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The Effect of Chaplain Patient Navigators and Multidisciplinary Family Meetings on Patient Outcomes in the ICU: The Critical Care Collaboration and Communication Project

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OBJECTIVES: To assess the effectiveness of a chaplain patient navigator in improving outcomes and reducing costs in the ICU setting.

DESIGN: A randomized controlled trial at a large, urban, academic community hospital in Baltimore, Maryland.

SETTING/PATIENTS: All patients admitted to the Johns Hopkins Bayview Medical Center Cardiac and Medical ICUs between March 2015 and December 2015.

INTERVENTIONS: Patients in the intervention group were assigned a chaplain patient navigator to facilitate communication, offer support, and setup multidisciplinary family meetings.

MEASUREMENTS AND MAIN RESULTS: The primary outcomes were hospital and ICU length of stay. Secondary outcomes included total and ICU charges, 60- and 90-day readmission rates, and the number of palliative care consults. For all outcomes, patients were included in the intention-to-treat analyses only if they remained in the ICU greater than 24 hours. In total, 1,174 were randomly assigned to "usual care" ($n = 573$) or to the intervention ($n = 601$). In the intervention group, 44.8% (269/601) had meetings within 24 hours of admission and, of those patients, 32.8% (88/268) took part in the larger multidisciplinary family meeting 2–3 days later. The intervention group had longer mean adjusted hospital length of stay (7.78 vs 8.63 d; $p \leq 0.001$) and mean ICU length of stay (3.65 vs 3.87 d; $p = 0.029$). In addition, they had greater total and ICU charges. There were no differences in other outcomes. Of note, only differences in total and ICU charges remained when controlling for case-mix index, which were greater in the intervention group.

CONCLUSIONS: Although the chaplain patient navigator anecdotally enhanced communication, our study found an increase in hospital and ICU length of stay as well as cost. Since other studies have shown benefits in some clinical outcomes, projects focused on patient navigators may learn lessons from our study in order to better prioritize family meetings, gather indicators of communication quality, and identify the optimal patient navigator operational context.

KEY WORDS: chaplaincy; critical care; family meetings; intensive care unit; multidisciplinary meetings; patient navigator

Effective communication between patients, families, and staff is essential in the ICU environment (1, 2). However, there are many barriers to communication, leading to missed opportunities in discussing goals of care, offering prognostic information, providing emotional support, or proposing comfort-focused care (3–5). These hindrances in communication are associated with deleterious patient outcomes and increased surrogate decision-maker psychologic distress (3, 6). Also, ineffective communication is associated with

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greater monetary spending and increased ICU utilization (7, 8) because families may favor an aggressive approach to preserve longevity if not given the opportunity to engage in goals of care conversations early during an admission (9–11).

Because of the value of effective communication in the ICU, many efforts have focused on identifying optimal strategies to facilitate communication. In particular, institutions have mandated ethics and palliative medicine consultations, provided informational pamphlets, and assigned additional support staff (12). Each of these interventions is beneficial in different respects. For example, one intervention used routine ethics consultation in the event of a "treatment conflict" and was associated with fewer ICU days before death (13). Another provided an informational video on cardiopulmonary resuscitation (CPR) and goals of care discussions, which ultimately aided surrogates and patients in making informed decisions about inhospital CPR (14).

More effective interventions have included a patient navigator (PN), who is trained to facilitate communication between ICU teams and families, advocate for patients and families, and liaison with hospital and community organizations (15, 16). PNs have varying levels of expertise and can be lay navigators or those who are professionals, such as nurses and social workers (17). In the ICU setting, PNs are associated with improvements in communication and the dissemination of prognostic information, and reduced ICU cost and length of stay (LOS) (15–19). The majority of PNs in previous studies focused on ICU care have had backgrounds in social work or nursing; however, individuals with different training backgrounds, outstanding communication skills, and advanced proficiency with navigating the complex medical system may also be well suited for this role (20). In particular, hospital chaplains could have appropriate backgrounds for the PN role (21). Chaplains are very comfortable in attending to patients and families and providing support during times of existential and spiritual crises (22). Multiple observational studies have linked spiritual and chaplaincy care at the end of life with better access to hospice and lower odds of receiving aggressive care and dying in the ICU (23). However, it is unclear if chaplains can facilitate decision-making processes with families, serve as liaisons with ICU staff, or set up and participate in multidisciplinary family meetings. In addition, there are no clinical trials that have used a chaplain as a PN. Therefore, we performed the Critical Care Collaboration and Communication (C4) Project to assess the effect of a chaplain PN, focusing on outcomes, such as LOS, cost, and readmission rates.

MATERIALS AND METHODS

C4 Project Trial Design

The Johns Hopkins Medicine Institutional Review Board (Study Number: NA_00071963), Johns Hopkins Bayview Medical Center (JHBMC) Patient Safety Board, and the Directors of the Medical ICU (MICU) and Cardiac ICU (CICU) all reviewed and approved the C4 Project. The C4 Project was a randomized, nonblinded controlled trial to evaluate the utility of a chaplain PN, who served as a health liaison for patients and their families, elicited their values and preferences, and organized admission, follow-up, and ad hoc family meetings. The control arm did not have a PN, thus, family meetings were based on the discretion of the ICU healthcare team. Of note, all patients in the control and intervention arms were cared for by the same ICU teams. Also, bedside nurses could have had patients in each arm at the same time since patient group status was not considered when assigning patients for their shifts.

Study Setting and Educational Interventions

The study was performed in the JHBMC 12-bed MICU and the 12-bed CICU between March 2015 and December 2015. Prior to project implementation, all ICU staff viewed an online training module introducing the project as well as strategies for facilitating family meetings and enhancing communication. For rotating residents and fellows, module completion was required prior to the start of the ICU rotation. In addition, all ICU providers, including residents, fellows, and attendings, were required to attend a biweekly 30-minute small-group workshop. At these sessions, skilled clinician-educators reinforced family meeting communication concepts using role-play and experiential learning, which was based on their experiences caring for patients in the ICUs. Finally, residents and fellows participated in post-family meeting debriefing sessions, where they were offered feedback on their communication skills.

Randomization and Patient Characteristics

All patients admitted to the CICU and MICU were eligible for this trial, and there were no exclusion criteria. Patients were approached by our staff to provide informed consent. These patients were all 18 years and older and almost always required advanced supportive medications and devices. In contrast to the MICU, approximately 65% of patients admitted to the CICU presented with primary cardiac diagnoses, such as acute coronary syndrome or cardiogenic shock. The remaining 35% presented with similar diagnoses as the MICU patients but were located in the CICU due to lack of bed availability in the MICU. At admission, a computer-based randomizer algorithm assigned patients in each ICU to the control or intervention group. Patients had the opportunity to decline participation at any time, in which case they would continue to receive usual ICU care but were excluded from the study population.

Patient Navigator

A chaplain PN was assigned to each newly admitted ICU patient in the intervention arm and was required to connect with the patient and their family within 24 hours. In addition to serving as an advocate for patients and their families, this chaplain PN would 1) organize and schedule multidisciplinary meetings, 2) help patients and families navigate the ICU and ensure that all questions are addressed, 3) provide emotional and spiritual support for patients and their family members, 4) gather the unique personal perspectives of incapacitated patients and their surrogates, 5) document the results of the multidisciplinary meetings in the patient's electronic medical record, 6) provide a brochure describing the format of multidisciplinary family meetings, and 7) identify resources for patients, such as transportation and community support groups.

The chaplain PN daily routine started with a huddle with each ICU team to discuss patients prior to work rounds. Subsequently, the chaplain PN would meet with all patients in the intervention group and check-in with their bedside nurses. Then, the PN would set up family meetings, which were typically scheduled for the early afternoon.

For the C4 Project, the chaplain PN was a resident enrolled in an accredited clinical pastoral education (CPE) program who had already completed one unit of CPE. As described in a prior report (21), the chaplain PN underwent special training to learn the PN role and was overseen by a CPE educator and a clinical chaplain mentor that were both very familiar with the study. The chaplain PN had few other responsibilities, except for occasional spiritual care duties outside of the project and twice weekly required CPE courses. The chaplain PN was also periodically assisted by chaplain interns and a staff chaplain, who helped cover the two ICUs when the chaplain PN was not working. Those additional staff underwent additional training by the chaplain PN to ready them for their duties.

Multidisciplinary Family Meetings

In the intervention arm, the chaplain PN was responsible for arranging an "admission" family meeting within 24 hours of admission. At a minimum, this meeting was to include the patient, one nurse, one physician, and any family or surrogate decision-makers. The chaplain PN was then responsible for arranging a larger multidisciplinary meeting 72–96 hours after admission. This multidisciplinary meeting would include the patient, family members and surrogates, at least one nurse and one house staff physician, the attending or fellow, the chaplain PN, one social worker, and pertinent consultants. If needed, the chaplain PN would also arrange an emergency ad hoc meeting before the scheduled multidisciplinary family meeting. For all meetings, the chaplain navigator was responsible for filling out the family meeting checklists (**Supplemental Figs. 1** and **2**, http://links.lww.com/CCX/A844), which recorded patient preferences, family dynamics, and identified surrogate decision-makers. Of note, all staff in the ICU were familiarized with these checklists when they completed their online training module.

Measurements and Outcomes

The primary outcomes were hospital and ICU LOS. Secondary outcomes included total hospital and ICU charges, readmission rates at 60 and 90 days, and the number of requested palliative care consults. Additional measurements included patient demographic information, inhospital death rates, and the percentage of completed family meetings.

Statistical Analysis

Relevant patient data were extracted from the electronic medical record and other sources and inputted and stored in a Research Electronic Data Capture database. Patient data were excluded if derived from a second or subsequent admission for the same patient during the study period or if the same patient received care in both the CICU and MICU during the same hospitalization. With a sample size of 1,174, allocating between intervention and control groups at a 1:1 ratio, we were powered to detect a difference in overall LOS of 1.6 days, ICU LOS of 0.6 days, MICU LOS of 0.7 days, and CICU LOS of 0.5 days (alpha 0.05, alpha 0.80).

All analyses were performed in patients who remained in the ICU for greater than 24 hours since the project interventions would not be expected to make a difference in those who were in the ICU for less than 24 hours. Intervention and control group characteristics were compared using Wilcoxon signed rank tests for continuous variables and Fisher exact test for categorical variables. In outcome analyses, marital status was controlled for because of significant group differences. Associations between LOS and cost were evaluated using multivariate Poisson models. Readmissions and palliative care utilization were evaluated using logistic regression models. For the majority of the analyses, an intention-to-treat approach was employed. Additional analyses were performed to control for case-mix index, which accounts for disease burden and severity. Stratified analyses were also conducted to further evaluate the characteristics for the patients that died since prior research suggested a benefit only for those who were at the end of life (12). Of note, all analyses were performed using STATA 15.1 (College Station, TX) software.

RESULTS

Study Population/Demographics

Out of 1,731 recruited patients, 1,174 had first admissions with an ICU LOS greater than 24 hours. Of these, the CICU had 593 participants with 298 in the intervention group, while the MICU had 581 participants with 303 in the intervention group. As shown in **Table 1**, demographic and social characteristics were similar between groups, except for marital status. Specifically, the intervention group included more married participants, which required adjustment in the analyses.

Admission and Multidisciplinary Family Meeting Rates

Admission meetings occurred in 44.6% (268/601) of the intervention group. For those that remained in the ICU for greater than 72 hours, multidisciplinary family meetings were completed in 32.8% (88/268), while 2.4% (8/333) of the group that had an ICU LOS less than 72 hours had ad hoc emergency meetings. **Figure 1** breaks down the distribution of multidisciplinary family meetings for each ICU. In the CICU, 48.0% (143/298) had admission meetings, while 32.8% (45/137) of those with an ICU LOS greater than 72 hours had multidisciplinary family meetings. Only five patients in the CICU with an ICU LOS less than 72 hours (n = 161) had emergency family meetings. In the MICU, 41.3% (125/303) had admission meetings, and 32.8% (43/131) of the patients with an ICU LOS greater than 72 hours had multidisciplinary family meetings. Emergency family meetings were performed in three patients in the MICU group with an ICU LOS less than 72 hours (n = 172).

Supplemental Tables 1 and **2** (http://links.lww.com/CCX/A844) show the reasons for the lack of completed admission and multidisciplinary family meetings. Many admission meetings (n = 333) were missed when the PN was off, which occurred primarily on weekends (28.7%, n = 95) and holidays (6.3%, n = 21). In addition, admission meetings did not occur when the patient and surrogate (13.6%, n = 45) or treatment team (13.0%, n = 43) were unavailable or if there were competing meeting priorities (10%, n = 33). In contrast, multidisciplinary family meetings (n = 287) were most often missed when the patient was already transferred or discharged out of the ICU (65.9%, n = 189) or scheduled to be transferred out of the ICU (4.2%, n = 12).

Primary Outcomes: Effects on Hospital and ICU LOS

The intervention group had an increased hospital LOS when compared with the control group (8.63 [SD, 12.04] vs 7.78 [SD, 7.51]; $p \leq 0.001$) (**Table 2** and **Fig. 2**). In addition, mean ICU LOS was longer in the intervention group (3.87 d [SD, 3.86 d] vs 3.65 d [SD, 3.43 d]; $p = 0.029$). This may have been driven by an increased MICU LOS in the intervention group (4.07 d [SD, 4.59 d] vs 3.56 d [3.58 d]; $p = 0.001$) since there were no differences noted in CICU LOS. Notably, there were no differences in LOS when adjusted for case-mix index.

TABLE 1.
Demographic Information for the Critical Care Collaboration and Communication Project Participants

Demographics	Variable	Intervention ($n = 601$)	Control ($n = 573$)	p[a]
Admission age (yr), median (interquartile range)		63 (53–76)	62 (52–75)	0.138
Gender, *n* (%)	Male	334 (55.7)	287 (50.1)	0.056
	Female	266 (44.3)	286 (49.9)	
Marital status, *n* (%)	Single	201 (34.5)	201 (36.0)	**0.002**
	Married	219 (37.6)	165 (29.5)	
	Divorced	43 (7.4)	78 (14)	
	Separated	23 (4)	14 (2.5)	
	Widow/widower	94 (16.1)	98 (17.5)	
	Other	3 (0.5)	3 (0.5)	
Race, *n* (%)	White/Caucasian	431 (72)	401 (70)	0.737
	Black/African American	136 (22.7)	141 (24.6)	
	Other/declined	32 (5.3)	31 (5.4)	
Native language, *n* (%)	English	562 (96.7)	546 (96.5)	0.520
	Spanish	12 (2.1	10 (1.8)	
	Greek	3 (0.5)	0 (0)	
	Other/declined	4 (0.7)	10 (1.8)	
Highest education level, *n* (%)	High school	60 (63.2)	74 (64.4)	0.674
	Associates/bachelors	7 (7.4)	13 (11.3)	
	Graduate degree	3 (3.2)	4 (3.5)	
	Other/unknown	26 (26.3)	24 (20.9)	
Occupation, *n* (%)	Retired	155 (49.4)	133 (43.6)	0.126
	Disabled	58 (18.5)	84 (27.5)	
	Unemployed	56 (17.8)	49 (16.1)	
	Employed	43 (13.7)	35 (11.5)	
	Self employed	1 (0.3)	3 (1)	
	Unknown	1 (0.3)	1 (0.3)	
Religion category, *n* (%)	Christian	154 (91.7)	149 (89.8)	0.796
	Other	5 (3)	7 (4.2)	
	None	9 (5.4)	10 (6)	
Inhospital death, *n* (%)	Yes	45 (7.8)	52 (9.5)	0.335

[a]*p* derived from *t* test for continuous variables and χ^2 test for categorical variables. The threshold for significance is $p < 0.05$. Boldface *p* values are statistically significant.

Secondary Outcomes: Effects on Hospital and ICU Charges, Readmission Rates, and Palliative Care Utilization Rates

In congruence with LOS, total hospital and ICU charges were greater in the intervention group when compared with the control group (total: $27,105 [SD, $23,953] vs $25,036 [SD, $21,699]; $p \leq 0.001$ and ICU: $19,463 [SD, $15,541] vs $18,303 [SD, $13,866]; $p \leq 0.001$), which remained significant when adjusted for case-mix index. However, there were no differences in 60- and 90-day readmission rates or in the number of palliative care consults (Table 2).

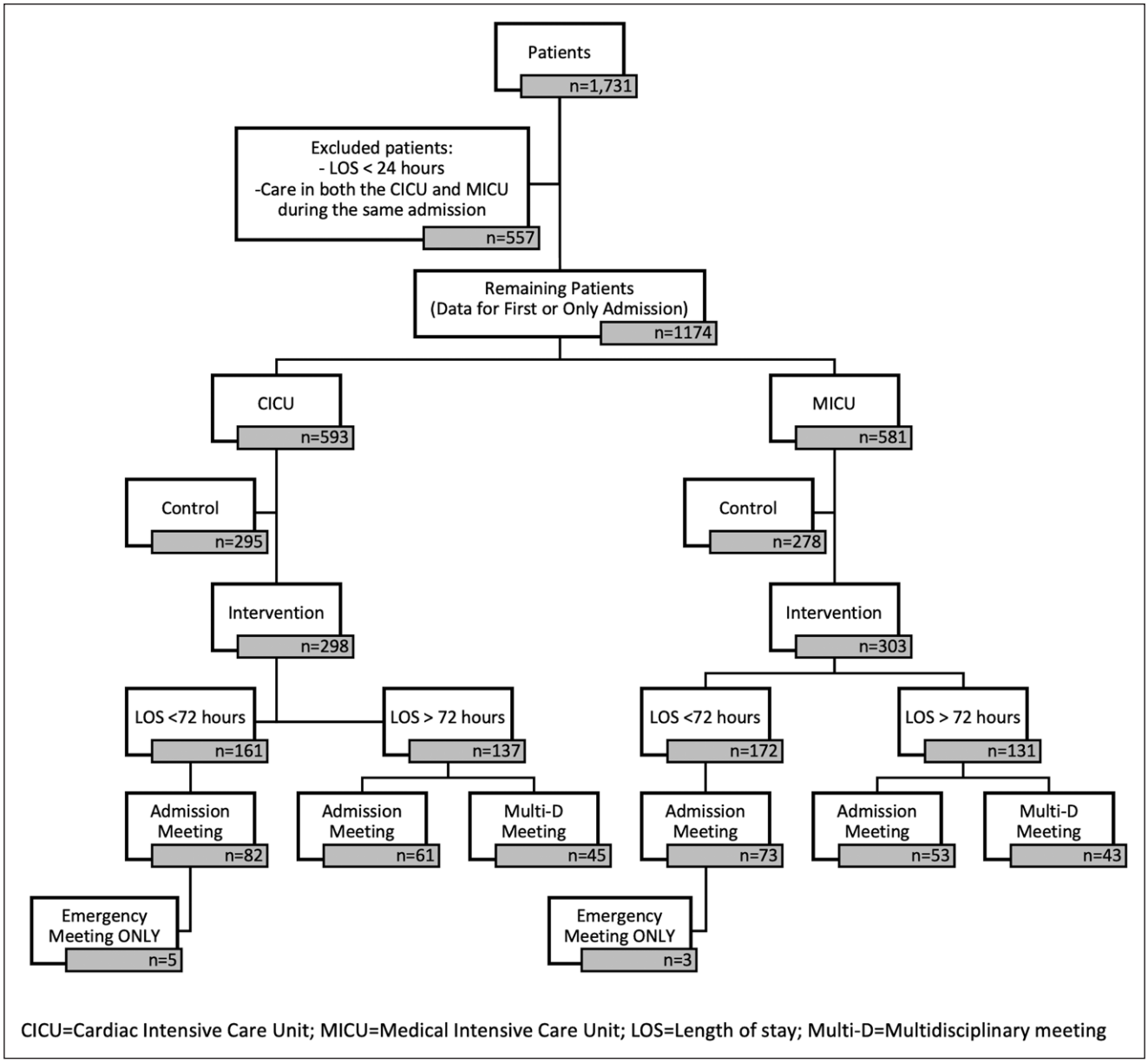

Figure 1. Flow diagram for family meetings for patients in the medical ICU (MICU) and cardiac ICU (CICU). LOS = length of stay, Multi-D = multidisciplinary meeting.

Stratified Analysis: Primary and Secondary Outcomes in Patients Who Died

For those patients that died, hospital LOS was greater in the intervention group compared with the control group (12.2 d [SD, 28.19 d] vs 8.48 d [SD, 8.22 d]; $p \leq 0.001$) (**Table 3**). In addition, total and ICU charges were greater in the intervention group (total: $34,490 [SD, $26,767] vs $28,698 [SD, $24,128]; $p \leq 0.001$ and ICU: $26,992 [SD, $14,209] vs $24,894 [SD, $17,684]; $p \leq 0.001$). However, there were no differences in case-mix adjusted LOS, ICU LOS, MICU LOS, CICU LOS, or the percentage of palliative care consults.

DISCUSSION

The C4 Project is the first large randomized controlled trial evaluating the effect of a chaplain PN in the ICU setting. The intervention was associated with increased hospital and ICU LOS and greater total and ICU charges. These findings persisted even when only comparing patients who died, except for ICU LOS, which was no longer significantly different. However, adjusting for case-mix index did affect the findings, which may indicate differences in disease severity between intervention and control groups (24). In particular, differences in hospital and ICU LOS were attenuated,

TABLE 2.
Primary and Secondary Outcomes for Patients Who Had a Length of Stay Greater Than 24 Hours

Outcome	Intervention ($n = 601$)	Control ($n = 573$)	p^a	p^b
Hospital LOS (d)	8.63 (12.04)	7.78 (7.51)	**< 0.001**	0.093
Case-mix adjusted LOS (d)	5.95 (4.74)	6.23 (5.52)	0.161	
ICU LOS (d)	3.87 (3.86)	3.65 (3.42)	**0.029**	0.562
Medical ICU LOS (d)	4.07 (4.59)	3.56 (3.58)	**0.001**	0.374
Cardiac ICU LOS (d)	3.68 (2.94)	3.74 (3.29)	0.877	0.114
Total charges ($)	27,105 (23,953)	25,036 (21,699)	**< 0.001**	**< 0.001**
Total ICU charges ($)	19,463 (15,541)	18,303 (13,886)	**< 0.001**	**< 0.001**
90-d readmission rate	20.2% (1.7%)	18.9% (1.7%)	0.320	0.293
60-d readmission rate	16.4% (1.5%)	16.2% (1.6%)	0.634	0.618
Palliative care consult order	2.4% (0.6%)	3.1% (0.7%)	0.502	0.453

LOS = length of stay.
[a]Poisson regression *p* for mean or percent difference controlling for marital status.
[b]Poisson regression *p* for mean or percent difference controlling for case-mix index and marital status.
Values are mean (SD) or % (%SE). The threshold for significance is $p < 0.05$. Boldface *p* values are statistically significant.

although total and ICU charges remained greater even after adjustment. In total, these findings are discordant with other studies focused on enhanced communication and decision-making in the ICU, which showed no differences or reductions in LOS and cost, especially for participants that died during their hospitalization (3, 15, 25, 26).

A number of factors may have accounted for the C4 Project results. First, the intervention group had difficulties in completing meetings. Many meetings were missed due to other priorities or because patients, families, or staff were unavailable. In addition, several multidisciplinary meetings did not occur because patients were moved out of the ICU prior to the scheduled meeting time.

Second, a chaplain serving in the PN role may not have been as ideal as trained nurses or social workers (1, 3, 12, 15, 19, 27). Chaplains bring insights into the ICU setting, but few have formal medical training (21, 28). In contrast, nurse PNs are familiar with the medical needs of patients because of their training and

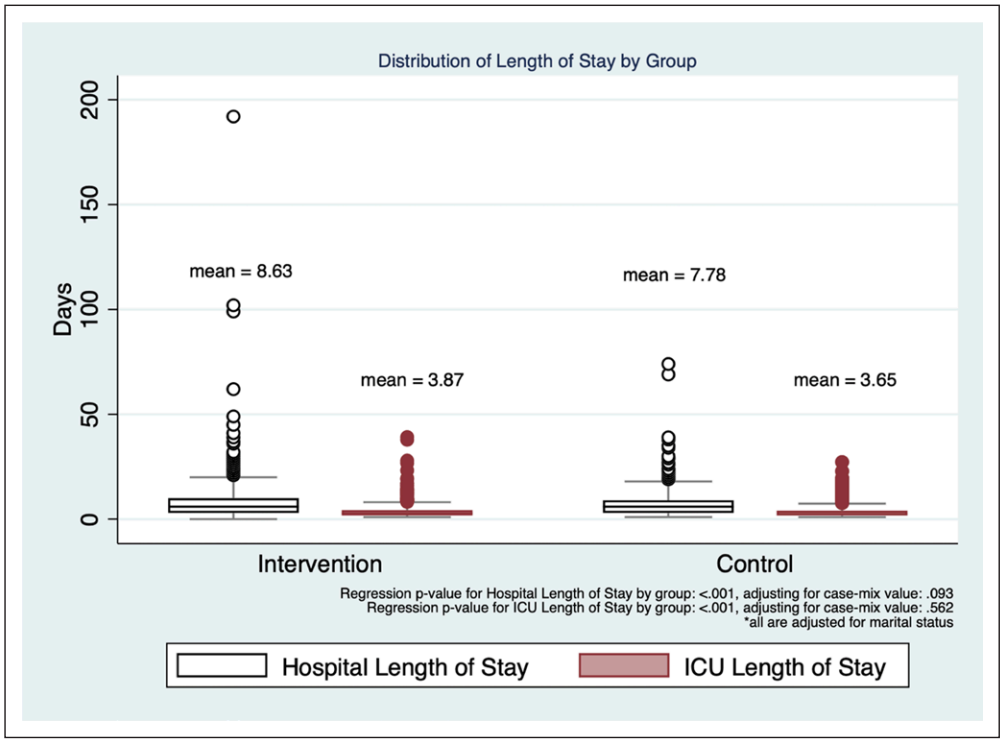

Figure 2. Length of stay group distributions.

TABLE 3.
Primary and Secondary Outcomes for Patients Who Died

Outcome	Intervention ($n = 45$)	Control ($n = 52$)	p[a]
Hospital LOS (d)	12.2 (28.19)	8.48 (8.22)	**< 0.001**
Case-mix adjusted LOS (d)	4.38 (5.56)	4.95 (6.39)	0.299
ICU LOS (d)	4.96 (3.74)	4.62 (4.50)	0.429
Medical ICU LOS (d)	5.07 (3.81)	4.27 (4.73)	0.379
Cardiac ICU LOS (d)	4.83 (3.75)	4.96 (4.33)	0.886
Total charges ($)	34,490 (26,767)	28,698 (24,128)	**< 0.001**
Total ICU charges ($)	26,992 (14,209)	24,894 (17,684)	**< 0.001**
Palliative care consult order	2.2% (2.2%)	1.9% (1.9%)	0.850

LOS = length of stay.

[a]Poisson regression p for mean or percent difference controlling for marital status.

Values are mean (SD) or % (%SE). The threshold for significance is $p < 0.05$. Boldface p values are statistically significant.

are well-received by patients, families, and ICU staff (19, 27, 29). Thus, they may be more adept at facilitating discussions addressing patients' beliefs and values in relation to their critical illness. Similarly, there may be advantages for PNs with a background in social work (30). Social workers are trained to address issues of crisis, adjustment, anticipatory grief, and complex family dynamics. In addition, they are very familiar with arranging and facilitating multidisciplinary family meetings. For these reasons, social work PNs may be more effective at providing psychosocial support and enhancing communication (31–33). These differences in training are likely magnified with limited ICU experience. In this study, the chaplain PN was a resident; thus, there may have been less understanding of ICU roles and interprofessional interactions, which may have hampered full integration into the ICU workflow. Furthermore, patients and families in the C4 Project intervention group frequently expected the chaplain PN to provide spiritual care and address medical issues and prognosis. Thus, there were anecdotal reports expressing disappointment with deferral of those questions to the ICU team (21). As a result, most ICU nurses reported that the chaplain's background was not appropriate for the PN role (21). In contrast, a more experienced chaplain would have been more comfortable interacting with ICU staff and thus more likely to be fully integrated into the ICU workflow.

Third, the C4 Project recruited all patients who entered the ICU as opposed to other trials that preselected sicker patients (12, 34–36). Thus, it is possible that the results were attenuated by healthier patients in the intervention group who quickly recovered, and presumably would not have substantially benefited from a PN or formalized multidisciplinary meetings. In addition, the burden of disease may have been different between groups since adjusting for case-mix index attenuated many of the outcomes.

Finally, it is unclear whether enhanced communication strategies or PNs alter patient and surrogate decision-making or outcomes. Patients often make intuitive decisions on end-of-life care (37); thus, enhanced communication and multidisciplinary family meetings may not affect ultimate decisions or outcomes (38). If anything, the C4 Project interventions may have helped surrogates and patients articulate their preferences for aggressive medical care, which could have influenced outcome measures.

The findings of this trial are tempered by several limitations. First, the trial was nonblinded and was without strict inclusion criteria, which may have obscured a potential benefit in an unidentified subgroup. Second, this trial was performed at a single center with a relatively homogenous population, which may limit generalizability. Third, patients in both the intervention and control groups were treated by the same care teams, who all participated in the same training modules. Thus, communication patterns may have been similar in the control and intervention groups. However, none of the patients in the control group had admission meetings, less than five had multidisciplinary family meetings within 96 hours of admission (data not shown), and none were assigned PNs. Fourth, subjective data from patients and families assessing psychologic

and communication quality metrics or behavioral approaches to decision-making were not systematically collected. Thus, it is possible that the C4 Project may have had similar benefits as other trials reporting improvements in communication quality and decreased psychologic burdens (3, 15, 27, 34, 36, 39, 40). Finally, adjusting for case-mix index is not common in critical care trials, and it would have been preferable to definitively predetermine patient acuity utilizing clinically validated severity scores such as the Acute Physiology and Chronic Health Evaluation II score (41).

Despite these limitations, the C4 Project study should serve as an impetus for further evaluating the role of a chaplain in the ICU given its unexpected results. Chaplains have a unique role in the healthcare system and are able to offer support to patients and families during the most critical phases of decision-making. They are trained to provide spiritual support and empathy and can help facilitate decisions aligned with personal beliefs. While we did not find any beneficial changes in clinical or financial outcomes, this study should spur future research to determine the optimal role of a chaplain, whether or not in the role of a PN. In addition, this study highlights the difficulties in holding admission and multidisciplinary meetings and emphasizes the important of future operational studies to help implement family meetings and other methods for providing additional support.

CONCLUSIONS

The utilization of the chaplain as a PN in our ICUs resulted in an increase in hospital and ICU LOS and healthcare costs. However, there remains a need to assess the efficacy of the chaplain PN for other outcomes that are relevant for patients, families, healthcare teams, and hospital systems.

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