Factors associated with nurses’ perceptions, self-confidence, and invitations of family presence during resuscitation in the intensive care unit: A cross-sectional survey

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ABSTRACT

Background: Family presence during resuscitation is not widely implemented in clinical practice. Prior research about nurse factors that may influence their decision to invite family members to remain in the room during resuscitation is contradictory and inconclusive.

Objectives: To describe intensive care unit nurses’ perceptions, self-confidence, and invitations of family presence during resuscitation, and to evaluate differences according to nurse factors.

Design: A cross-sectional survey design was used for descriptive and correlational analyses.

Setting: Data collection occurred online.

Participants: A convenience sample of 395 nurses working in intensive care units across the United States was obtained.

Methods: Participants completed a survey to collect personal, professional, and workplace information. The Family Presence Risk-Benefit Scale and Family Presence Self-confidence Scale were administered, and frequency of inviting family members to be in the room during resuscitation was collected by self-report. Following descriptive analysis of univariate distributions, a series of hierarchical OLS regression analyses was used to identify which personal, professional, or workplace factors yielded the largest unique impact on nurse perceptions, self-confidence, and invitations of family presence during resuscitation.

Results: Despite high frequency of performing resuscitative care, one-third of participants had never invited family members to be in the room during resuscitation during their careers, and another 33% had invited family members to be present just 1–5 times. Having had clinical experience with family presence during resuscitation was the strongest predictor of positive perceptions, higher self-confidence, and increased invitations. In addition, having received education on family presence during resuscitation and a written facility policy were found to be key professional and workplace predictors of perceptions and invitations.

Conclusions: Nurses who work in a facility with a policy on family presence during resuscitation, are educated on it, and have experienced it in the clinical setting are more likely to have positive perceptions and higher self-confidence, and to invite family members to be in the room during resuscitation with increased frequency. Nurses in leadership roles should create policies for their units and provide education to nurses and other healthcare providers. Due to the apparent importance of clinical experience with family presence during resuscitation, it is recommended to initially provide this experience using simulation and role modeling.

What is already known about the topic?

- Family presence during resuscitation is controversial and not widely implemented by nurses.
- Prior research has linked nurses’ perceptions and self-confidence for family presence during resuscitation to whether or not they choose to invite family members to be in the room.
- There is limited and inconclusive evidence on relationships between nurses’ personal, professional, and workplace factors and their decision to invite family members to be at the bedside during resuscitation.

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1. Introduction

Family presence during resuscitation has been debated in the literature since the concept was first introduced three decades ago (Doyle et al., 1987). Although studies have shown it can be beneficial to patients, family members, and healthcare providers (Flanders and Strasen, 2014), family presence during resuscitation remains controversial and is not widely implemented by nurses across practice settings (Tudor et al., 2014; Twibell et al., 2008) or in the intensive care unit where resuscitative care is more commonly provided (Carroll, 2014; Powers and Candela, 2017). Previously, it has been shown that perceptions of family presence during resuscitation and self-confidence for implementing it are empirically linked to whether or not nurses choose to invite family members to be in the patient’s room during resuscitation (Tudor et al., 2014; Twibell et al., 2008). Knowledge about the various personal, professional, and workplace factors associated with nurses’ perceptions, self-confidence, and invitations of family presence during resuscitation is needed to develop more effective interventions for increasing rates of it being offered to family members as an option. Although some studies have investigated relationships between nurse factors and their decision to invite family to be at the bedside during resuscitation, the evidence to date is inconclusive.

2. Background

2.1. Benefits of family presence during resuscitation

Few studies have evaluated the patient perspective; however, those that have been conducted suggest the vast majority of patients who have experienced resuscitation support the option of having family members present (Albarran et al., 2009; Twibell et al., 2015) and patients feel this could provide them with emotional support and comfort (McMahon-Parkes et al., 2009; Twibell et al., 2015). Similar results have been seen among family members who have experienced family presence during resuscitation, with 94%–100% saying they would participate in it again (Doyle et al., 1987; Duran et al., 2007; Holzhauer et al., 2006; Mangurten et al., 2006). In qualitative research, a benefit frequently cited by family members is improved grieving because they could see everything was done for their loved one and were able to say goodbye (De Stefano et al., 2016; Maxton, 2008). Jabre et al. (2013, 2014) confirmed these benefits in a randomized controlled trial that found family members who participated in family presence during resuscitation had significantly fewer symptoms of complicated grief, depression, anxiety, and post-traumatic stress disorder. Finally, descriptive and qualitative research has revealed that having family members in the room during resuscitation can also be a positive experience for nurses and other healthcare providers. The presence of family members can improve staff professionalism and quality of patient care (Jones et al., 2011), and it can be personally rewarding when family members express gratitude for their efforts and allowing them to stay (Davidson et al., 2011; Jones et al., 2011; Miller and Stiles, 2009).

Offering family presence during resuscitation as an option also helps uphold the principles of family-centered care by facilitating family member participation in care at the level of their choice (Institute for Patient- and Family-Centered Care, 2017). The current emphasis on family-centered care and evidence demonstrating the benefits of family presence during resuscitation has resulted in supportive position statements from multiple professional organizations in the United States and internationally (Lippert et al., 2010; Oczkowski et al., 2015; Wolf et al., 2012). Recent guidance has also been issued specifically for intensive care unit clinicians and it is recommended that family members of patients in this setting be given the option to participate in family presence during resuscitation (American Association of Critical-Care Nurses, 2016; Davidson et al., 2017).

2.2. Resistance to family presence during resuscitation

Despite the apparent benefits, descriptive study findings show low levels of support for family presence during resuscitation among healthcare providers. In the United States, a recent study found only 36.9% of 195 physicians, nurses, and respiratory therapists from a large academic hospital were in favor of having family members in the room during resuscitation (Martin et al., 2016). Studies conducted in other countries also have shown low levels of support (Sak-Dankosky et al., 2015; Vavarouta et al., 2011), especially in non-Western countries where family presence during resuscitation is rarely practiced (Al Mutair et al., 2013; Zali et al., 2017).

As family presence during resuscitation is often viewed as a nurse-driven practice (MacLean et al., 2003; Mian et al., 2007), several studies have focused exclusively on nurse populations. Results indicate nurses across practice settings infrequently and inconsistently offer family members the option to be present during their relative’s resuscitation (Tudor et al., 2014; Twibell et al., 2008). As resuscitative care is more common in the intensive care setting (Morrison et al., 2013), studies have also focused exclusively on intensive care unit nurses. International research using descriptive surveys has shown intensive care unit nurses have low levels of support for family presence during resuscitation (Günes and Zaybak, 2009; Köberich et al., 2010). In the United States, a national survey found only 52% of 124 intensive care unit nurses had invited family members to be in the room during resuscitation in the preceding year (Powers and Candela, 2017), while a descriptive study conducted in a large academic medical center found just 9% of 207 intensive care unit nurses had experience with family presence during resuscitation (Carroll, 2014).

2.3. Potential predictors of perceptions, self-confidence, and invitations

The seemingly low support for family presence during resuscitation among nurses, in comparison to the high level of reported support among patients and family members, suggests research is needed to investigate which nurse factors significantly influence nurses’ decision to offer family members the option to be present during resuscitation. Unfortunately, the bulk of the correlational research to date has been inconclusive at best; contradictory at worst. For example, Chapman et al. (2011) found self-confidence for implementing family presence during resuscitation increased with age, but several other studies found no significant relationship for provider age (Fallis et al., 2008; Fulbrook et al., 2007; Tudor et al., 2014; Twibell et al., 2008). Likewise, while some studies have shown a significant association with gender (Basol et al., 2009; Sak-Dankosky et al., 2015), others did not (Tudor et al., 2014; Vavarouta et al., 2011). Similar inconclusive results have been seen for professional and workplace factors. Some studies show significant effects stemming from level of degree attainment (Basol et al., 2009; Chapman et al., 2011), years of professional experience (Axelsson et al., 2010; Chapman et al., 2011; Fulbrook et al., 2005; McLean et al., 2016; Tudor et al., 2014), and specific job roles (Axelsson et al., 2010; Fulbrook et al., 2005; Sak-Dankosky et al., 2015), but at the same time other studies have empirically refuted those findings (Fallis et al., 2008; Feagan and Fisher, 2011; Fulbrook et al., 2007; Mclean et al., 2016;
Sak-Dankosky et al., 2015; Twibell et al., 2008; Vavarouta et al., 2011). Fortunately, some consistent findings seem to be emerging. In particular, increased experience with providing resuscitative care (Feagan and Fisher, 2011; McLean et al., 2016; Tudor et al., 2014) and having had experience with family presence during resuscitation in clinical practice (Chapman et al., 2011; Duran et al., 2007; Feagan and Fisher, 2011; Twibell et al., 2008; Vavarouta et al., 2011) seem to be consistent predictors of heightened support, perceptions, and self-confidence.

Given that the literature investigating factors that may influence nurses’ perceptions, self-confidence, and invitations of family presence during resuscitation could be described as a nascent or intermediate field of inquiry, formal quantitative hypotheses were not deemed proper (Edmondson and McManus, 2007). Rather, consistent with the stage of research, the goal of the current paper was to engage in a descriptive and exploratory analysis of survey data to better understand distributional properties of meaningful concepts and potential relations (Edmondson and McManus, 2007, p. 1160). As such, our research questions were as follows: (1) What are the univariate distributional properties of measures of perceptions, self-confidence, and invitations of family presence during resuscitation among intensive care unit nurses? and (2) Which nurse factors (personal, professional, and workplace) uniquely contribute to the variance in perceptions, self-confidence, and invitations of family presence during resuscitation?

3. Methods

3.1. Study design and sampling

A cross-sectional survey design was used to collect self-report data from intensive care unit nurses in the United States. Convenience sampling was utilized to obtain a non-representative, but national sample of intensive care unit nurses. Study participation required employment in an intensive care unit and registered nurse licensure. Recruitment occurred with study advertisements posted on the American Association of Critical-Care Nurses’ Critical Care eNewsletter (emailed to subscribers and posted on organization webpage) and social media sites. A total of 395 intensive care unit nurses participated in this study. A true overall response rate could not be calculated because of the unknown number of persons who received the advertisements via eNewsletter and social media posts. However, of the 487 potential participants who visited the Qualtrics® study site, 404 consented resulting in an estimated participation rate of 83%. An additional 9 participants were subsequently excluded from data analysis due to a failure to complete the measures dealing with family presence during resuscitation, resulting in a final operational sample of N = 395.

3.2. Data collection procedures

Study advertisements began following institutional review board approval. The weekly study advertisements included a link to the online study site in Qualtrics®. When potential participants clicked on the link and entered the Qualtrics® study site, study information was displayed and participants provided their informed consent by clicking “I agree to participate in this study.” No signature or other identifying information was collected and the password-protected Qualtrics® online platform was set to record responses anonymously.

Data collection occurred online in 2016 using Qualtrics®, and participants completed surveys requiring approximately 20 min to complete. After four weeks of data collection, the Qualtrics® study site was closed. Data was then removed from Qualtrics® and transferred to SPSS IBM® version 23 for analysis.

3.3. Measures of nurse factors

A 19-item survey was created by the principal investigator to collect participants’ personal, professional, and workplace information. This survey was created based on a review of prior studies that had investigated relationships between various nurse factors and support for family presence during resuscitation. Personal factors included age (assessed on a 6-point ordinal scale), gender, and race/ethnicity. For analytic purposes, gender was dummy coded with female as the reference group (female = 0, male = 1). Because of the limited distribution of race/ethnicities within the sample (86% white, non-Hispanic), this variable was dummy coded as a binary variable reflecting white vs. “not white”, with white as the reference group (white = 0, “not white” = 1).

Professional information included educational level (“Educ. Level”; a 5-level ordinal variable ranging from 1 = diploma degree to 6 = doctoral degree), years of nursing experience (“Tenure”; coded as a 6 level ordinal variable from 1 = “less than 1 year” to 6 = “20+ years”), advanced cardiac life support or pediatric advanced life support certification (“ACLS Cert.”; yes = 1, no = 0), specialty certification (“Specialty Cert.”; yes = 1, no = 0), professional organization membership (yes = 1, no = 0), and prior family presence during resuscitation training or education (“FPDR Training”; yes = 1, no = 0). Data was also collected on amount of experience with cardiopulmonary resuscitation (“CPR Exper.”), family members in the room during cardiopulmonary resuscitation (“FPDR Exper.”), and family member requests to be in the room during cardiopulmonary resuscitation (“Family Request”). Each of these items used a 5-point frequency scale ranging from 1 = never to 5 = more than 20 times.

Workplace factors included geographic setting, current job position, patient population, and whether their facility had a written policy on family presence during resuscitation (“no policy” was the reference group). The geographic setting variable was dummy coded with a structural set of two binary terms reflecting the suburban and rural groups, with urban as the reference group (urban = 0). Although job position originally had four conditions, the distribution was too limited with 75% being bedside nurses. As such, this was coded as a binary variable with “beside nurse” = 0 vs. “not bedside” = 1 (manager, educator, or advanced practice nurse). Similarly, because of the limited distribution of patient populations within the sample (82% worked with adults only), this variable was dummy coded as a binary variable reflecting “adult only” = 0 and “Pediatric +” = 1 (works with pediatric only, neonatal only, or children and adults).

3.4. Dependent variables

3.4.1. Perceptions

To measure participants’ perceptions of family presence during resuscitation, we used the 22-item Family Presence Risk-Benefit Scale (Twibell et al., 2008). The perceived risks assessed include patient care interference, distraction of the resuscitation team, increased lawsuits, and negative emotional effects. The perceived benefits assessed include better family member coping, positive satisfaction ratings, and improved family-provider relationships. The Family Presence Risk-Benefit Scale also includes items to evaluate perceptions of whether family presence during resuscitation is a right of patients and family members. All items are self-report using a 5-point Likert scale with response options ranging from 1 = strongly disagree to 5 = strongly agree. Mean scoring is used to place the overall perception score on the same 5-point scale as the items. In the current sample, the Family Presence Risk-Benefit Scale demonstrated a high level of internal consistency (α = 0.96).

3.4.2. Self-confidence

Participants’ self-confidence for family presence during resuscitation was measured with the 17-item Family Presence Self-confidence Scale (Twibell et al., 2008). It assesses self-confidence for performing patient care and communicating while family members are present, as well as self-confidence for supporting family members before, during,
and after witnessing resuscitation. The Family Presence Self-confidence Scale also uses self-report items measured with a 5-point Likert scale, and response options range from 1 = not at all confident to 5 = very confident. Mean scoring is used to determine overall self-confidence for family presence during resuscitation. The Family Presence Risk-Benefit Scale and Family Presence Self-confidence Scale have established validity and a high level of internal consistency has previously been shown in research conducted with intensive care unit nurses ($\alpha = 0.94$, Powers and Candela, 2016). Likewise, the Family Presence Self-confidence Scale yielded an $\alpha = 0.97$ in the current sample.

3.4.3. Invitations

Two items asked participants to report the number of times they invited family presence during resuscitation by asking family members if they would like to be in the room during cardiopulmonary resuscitation. Participants were asked to report the amount of times they invited family presence during resuscitation in the past year and during their careers. Given the extremely high multicollinearity between the two items, the results were the same when using these two items as dependent variables. As such, we only use and report the analyses of the “Career Invites” variable as it is likely to be a more reliable measure of differences in overall frequency of inviting than a single year.

3.5. Data analysis

SPSS IBM© version 23 was used for all data analyses. Descriptive statistics (specifically, means, standard deviations, and Pearson product-moment or point-biserial correlations) were used to address our first question regarding the distributions of participants’ perceptions, self-confidence, and invitations of family presence during resuscitation. These means, standard deviations, and zero-order correlations were also evaluated to ensure integrity of the data and determine which variables were valuable for further study (e.g., had sufficient variability, showed zero-order associations with at least a few outcomes). These zero-order associations were not used to directly investigate our second question due to known multi-collinearity among the observed variables.

To address our second question regarding which factors were most strongly related to the dependent variables, we utilized a series hierarchical OLS regressions. However, because some of the various factors exhibit natural multicollinearity (e.g., age and tenure are strongly correlated), the primary analysis utilized a series of multiple regression models to examine which factors were contributing the most unique variance to the dependent variables. Specifically, we first examined the relative importance of the individual factors within functional sets (i.e., personal factors, professional factors, workplace factors). We then selected the predominant factors within each of those functional sets to further examine in a more complete information model. This process stopped when variables could no longer be removed from the model without a significant reduction the total variance explained.

4. Results

4.1. Sample information

The study sample consisted of 395 intensive care unit nurses from across the United States, with slightly over half reporting employment in urban locations (56%), about a third in suburban locations (32%), and the fewest in rural locations (12%). The sample was not highly diverse with respect to race/ethnicity (86% white, non-Hispanic) or gender (88% female); however, this distribution is similar to national workforce trends (National Council of State Boards of Nursing, 2015) suggesting it is a representative sample of the active workforce. Three-fourths of participants were 25–54 years old and half (53%) had obtained a baccalaureate degree. Amount of nursing experience varied, with 33% having five or less years of experience and 32% having more than 20 years’ experience. The majority of participants (75%) reported their job was providing patient care at the bedside, and 82% reported their patient population of care was adult patients only. Most of the participants (87%) held membership in a professional organization, 58% had a specialty certification, and nearly all (97%) were advanced cardiac life support or pediatric advanced life support certified.

As expected, amount of experience with performing cardiopulmonary resuscitation was higher than amount of experience with having family members in the room during resuscitation, which was more common than experience with family members requesting to be present during resuscitation. The majority of participants (72%) had performed cardiopulmonary resuscitation greater than 20 times during their career, while only 17% had experienced family presence during resuscitation more than 20 times during their career. Most (93%) had experienced family presence during resuscitation at least once during their career, with 1–5 experiences most commonly reported (40%). More than half of participants (61%) reported receiving family member requests to be present during resuscitation during their career, with 38% receiving such requests between 1–5 times. Only one-third of participants had received any training or education on family presence during resuscitation. In terms of written policy, 46% said no policy on family presence during resuscitation existed at their facility, 37% were unsure, and only 17% could confirm their facility had a policy.

4.2. Research question 1: univariate distributional properties of measures of perceptions, self-confidence, and invitations

Means and standard deviations for the primary variables are shown in Table 1, in the first two columns. All dichotomous variables are coded (0,1) so the Mean reflects proportions. The last three variables (rows) are the primary dependent variables for this study.

The Family Presence Risk-Benefit Scale was used to measure participants’ perceptions of family presence during resuscitation and the overall mean score was 3.52 (SD 0.75), corresponding with the scale response option “neither agree nor disagree.” This indicates that, overall, participants had neutral perceptions (neither positive nor negative) of family presence during resuscitation. The Family Presence Self-confidence Scale was used to measure participants’ self-confidence for family presence during resuscitation. The overall mean score on was 4.09 (SD .93), indicating that participants were “quite confident” for implementing family presence during resuscitation in practice.

Analysis of self-report data on the amount of times participants had invited family presence during resuscitation revealed that 131 out of 395 participants (33%) had never offered family members the option to be at the bedside during cardiopulmonary resuscitation. An additional 33% had invited family to be at the bedside during resuscitation between 1–5 times during their careers. The remainder of participants indicated they had invited it 6–10 times (10%), 11–20 times (10%), or more than 20 times (14%) during their careers.

4.3. Research question 2: correlative analyses and empirical predictors

4.3.1. Zero-order correlations

Zero-order correlations among the primary variables are shown in Table 1, to the right of the Means and Standard Deviations. Again, the last three variables (rows) are the primary dependent variables for this study. So as not to clutter the table visually, indicators for the typically NHST are not shown on each coefficient. Rather, as shown in the note, given the sample size, correlations larger than |0.10| significant at $p < .05$ and larger than |0.13| significant at $p < .01$.

Of the personal factors, only age showed consistently significant associations with all three dependent outcomes. Age had a moderate association with Perceptions, and a large association with Confidence and Invitations. The point-biserial correlations with the race/ethnicity dummy code suggested non-white nurses, on average, had slightly lower scores on all three outcomes, though only the association with
Table 1
Means, standard deviations, and zero-order correlations among study variables.

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<tr>
<td>20 Confidence</td>
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<td>0.29</td>
<td>-0.23</td>
<td>0.55</td>
<td>0.44</td>
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</table>

*Note. N = 395. Correlations larger than |0.10| significant at p < .05; larger than |.13| significant at p < .01. All dichotomous variables are coded (0,1) so the Mean reflects proportions, and correlations are point-biserial r’s.*
Invitations was statistically significant. Most of the professional factors showed significant, and typically moderate to strong, zero-order associations with at least two, if not all three of the outcomes. Only advanced cardiac life support or pediatric advanced life support certification failed to show any significant associations; however, this is likely a statistical artifact due to extreme range restriction on this variable. In terms of workplace factors, the setting (urban, suburban, rural) was the only variable not associated with the outcomes. Not being a bedside nurse (compared to being one) was associated with higher scores on all three outcomes, as was working with pediatric patients in some fashion (compared to adults exclusively). Finally, knowing that one’s facility has a written policy on family presence during resuscitation was found to be better than knowing the facility does not have such a policy, but being unsure was worse than knowing there is no policy.

Based on the results of the correlation analysis, we removed gender, race/ethnicity, advanced cardiac life support or pediatric advanced life support certification, and work setting from further analysis. Moving “age” into the professional category, we decided to first run two sets of regression analyses to determine the most predominant predictors of the family presence during resuscitation outcomes; one set of analyses for the professional factors and one set for the workplace factors. Following that, we then fed those remaining variables into a combined model.

**4.3.2. Multiple regression analyses**

The results of the hierarchical multiple regression analyses of the functional set of professional factors is shown in the top half of Table 2. Combined, the set of factors accounted for 25% of the variance in Perceptions, 22% of the variance in Confidence, and 59% of the variance in Invitations. Thus, as a functional set, the professional factors under study well predicted both perceptions and self-confidence, and were especially strong predictors of the behavioral outcome (invitations).

Examination of the partial regression coefficients, which indicate the variable’s unique impact on the criterion, shows that despite its large zero-order association, age does not seem to yield a unique influence. Rather, its zero-order association appears to be due to shared variance with experiential variables. The small exception is that age maintained a small unique influence on Invitations; however, its effect was opposite of its zero-order association. To confirm age was not the putative factor, we ran two hierarchical regression models for each outcome. In one model, age was entered first, then all the professional variables entered second. In the second model, we reversed the order of entry. This is a standard process to determine whether a variable is really contributing unique variance. When age was entered first, it accounted for a significant portion of the variance in all three outcomes, but when entered second, the professional factors accounted for all of the predictable variance and age did not increment the variance (ΔR² = 0.00 for all three outcomes).

With respect to the other predictors, the findings were somewhat consistent across the outcomes. Career experience with family present in the room during resuscitation was the most significant, strongest single predictor of all three outcomes. Beyond that, the regression analyses indicated much of the zero-order associations between the professional factors and the outcomes were likely to due to multicollinearity with a few key variables as most of them failed to contribute any significant unique variance. Education level was the only other significant predictor of Perceptions, and family presence during resuscitation training or education was the only other significant predictor of Invitations. Tenure and having a specialty certification were significantly related to Confidence, but the unique association with certification was opposite of its zero-order effect likely due to multicollinearity.

The results of the multiple regression analyses of the functional set of workplace factors is shown in the bottom half of Table 2. Combined, the set of factors accounted for 13% of the variance in Perceptions, 7% of the variance in Confidence, and 16% of the variance in Invitations. Thus, as a functional set, the workplace factors also significantly predicted both perceptions and invitations. However, compared to the professional factors, the workplace factors did not have as strong of effects. Examination of the partial regression coefficients revealed that, unlike the analysis of the professional factors where most of the individual variables washed out, all three of the workplace factors typically demonstrated significant unique associations with the three outcomes. The only exception is that the difference between “no policy” and “don’t know” was no longer significant (note, this dummy code had to be retained as it part of a structural set).

Based on these independent analyses, we retained the significant predictors for each outcome and combined them into a single model. These results are shown in the left-hand side of Table 3. For Perceptions, the full model included education level, experience with family in the room during resuscitation, and all the workplace factors. This model accounted for 26% of the variance, with education level, experience with family in the room during resuscitation, and having a written policy emerging as the putative variables. For Confidence, the full model included experience with family in the room during resuscitation.

### Table 2

Regression analysis of family presence during resuscitation outcomes on professional and workplace factors.

<table>
<thead>
<tr>
<th></th>
<th>Perceptions</th>
<th></th>
<th>Confidence</th>
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<th>Invitations</th>
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<td><strong>Professional Factors</strong></td>
<td></td>
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<tr>
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<td>0.21</td>
<td>2.68</td>
<td>0.26</td>
<td>-0.31</td>
<td>0.28</td>
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<td>0.05</td>
<td>-0.08</td>
<td>0.06</td>
<td>-0.13</td>
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<tr>
<td>Edu. Level</td>
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<td>0.13</td>
<td>0.03</td>
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<td>0.06</td>
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<td>0.03</td>
<td>-0.21a</td>
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<td>-0.02</td>
<td>0.04</td>
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<td>0.06</td>
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<tr>
<td>Family Request</td>
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<td>0.36</td>
<td>0.21b</td>
<td>0.05</td>
<td>0.28</td>
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<tr>
<td>(Intercept)</td>
<td>3.34</td>
<td>0.06</td>
<td>3.93</td>
<td>0.08</td>
<td>2.09</td>
<td>0.11</td>
</tr>
<tr>
<td>Not Bedside</td>
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<td>0.17</td>
<td>0.34b</td>
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<td>0.16</td>
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<td>-0.05</td>
<td>-0.09</td>
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</table>

**Note:** N = 395. a p < .05; b p < .01.
resuscitation, tenure, and all the workplace factors. This model accounted for 22% of the variance, with tenure and experience with family in the room during resuscitation emerging as the putative variables. Finally, for Invitations, the full model included family presence during resuscitation training or education, experience with family in the room during resuscitation, and all the workplace factors. This model accounted for 59% of the variance, with experience with family in the room during resuscitation, having received family presence during resuscitation training/education, and having a written policy emerging as the putative variables.

To confirm these few variables were efficient without loss of predictive information, we ran a final model for each outcome including only the significant factors from the prior model. If the overall variance accounted for (i.e., $R^2$) did not decrease appreciably, then the restricted model was deemed properly efficient. Because the distinction between “no policy” and “don’t know” failed to yield a difference in the outcomes, we recoded the policy variable into a simple “yes/no” variable (no/“DK” = 0, yes = 1). The results of these models are shown in the right-hand side of Table 3. As shown, reduction of the models to just these few variables retained the maximal predictive value possible (Confidence showed a 1% reduction, but this was due to a small change in the third decimal point that changed the rounding). Finally, to confirm that these small 2 and 3 variable models were not overly trimmed, we compared their predictive power to that of the “full information model” (i.e., a simultaneous entry regression model that included all variables). The Full Information Model shows the maximal amount of variance that can possibly be predicted (atheoretically) by the entire set of variables in a dataset. For the three outcomes, the overall $R^2$ was 0.28, .23, and .61, respectively. Compared to the Final Models shown in Table 3, going from 19 to 3 variables only reduced the total predictive validity by 0.02 for Perceptions (from 28% to 26%), by 0.02 for Confidence (from 23% to 21%), and by 0.01 for Invitations (from 61% to 60%). This confirms that the final models were not overly trimmed and are likely the best, most parsimonious models for this dataset.

5. Discussion

Offering family members the option to be present in the room during resuscitation is recognized as a way to implement family-centered care during life-threatening emergencies. Professional guidelines recommend that family members of critically ill patients be offered the opportunity to participate in family presence during resuscitation (Davidson et al., 2017). However, consistent with prior studies which have shown it is not widely practiced in intensive care unit settings (Carroll, 2014; Powers and Candela, 2017), the current study found 33% of the 395 intensive care unit nurse participants had never invited family presence during resuscitation during their careers and another 33% had invited it just 1–5 times. Considering that 72% of the sample had performed cardiopulmonary resuscitation more than 20 times during their careers, it appears family presence during resuscitation is not a routine component of nurses’ resuscitative care in the intensive care unit. This indicates a need to improve nurses’ family-centered care practices during life-threatening emergencies.

In the current study we found that the nurse participants’ perceptions of family presence during resuscitation, overall, were neutral with a mean Family Presence Risk-Benefit Scale score of 3.52 (measured from 1 to 5, with 5 being most positive perceptions). Yet, the mean self-confidence score (Family Presence Self-confidence Scale) was 4.09, correlating with “quite confident.” These findings are consistent with a recent study that also found intensive care unit nurses reported overall neutral perceptions but were quite confident they could implement family presence during resuscitation (Powers and Candela, 2016). Prior studies have demonstrated a link between perceptions of family presence during resuscitation and self-confidence for implementing it, and whether or not nurses choose to invite family members to be in the room during resuscitation (Tudor et al., 2014; Twibell et al., 2008). In the current study, we too found that perceptions, self-confidence, and invitations were all strongly associated. Participants who perceived family presence during resuscitation positively and who had higher levels of self-confidence for implementing it were more likely to have offered family members the option to participate in family presence during resuscitation. Therefore, interventions designed to improve intensive care unit nurses’ perceptions and self-confidence are important because they may promote higher frequency of inviting family to be in the room during resuscitation.

Due to this link, prior research studies have sought to examine which nurse factors influence perceptions, self-confidence, and the decision to offer family presence during resuscitation as an option; however, the majority of findings to date have been inconclusive. Therefore, we used a rationally-driven Multiple Regression & Correlation analysis to identify the nurse factors that best predicted perceptions, self-confidence, and invitations. We found that participants’ personal factors were not significant unique predictors of perceptions, self-confidence, or invitations. Instead, results show that having had clinical experiences with family members in the room during resuscitation, a written policy, and an advanced education level were the strongest predictors of positive perceptions. Having had clinical experiences with family in the room during resuscitation and increased years of nursing experience were the strongest predictors of heightened self-confidence levels. Finally, having had clinical experiences with family in the room during resuscitation, training or education on family presence during resuscitation, and a written policy most strongly predicted whether or not nurses in this sample invited family members to be present during resuscitation. These findings suggest several recommendations for both clinical practice and future research.

5.1. Recommendations for clinical practice

5.1.1. Create policies

In the current study, having a written facility policy on family presence during resuscitation was strongly associated with positive
perceptions and increased invitations to family members. Yet, only 17% of the sample reported having a written policy at their facility. Policy creation has been repeatedly recommended in the literature (Basol et al., 2009; MacLean et al., 2003; Nykiel et al., 2011; Powers and Candela, 2017), and is supported by our findings. Creating policies on family presence during resuscitation can provide nurses with support for inviting family members to be at the bedside during resuscitation and can help prevent practice inconsistencies which can lead to inequitable care, as well as conflicts among the healthcare team (Flanders and Strasen, 2014). We recommend that intensive care units form a task force to create a policy that is based on professional organization guidelines and evidence-based literature. Nurses in leadership roles can help facilitate task force establishment, which should include bedside nurses and other members of the healthcare team because both resuscitation and family presence during resuscitation require the efforts of various disciplines. It is also recommended that nurses determine whether or not their facility has a written policy. We found that 37% of study participants were unsure if their facility has a policy or not, and these participants were more likely to perceive family presence during resuscitation negatively and to have lower self-confidence for implementing it, and were less likely to have offered family members the option to be in the room during resuscitation. Ongoing education on a unit's policy is important to help promote continued awareness and compliance.

5.1.2. Provide education

We found that having received prior training or education on family presence during resuscitation was associated with increased invitations to family members. This finding is consistent with prior interventional studies that showed education can improve nurses’ and providers’ intent to offer family members the option to be present during resuscitation (Bassler, 1999; Curley et al., 2012). Educational interventions have also resulted in 100% compliance (up from 9%) with offering family members the option to be in the room as part of an emergency department’s policy (Ferrara et al., 2016) and an increase in the percentage (from 52% to 72%) of parents who were given the option for family presence during resuscitation by pediatric intensive care unit providers (Curley et al., 2012). Based on prior research and our study findings, we recommend providing education on family presence during resuscitation to help increase invitations to family members. Further, educating all members of the healthcare team is suggested to prepare all individuals involved in resuscitative care for the presence of family members in the room (Mian et al., 2007). Educational content and strategies should aim to improve perceptions and self-confidence, as these variables were found to be strongly associated with nurses’ invitations of family presence during resuscitation in the current study. Including evidence on outcomes of family member presence drawn from the literature may help improve perceptions, while using simulations to provide experiential learning and practice may help improve self-confidence for implementing family presence during resuscitation.

5.1.3. Promote clinical experience

Having had prior clinical experiences with family in the room during resuscitation was found to be the strongest predictor of participants’ perceptions, self-confidence, and invitations. This supports findings of prior quantitative studies (Chapman et al., 2011; Duran et al., 2007; Feagan and Fisher, 2011; Twibell et al., 2008; Vavarouta et al., 2011). In qualitative research, nurse participants have described how their initial hesitance to implement family presence during resuscitation disappeared after gaining clinical experience with it (Miller and Stiles, 2009; Powers, 2017). Miller and Stiles (2009) described how positive clinical experiences helped nurses overcome their fears and they then offered family members the option to be present as part of their resuscitative care (Miller and Stiles, 2009). Thus, we recommend providing intensive care unit nurses with family presence during resuscitation experiences to help improve their perceptions, self-confidence, and invitations. This can initially be accomplished using simulation with a manikin as the patient and standardized actors to portray family members (Pye et al., 2010). Educators could then model the implementation of family presence during resuscitation with family members during actual resuscitations on the unit (Mian et al., 2007). Additionally, ensuring that there is a written facility policy allowing family presence during resuscitation is another strategy necessary for promoting clinical experiences.

5.2. Recommendations for future research

We recommend continued research regarding the nurse factors that may influence perceptions, self-confidence, and invitations of family presence during resuscitation. As attitudes towards having family members in the room during resuscitation are known to vary according to country (Sak-Dankosky et al., 2014), it is important to replicate this study in other countries to further extend what we know about family presence during resuscitation from a global perspective. Extending this knowledge is important to develop more effective interventions to increase invitations to family members in clinical practice.

6. Limitations

The use of convenience sampling is a study limitation as there is the potential for selection bias and nurses with strong positive or negative views may have selected to participate. However, as noted above, our demographic distribution matches national trends and our descriptive findings are similar to prior studies conducted with intensive care unit nurses in the United States. Further, self-selection did not seem to be a significant concern as one-third of the sample had never invited family presence during resuscitation, another one-third had invited it 1–5 times, and the final one-third invited it 6 times or more. Another limitation involves the method of recruitment because it resulted in most participants (80%) being members of the American Association of Critical-Care Nurses which has issued practice alerts in support of family presence during resuscitation. Findings may not be representative of nurses who are not members of this association. Finally, all measures were self-report items and there is the potential for response bias. However, given the anonymity and lack of specified hypotheses, it seems unlikely there would have been a systematic bias for over or under-reporting one’s perceptions, self-confidence, or invitations of family presence during resuscitation.

7. Conclusion

The current study adds to the limited and inconclusive knowledge about the nurse factors that may influence their perceptions, self-confidence, and invitations of family presence during resuscitation. By examining the nurse factors in combination, the multivariate variance was partitioned to discover which of the many correlated variables may in influence their perceptions, self-confidence, and invitations of family presence during resuscitation may be readily enhanced by just a few modifiable factors. The most influential, modifiable factors noted in the current study were having had experience with family members in the room during resuscitation, training or education on family presence during resuscitation, and knowledge of a written facility policy. The intensive care unit nurses who possessed these factors were found to have more positive perceptions and heightened self-confidence, and also had invited family members to be in the room during resuscitation with increased frequency. Based on these findings, practice recommendations are to create policies, provide education, and promote clinical experiences with family presence during resuscitation.
Funding
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Conflicts of interest
There are no conflicts of interest to report.

Acknowledgement
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