56	.437
	7	86.76±22.00	87.25±18.28	.754
	8	89.71±21.90	88.24±18.94	.357
	9	93.14±15.07	89.71±18.83	.338
	10	87.25±25.68	86.76±22.00	.592
	11	88.24±21.42	88.23±18.27	.601
	12	88.73±20.80	89.71±17.45	.984
	13	78.57±23.94	81.37±21.12	.653
	14	85.29±22.46	79.41±23.29	.095
Decision Making	15	79.90±24.50	71.57±29.59	.152
	16	91.67±17.80	83.82±19.89	.012
	17	89.71±21.32	87.75±18.28	.225
	18	90.20±17.38	86.76±17.57	.225
	19	89.71±20.11	87.25±18.28	.268
	20	85.29±26.07	78.92±27.10	.097
	21	84.80±26.02	82.84±26.22	.628
	22	83.82±21.11	79.41±23.83	.313
	23	82.84±21.50	78.92±25.19	.524
	24	96.08±19.60	94.12±23.76	.648

P-values for difference in scores between the pre-intervention and post-intervention surveys were calculated using the Mann-Whitney U test and a two-sided 5% significance level for statistical inferences.

Table 5

Association of patient characteristics with family satisfaction

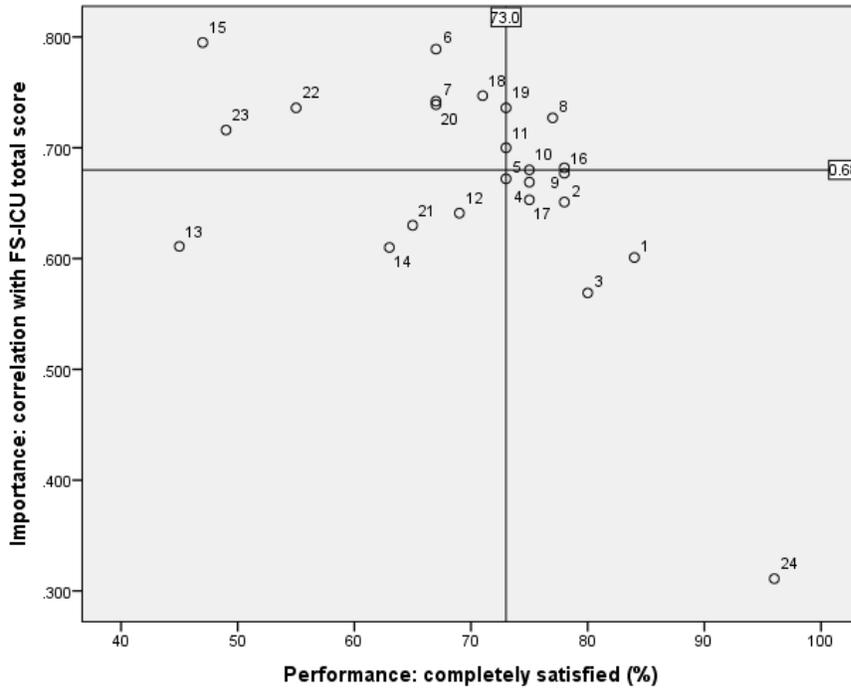| FS-ICU$_{total}$	**Total Length of Stay** N=94	**ICU Length of Stay** N=92	**Ventilator Days** N=94
Pre	0.130	0.130	0.234
Post	0.607	0.394	0.964
Entire cohort	0.119	0.073	0.318

P-values calculated using Spearman's rho and a two-sided 5% significance level.

Figure 1

Pre-intervention and post-intervention performance importance plots for overall satisfaction.

1-concern and caring for patient

2-assessment and treatment of pain

3-assessment and treatment of breathlessness

4-assessment and treatment of agitation

5-consideration of proxies' needs

6-emotional support for proxies

7-coordination of care

8-concern and caring for proxies

9-skills and competence of nurses

10-frequency of communication with nurses

11-skills and competence of physicians

12-general atmosphere of ICU

13-waiting room atmosphere

14-amount of health care received

15-frequency of communication with physicians

16-ease of getting information

17-understanding of information

18-honesty of information

19-completeness of information

20-consistency of information

21-inclusion in the decision-making process

22-support during the decision-making process

23-control over patient's care
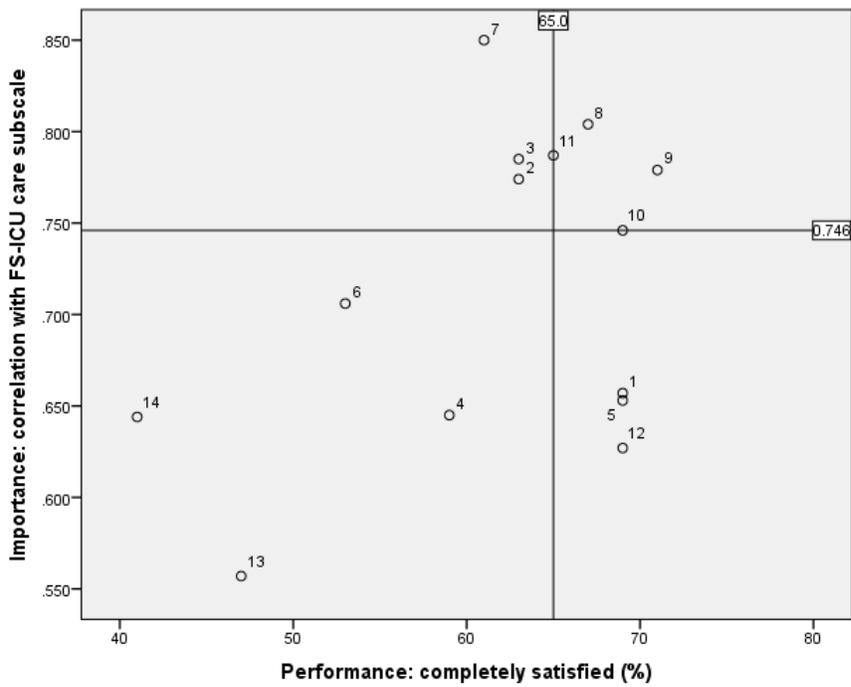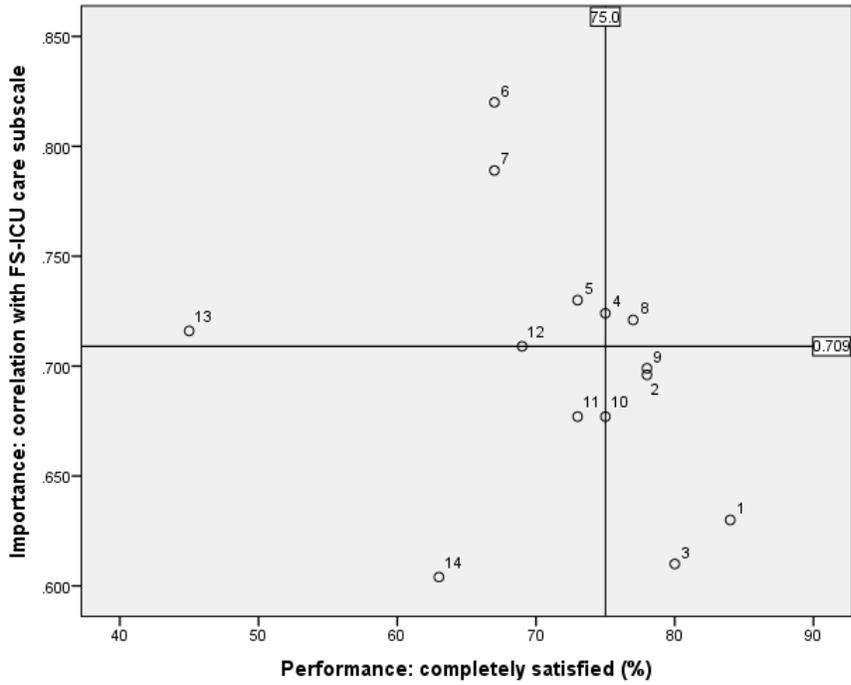
24-adequate time to address concerns and answer questions
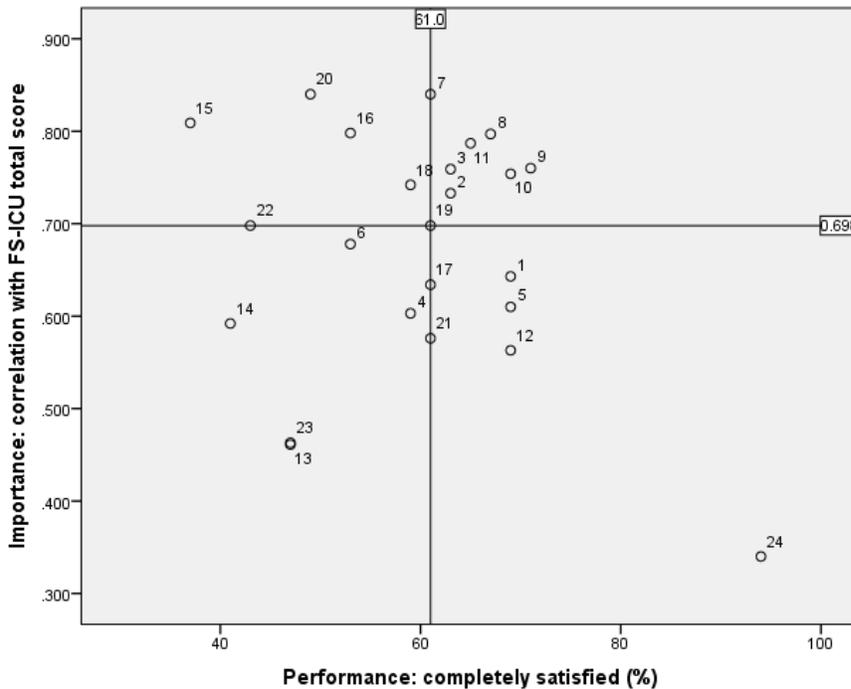
Performance-importance plot for overall satisfaction (FS-ICU$_{total}$). Each point refers to a specific item in the survey (key in right column). On the x-axis, the percentage of responses given as "excellent" for each item is given. On the y-axis, the correlation (Spearman's correlation coefficient) of the item with the summary score FS-ICU$_{total}$ is shown. Items with a low rating of satisfaction and a high correlation (upper left quadrant) can be elucidated and prioritized for quality improvement. Horizontal and vertical lines indicate the median distributions.

Figure 2

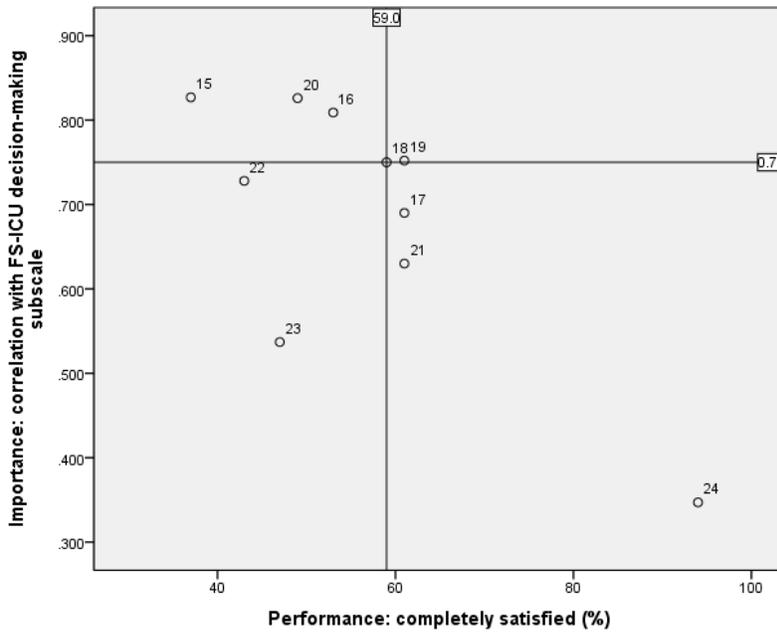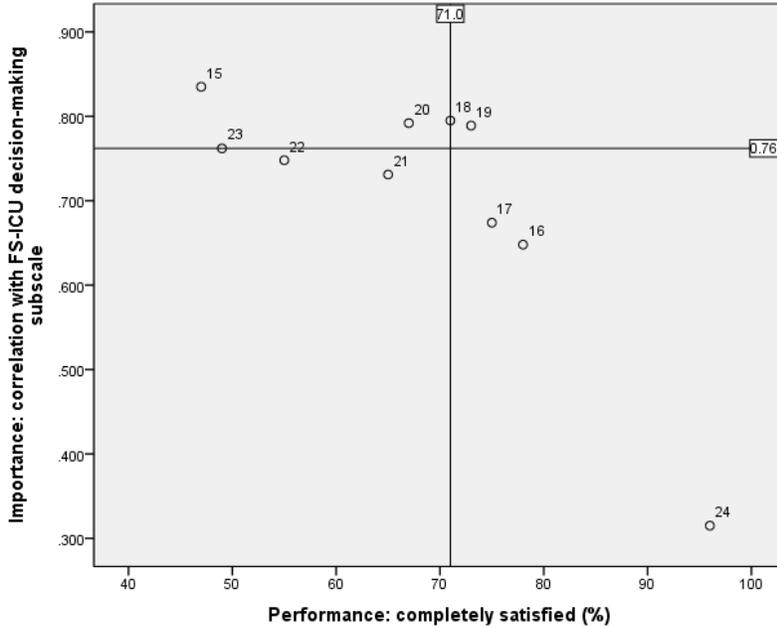**Pre-intervention and post-intervention performance importance plots for satisfaction with care subscale items.**

Figure 3

Pre-intervention and post-intervention performance importance matrices for satisfaction with decision-making subscale items.

Appendix

FS-ICU 24 Survey

1. I am: Male   Female
2. I am _____ years old
3. I am the patient's:
   Wife   Husband   Partner   Mother   Father   Sister   Brother
   Daughter   Son   Other

4. Before this most recent event, have you been involved as a family member of a patient in an ICU (Intensive Care Unit)?   Yes   No

5. Do you live with the patient?   Yes   No
   If no, then on average how often do you see the patient?

More than weekly   Weekly   Monthly   Yearly   Less than once a year

6. Where do you live in relation to the ICU?
   Less than 15 minutes away   15 minutes to an hour away   More than an hour away

Please check one circle that best reflects your views. If the question does not apply to your family member's stay then check the not applicable box (N/A).

How did we treat your family member (the patient)

1. Concern and Caring by ICU Staff: The courtesy, respect, and compassion your family member was given	Excellent	Very Good	Good	Fair	Poor	N/A

2. Symptom Management: How well the ICU staff assessed and treated your family member's pain	Excellent	Very Good	Good	Fair	Poor	N/A

3. Symptom Management: How well the ICU staff assessed and treated your family member's breathlessness	Excellent	Very Good	Good	Fair	Poor	N/A

FAMILY ROUNDS

4. Symptom Management: How well Excellent Very Good Fair Poor N/A

the ICU staff assessed and treated   Good

your family member's agitation

Please circle answer that best reflects your views. If the question does not apply to your family member's stay then check the not applicable box (N/A).

How did we treat you?

5. Consideration of your needs: How Excellent Very Good Fair Poor N/A

well the ICU staff showed an interest   Good

in your needs

6. Emotional support: How well the ICU Excellent Very Good Fair Poor N/A

staff provided emotional support   Good

7. Coordination of care: The teamwork Excellent Very Good Fair Poor N/A

of all the ICU staff who took care of my   Good

family member

8. Concern and Caring by ICU Staff: Excellent Very Good Fair Poor N/A

The courtesy, respect, and compassion   Good

you were given

9. Skill and Competence of ICU Excellent Very Good Fair Poor N/A

Nurses: How well the nurses cared   Good

for your family member

FAMILY ROUNDS

10. Frequency of Communication with ICU Nurses: How often nurses communicated to you about your family member's condition	Excellent	Very Good	Good	Fair	Poor	N/A

11. Skill and Competence of ICU Physicians (All Doctors, including Residents): How well doctors cared for your family member	Excellent	Very Good	Good	Fair	Poor	N/A

12. Atmosphere of the ICU was?	Excellent	Very Good	Good	Fair	Poor	N/A

13. The Atmosphere in the ICU waiting Room was?	Excellent	Very Good	Good	Fair	Poor	N/A

14. Some people want everything done for their health problems while others do not want a lot done. How satisfied were you with the LEVEL or amount of health care your family member received in the ICU

Very dissatisfied

Slightly dissatisfied

Mostly satisfied

Very satisfied

Completely satisfied

This part of the questionnaire is designed to measure how you feel about YOUR involvement in decisions related to your family member's health care. In the Intensive Care Unit (ICU), your family member may have received care from different people. We would like you to think about all the care your family member received when you are answering the questions.

FAMILY ROUNDS

15. Frequency of Communication with
ICU Doctors: How often doctors
communicated to you about your
family member's condition

	Excellent	Very Good	Good	Fair	Poor	N/A

16. Ease of Getting Information:
Willingness of ICU staff to
answer your questions

	Excellent	Very Good	Good	Fair	Poor	N/A

17. Understanding of information:
How well ICU staff provided
you with explanations that
you understood

	Excellent	Very Good	Good	Fair	Poor	N/A

18. Honesty of Information: The
honesty of information
provided to you about your
family member's condition

	Excellent	Very Good	Good	Fair	Poor	N/A

19. Completeness of Information:
How well the ICU staff informed
you what was happening to your
family member and why things
were being done

	Excellent	Very Good	Good	Fair	Poor	N/A

20. Consistency of Information: The
consistency of information

	Excellent	Very Good	Good	Fair	Poor	N/A

provided to you about your

family member's condition

(Did you get a similar story from

the doctor, nurse, etc.)

During your family member's stay in the ICU, many important decisions were made regarding the health care she or he received. For the following questions, pick one answer from each of the following set of ideas that best matches your views:

21. Did you feel included in the decision

making process?

    I felt very excluded

    I felt somewhat excluded

    I felt neither included nor excluded
    I felt somewhat included

    I felt very included

22. Did you feel supported during the

decision making process?

    I felt totally overwhelmed

    I felt somewhat overwhelmed

    I felt neither overwhelmed nor supported

    I felt supported

    I felt very supported

23. Did you feel you had control over the

care of your family member?

    I felt really out of control and that the

    healthcare system took over and dictated the
    care my family member received

    I felt somewhat out of control and that the
    healthcare system took over and dictated the
    care my family member received

I felt neither in control nor out of control

I felt I had some control over the care my family member received

I felt I had good control over the care my family member received

24. When making decisions, did you have adequate time to have your concern addressed and questions answered?

I could have used more time

I had adequate time