Clinical paper

A descriptive study of the multidisciplinary healthcare experiences of inpatient resuscitation events

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Abstract

Background: In-hospital resuscitation events have complex and enduring effects on clinicians, with implications for job satisfaction, performance, and burnout. Ethically ambiguous cases are associated with increased moral distress. We aim to quantitatively describe the multidisciplinary resuscitation experience.

Methods: Multidisciplinary in-hospital healthcare professionals at an adult academic health center in the Midwestern United States completed surveys one and six weeks after a resuscitation event. Surveys included demographic data, task load (NASA-TLX), overall and moral distress, anxiety, depression, and spiritual peace. Spearman's rank correlation was computed to assess task load and distress.

Results: During the 5-month study period, the study included 12 resuscitation events across six inpatient units. Of 82 in-hospital healthcare professionals eligible for recruitment, 44 (53.7%) completed the one-week post-resuscitation event survey. Of those, 37 (84.1%) completed the six-week survey. Highest median task load burden at one week was seen for temporal demand, effort, and mental demand. Median moral distress scores were low, while "at peace" median scores tended to be high. There were no significant non-zero changes in task load or distress scores from weeks 1–6. Mental demand ($r = 0.545$, $p < 0.001$), physical demand ($r = 0.464$, $p = 0.005$), performance ($r = -0.539$, $p < 0.001$), and frustration ($r = 0.545$, $p < 0.001$) significantly correlated with overall distress. Performance ($r = -0.371$, $p = 0.028$) and frustration ($r = 0.480$, $p = 0.004$) also significantly correlated with moral distress.

Conclusions: In-hospital healthcare professionals' experiences of resuscitation events are varied and complex. Aspects of task load burden including mental and physical demand, performance, and frustration contribute to overall and moral distress, deserving greater attention in clinical contexts.

Keywords: Cardiopulmonary resuscitation, Resuscitation, In-hospital, Healthcare workforce, Spirituality

Introduction

In-hospital healthcare professionals regularly encounter challenging situations that impact their well-being and delivery of patient care. ICU professionals experience increased symptoms of anxiety, depression, and burnout after repeated exposure to death and grief.[1] The COVID-19 pandemic exacerbated these responses.[2]

Resuscitation events have a disproportionate effect on levels of distress, well-being, and job satisfaction.[3] Clinicians' reactions have included concerns about what was done and what could have been done differently, sadness for family, anger and frustration, and a sense of duty toward their jobs.[4] In one study, over half of healthcare

providers reported feeling stressed the last time they performed CPR, and as many as one in ten felt like a failure.[5] These effects are not limited to new clinicians; data suggest experienced nurses feel stressed around resuscitation events.[6] Clinician stress has been shown to have detrimental effects on general performance.[7] In one study of continuous trauma-related stresses, as many as one in four nurses were thinking of leaving their job.[8]

Increasingly, in-hospital healthcare professionals are required to provide CPR to patients with severe comorbidities.[3] As many as one in five resuscitation events may lead healthcare professionals to question the appropriateness of interventions, contributing to moral distress.[3] A study of several thousand clinicians found two-thirds questioned the appropriateness of CPR, over half reported moral distress connected with a perceived inappropriate resuscitation attempt, and one-third thought about leaving their current position.[3] Although some studies have documented staff reactions to providing compressions, none have quantitatively described the multi-disciplinary experience of being part of a resuscitation event. Our study's aim was to evaluate and describe current stress of multidisciplinary clinical staff who participate in cardiopulmonary resuscitation events.

Methods

Study design and setting

This study was conducted between December 2020 and April 2021 at a 574-bed academic health center in the Midwestern United States. Resuscitation events were eligible if CPR was performed for at least one minute on an inpatient at least 18 years old. Excluded resuscitation events included those not announced on the overhead paging system; occurred in the Emergency Department or other outpatient area; or occurred when only one chaplain was present in the hospital. Each individual unit was assessed for meeting inclusion criteria of the study. Some units were excluded secondary to administrative issues. For example, some units have "silent codes" not called overhead. Excluded units were inpatient behavioral health and a single surgical ICU. The Institutional Review Board of Indiana University approved this study, Protocol # 2006053247.

Participant selection

Multidisciplinary in-hospital healthcare professionals were approached if they were an employee and actively involved in a resuscitation event in one of the following capacities: Gave CPR, administered medication, provided respiratory support, gave clinical orders or directions to staff, retrieved supplies, or documented interventions during the resuscitation event. Eligible team members included physicians, nurses, pharmacists, advanced practice providers, and respiratory therapists. Professionals were classified as "in training" or "completed training" to distinguish between learners and fully trained professionals. Those "in training" were completing professional or post-graduate training, such as Resident Physicians. Educational trainees who were not employees, such as Medical Students, were excluded. Participants were required to be fluent in written and spoken English.

Study procedures

To determine event eligibility, a trained study chaplain responded to resuscitation events. Study chaplains were Master-level educated, Board certified or Board eligible employees of the healthcare system.

Chaplains were utilized in a recruitment role due to being familiar with the flow of resuscitation events but not having direct involvement. To not disrupt usual chaplain care to patient families, resuscitation events that occurred with only one chaplain in the hospital were excluded and limited recruitment during nights and weekends.

Once eligibility was established, the chaplain approached in-hospital healthcare professionals with the opportunity to participate in the study. Those expressing interest completed a recruitment slip with their name, discipline, and contact information. Eligible participants received electronic surveys one-week and six-weeks after the resuscitation event. Those who completed the one-week survey were eligible to complete the six-week survey. Participants completing both surveys received a $10 incentive. Informed consent was established using the e-consent module in REDCap. Survey data were collected in REDCap.

Measurements

Surveys included demographic data, task load, overall and moral distress, depression, anxiety, and spiritual peace. The same measures were used at one-week and six-weeks. Demographic data included email address, level of training, age, gender, race, ethnicity, discipline, years in the profession, and years employed in the healthcare system. Task load burden included items for mental, physical, and temporal demand; performance; effort; and frustration, measured by the NASA-Task Load Index (NASA-TLX).[9,10] Overall distress was measured using a rating of 0–10 and included the prompt: "Thinking back to the resuscitation event, please indicate on a 0–10 scale how much overall distress it caused you. 0 is no distress and 10 is extreme distress."[11] Moral distress was measured using a visual representation of a thermometer with ratings from "none" to "worst possible," and included a prompt with a definition of moral distress: "Moral distress occurs when you believe you know the ethically correct thing to do, but something or someone restricts your ability to pursue the right course of action."[12] Psychological outcomes included anxiety and depression as measured by the PHQ-4 utilizing the prompt, "Since the day the code occurred, how often have you been bothered by the following problems?"[13] Spiritual peace was measured using the single item "At Peace" measure[14] with the prompt "When thinking back to the resuscitation event, to what extent are you at peace?" Prior to each prompt, research staff inserted the day of the week, date, and start time of the code event in an effort to cue participants' attention to the specific event (e.g. "The following questions refer to the code that occurred on Thursday, February 10, 2021, at 2:48p.m.").

Statistical analysis

Basic descriptive statistics were generated for demographic characteristics at both one- and six-weeks. Wilcoxon rank-sum tests were used to determine if there were differences in scores between the two time points, due to data skewness. Due to the overlap in participants in the two time periods, additional analyses were performed with signed-rank tests to account for the paired aspect of these participants. Spearman's rank correlation analyses were used to assess the associations between task load variables and distress variables, due to data skewness. Changes in TLX and distress scores from week 1 to week 6 were also analyzed, using Student's t-tests to determine if there was a significant non-zero change; change scores were calculated as week 6 data minus week 1 data, so that positive change scores indicate larger values at week 6 and negative values indicate lower values at week 6. Data were ana-

lyzed using SAS v9.4 (SAS Institute, Cary, NC) and all analytic assumptions were verified.

Results

We approached 108 in-hospital healthcare professionals for participation, including 10 who refused and 16 who were ineligible (Fig. 1). Clinicians most often refused if they perceived they had no active role in the resuscitation event (i.e., a bystander in the hallway). Of the 82 (75.9%) eligible for recruitment, 44 (53.7%) completed the one-week post-resuscitation survey, and of those, 37 (84.1%) completed the 6-week survey. During the 5-month study period, the study included 12 resuscitation events across six inpatient units (ICU, step down, med/surg). According to a recent review article, the incidence of in-hospital cardiac arrests in the United States is 290,000 annually or approximately 6–7 per 1,000 admissions.[15]

A majority of enrolled participants for each survey time point were fully trained, female professionals (Table 1). For both the one- and six-week surveys, participants were predominantly White and non-Hispanic. Disciplines included registered nurses, physicians, respiratory therapists, advanced practice providers, and pharmacists. Roughly half had been in their profession five years or less and were relatively new to the healthcare system.

The task load data describe the demands experienced during a resuscitation event. Task load scores had a possible range of 0–100, low to high. Highest median task load burden at one week was seen for temporal demand (75), effort (74), and mental demand (70) (Table 2). Though less prominent, other task load items such as physical demand (57) and frustration (25) contributed to overall task load burden. Performance had a median score of 75 for "How successful were you in accomplishing what you were asked to do?". Median six-week scores indicate some participants were *more* frustrated thinking back on the resuscitation attempt after six weeks (37), compared to one week (25) (Table 2) – the only task load item reported to increase over the six-week period. Other task load burdens were slightly lower at six weeks (Table 2). Results were similar for those who had data at both time points. There were no significant non-zero changes from week 1 to week 6 (Table 2).

The PHQ-4 median scores at one and six weeks were low (0), with a range of 0–8 and 0–6, respectively. A greater proportion of
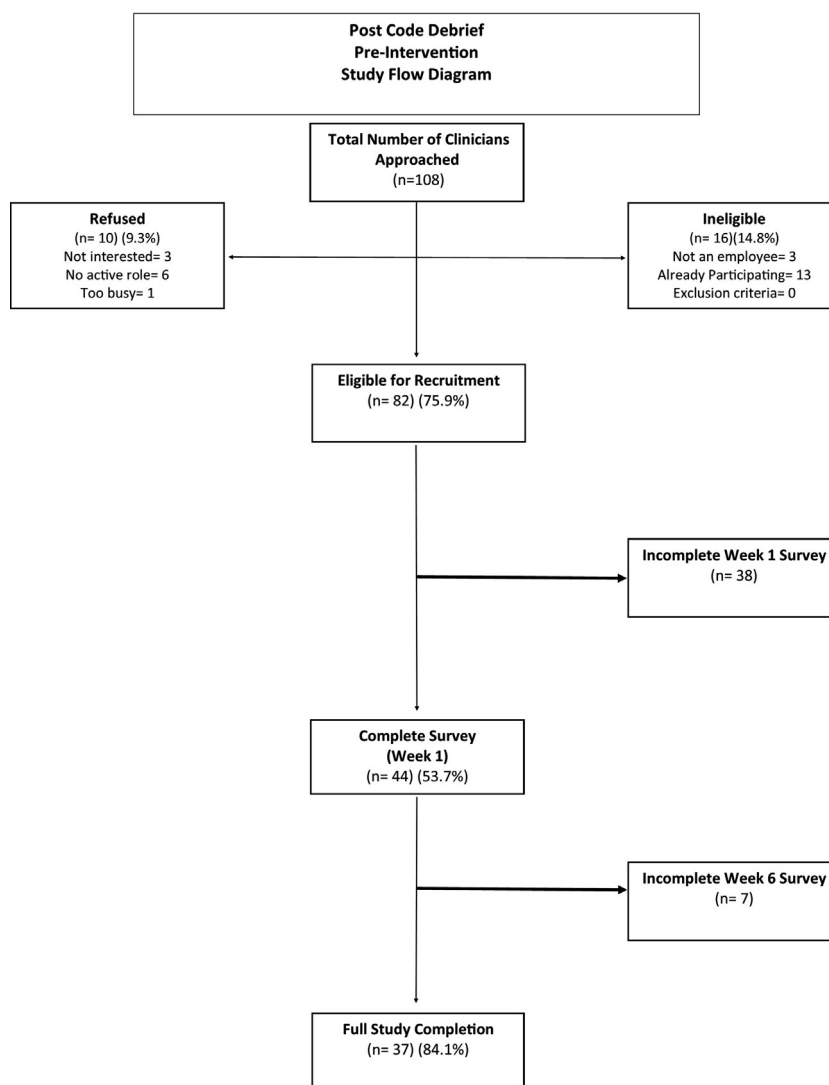

Fig. 1 –

Table 1 – Demographic Information, 6-week column includes participants that completed 1 week and 6 week surveys.

Demographic Information

	1 Week Participants; *n = 45*	6 Week Participants; *n = 35*
Level of Training		
In training[1]	14 (31.1)	13 (37.1)
Completed Training[2]	31 (68.9)	22 (62.9)
Age, years	34.8 (7.9)	34.1 (7.6)
Gender		
Male	16 (35.6)	13 (37.1)
Female	29 (64.4)	22 (62.9)
Non-Binary	0	0
Prefer not to say	0	0
Race		
White	41 (91.1)	31 (88.6)
African American or Black	1 (2.2)	1 (2.9)
Asian	1 (2.2)	1 (2.9)
American Indian/ Alaska Native	0	0
Native Hawaiian or Other Pacific Islander	0	0
More than one race	2 (4.4)	2 (5.7)
Prefer not to say	0	0
Hispanic or Latinx		
Yes	3 (6.7)	2 (5.7)
No	40 (88.9)	31 (88.6)
Prefer not to say	2 (4.4)	2 (5.7)
Discipline		
Advanced Practice Provider	1 (2.2)	1 (2.9)
Pharmacist	7 (15.6)	7 (20.0)
Physician	9 (20.0)	7 (20.0)
Registered Nurse	19 (42.2)	14 (40.0)
Respiratory Therapist	8 (17.8)	5 (14.3)
Other	1 (2.2)	1 (2.9)
Years in Profession		
0–5	20 (44.4)	17 (48.6)
6–10	4 (8.9)	4 (11.4)
11–15	13 (28.9)	10 (28.6)
16–20	4 (8.9)	2 (5.7)
20+	4 (8.9)	2 (5.7)
Years at Current Institution		
0–5	24 (53.3)	20 (57.1)
6–10	5 (11.1)	5 (14.3)
11–15	9 (20.0)	6 (17.1)
16–20	4 (8.9)	3 (8.6)
20+	3 (6.7)	1 (2.9)

Values are frequencies (percentages) for categorical variables and means (standard deviations) for age.

[1] Completing professional or post-graduate training (e.g. Resident Physicians).

[2] Fully trained professionals.

participants reported "not at all" being bothered by symptoms at one week compared to six weeks. Also, when compared to one week, more participants at six weeks indicated they felt down, depressed, or hopeless "several days," and more participants reported feeling nervous, anxious, or on edge "several days." (Table 3).

Median overall distress was moderate (5) at one week and slightly lower (4) at six weeks. However, overall distress at one week showed wide variability among participants, enduring at six weeks (Table 4). Median moral distress was very mild (1) at one week and decreased to 0 at six weeks. In comparison to overall distress, moral distress demonstrated a narrower spread of scores from no distress to moderately high distress. Interestingly, the range of moral distress scores increased at six weeks (Table 4). There was no sig-

nificant non-zero change in either distress score from week 1 to week 6 (Table 4).

Regarding the "at peace" item, at one week nearly half (45.5%) of participants reported being "completely at peace", and just over half (51.5%) reported such at six weeks. None reported being "not at all" at peace at either time point. The extent participants reported being "at peace" when thinking back at one-week included a median response of "4" ("quite a bit") with a majority reporting "5" ("completely"). At six-weeks, median scores increased to correspond with being "completely" at peace (4 and 5, respectively) (Supplemental Table 1).

Task load burden showed significant correlations between several individual items. Specifically, positive correlations were found between mental demand and the following: effort (r = 0.559,

Table 2 – NASA Task Load Index 1-week and 6-weeks post clinical response to an in-hospital cardiac arrest (IHCA).

	1 Week n = 45	6 Week n = 35	Mean difference (95% CI)	p-value
Mental Demand				
How mentally demanding was the task?	70 (20, 100)	65 (9, 100)	−5.18 (−11.12, 0.76)	0.085
Physical Demand				
How physically demanding was the task?	57 (1, 100)	50 (0, 95)	−3.27 (−8.84, 2.29)	0.240
Temporal Demand				
How hurried or rushed was the pace of the task?	75 (26, 100)	74 (30, 100)	−4.12 (−8.45, 0.21)	0.061
Performance*				
How successful were you in accomplishing what you were asked to do?	75 (0, 100)	75 (0, 93)	−1.88 (−12.26, 8.51)	0.715
Effort				
How hard did you have to work to accomplish your level of performance?	74 (0, 100)	69 (13, 100)	−4.85 (−11.33, 1.63)	0.137
Frustration				
How insecure, discouraged, irritated, stressed, and annoyed were you?	25 (0, 93)	37 (0, 90)	3.94 (−5.70, 13.58)	0.411
NASA Tax Load Index Composite Score				
	62.5 (31.7, 88)	61.8 (29.5, 748)	−2.56 (−6.28, 1.16)	0.170

Scores are medians (ranges). Scores range from 0 to 100. Values are mean differences between week 1 and week 6, with 95% confidence intervals and p-values for from t-tests, testing if the change is zero, with Signed Rank tests also being performed as some distributions were slightly skewed. Differences are calculated as week 6 minus week 1, so positive values indicate larger values are week 6 and negative values indicate smaller values are week 6 compared to week 1.
* Performance is a reverse-scored item. Higher performance values represent greater perceived success.

Table 3 – PHQ-4, one-week and six-weeks post clinical response to an in-hospital cardiac arrest (IHCA). Data are presented as frequencies (percentages). Score ranges from 0 to 12. PHQ-4 scores were operationally categorized as normal (0–2), mild (3–5), moderate (6–8), and severe (9–12). PHQ: Patient Health Questionnaire; total scores are given as medians (ranges).

	1-week				6-weeks			
Item	Not at all	Several days	More than half the days	Nearly every day	Not at all	Several days	More than half the days	Nearly every day
Since the day the code occurred, how often have you been bothered by the following problems?								
Feeling nervous, anxious or on edge	35 (79.6)	7 (15.9)	1 (2.3)	1 (2.3)	21 (63.6)	10 (30.3)	2 (6.1)	0 (0)
Not being able to stop or control worrying	37 (84.1)	6 (13.6)	1 (2.3)	0 (0)	25 (75.8)	7 (21.2)	1 (3.0)	0 (0)
Feeling down, depressed or hopeless	40 (90.9)	2 (4.6)	2 (4.6)	0 (0)	25 (75.8)	8 (24.2)	0 (0)	0 (0)
Little interest or pleasure in doing things	41 (93.2)	3 (6.8)	0 (0)	0 (0)	28 (84.9)	4 (12.1)	1 (3.0)	0 (0)
PHQ-2 Total Score	0 (0, 3)				0 (0, 3)			
PHQ-4 Total score	0 (0, 8)				0 (0, 6)			

p < 0.001), physical demand (r = 0.514, p = 0.002), and temporal demand (r = 0.499, p = 0.002). In contrast, temporal demand was negatively correlated with performance (r = −0.364, p = 0.032). Effort positively correlated with physical demand (r = 0.436, p = 0.009) and temporal demand (r = 0.359, p = 0.034). Performance negatively correlated with frustration (r = −0.419, p = 0.012) (Tables 5a and 5b).

Significant correlations were also found between task load items and distress at one-week. Mental demand, physical demand, performance, and frustration significantly correlated with overall distress (Tables 5a and 5b). Performance and frustration also significantly correlated with moral distress (Tables 5a and 5b). Frustration negatively correlated with being "at peace," and physical demand marginally correlated (Tables 5a and 5b). Some correlations persisted and appeared stronger at six-weeks, notably frustration and distress

(r = 0.571, p < 0.001) as well as frustration and peace (r = −0.573, p < 0.001). Additionally, the correlation between mental demand and physical demand was stronger at six-weeks (r = 0.595, p < 0.001). Years in the profession were not correlated with overall or moral distress at one week (r = −0.227, p = 0.134; r = −222, p = 0.144). Immediate patient survival was also not associated with one-week overall distress (p = 0.507), and patient length of stay was not associated with moral distress (r = 0.205, p = 0.177).

Discussion

This study is the first to apply the NASA-TLX to the in-hospital resuscitation experience. NASA-TLX was used previously to measure task

Table 4 – Overall Distress and Moral Distress 1-week and 6-weeks post clinical response to an in-hospital cardiac arrest (IHCA). Scales are 0–10. For overall distress, 0 is no distress and 10 is extreme distress. For moral distress, 10 is worst possible, 8 is intense, 6 is distressing, 4 is uncomfortable, 2 is mild, and 0 is none. Scores are given as medians (ranges).

	1-week post n = 45	1-week who also have 6-week n = 35	6-weeks post n = 35	Mean difference (95% CI)	p-value
Overall Distress Thermometer	5 (0, 9)	5 (0, 9)	4 (0, 9)	−0.16 (0.88, 0.57)	0.6737
Thinking back to the code, please indicate on a 0 to 10 scale how much overall distress it caused you. 0 is no distress, and 10 is extreme distress.					
Moral Distress Thermometer	1 (0, 6)	1 (0, 6)	0 (0, 7)	−0.48 (−1.25, 0.28)	0.2049
Please mark the number (0–10) on the Moral Distress Thermometer that best describes how much moral distress you have been experiencing in the past week related to the code.					

Values are mean differences between week 1 and week 6, with 95% confidence intervals and p-values for from t-tests, testing if the change is zero, with Signed Rank tests also being performed as some distributions were slightly skewed. Differences are calculated as week 6 minus week 1, so positive values indicate larger values are week 6 and negative values indicate smaller values are week 6 compared to week 1.

Table 5a – Correlation Matrices at 1-week post code: TLX items and Peace and Distress items Week 1.

	TLX 1	TLX 2	TLX 3	TLX 4	TLX 5	TLX 6	Peace	Distress	Moral Distress
TLX 1 Mental Demand		**0.514** $P = 0.002$	**0.499** $P = 0.002$	−0.293 $P = 0.088$	**0.559** $P < 0.001$	0.229 $P = 0.185$	−0.295 $P = 0.086$	**0.545** $P < 0.001$	0.073 $P = 0.676$
TLX 2 Physical Demand			0.216 $P = 0.213$	−0.193 $P = 0.268$	**0.436** $P = 0.009$	0.109 $P = 0.532$	**−0.353** $P = 0.048$	**0.464** $P = 0.005$	0.298 $P = 0.082$
TLX 3 Temporal Demand				**−0.364** $P = 0.032$	**0.359** $P = 0.034$	0.201 $P = 0.247$	−0.275 $P = 0.110$	0.258 $P = 0.135$	0.059 $P = 0.738$
TLX 4 Performance					−0.049 $P = 0.825$	**−0.419** $P = 0.012$	0.069 $P = 0.692$	**−0.539** $P < 0.001$	**−0.371** $P = 0.028$
TLX 5 Effort						0.208 $P = 0.231$	−0.311 $P = 0.069$	0.318 $P = 0.063$	0.121 $P = 0.489$
TLX 6 Frustration							**−0.478** $P = 0.004$	**0.545** $P < 0.001$	**0.480** $P = 0.004$
Peace								**−0.506** $P = 0.002$	**−0.357** $P = 0.036$
Distress									**0.557** $P < 0.001$
Moral Distress									

Values are Spearman's non-parametric correlation coefficients and p-values.
  Statistically significant p-values (p < 0.05) are bolded.

load in simulated and surgical healthcare settings.[16,17] Prior studies of resuscitation events focused on measuring PTSD, coping behaviors, feelings of competency, and stress.[5,18] In contrast to prior studies, our findings include the multidisciplinary team. We identify contributing factors to the resuscitation experience, leading to the opportunity to differentiate between more and less stressful circumstances. Findings suggest in-hospital healthcare professionals' experiences of resuscitation events are multi-faceted – indicating no single aspect of the experience dominates the professional's interpretation of the event. Likewise, interventions should be multidimensional in order to adequately address healthcare professionals' self-perceptions of performance, ethical concerns, spiritual well-being, and distress.

Task load burden and overall distress

This study found overall distress significantly correlated with multiple aspects of task load burden, including mental demand, physical demand, performance, and frustration. Except for performance, these relationships endured at six-weeks post-resuscitation event. Comparatively, the relationship between overall distress and frustration became stronger at six weeks.

These findings are consistent with prior studies that found elevated stress levels impact performance. For example, an individual's appraisal of the demands of a situation can impede performance on tasks requiring working memory and decision-making.[19] Other studies found high-stress resuscitation simulations impaired overall clinical performance compared with low-stress simulations,[20] and that professional first responders perform worse under stress.[17] Although healthcare workers may discount the stress they experience, studies have demonstrated the physiological reality of stress in crisis situations.[21] Focusing on self-report measures, descriptive studies showed over half of the participants felt stressed during a resuscitation event.[8] Given the high scores on the NASA-TLX and the correlation with overall distress, our study adds to the literature describing the high rate of burnout experienced by in-hospital healthcare professionals.

Table 5b – Correlation Matrices at 6-weeks post code: TLX items and Peace and Distress items Week 6.

	TLX 1	TLX 2	TLX 3	TLX 4	TLX 5	TLX 6	Peace	Distress	Moral Distress
TLX 1		**0.595** $P < 0.001$	**0.349** $P = 0.047$	−0.051 $P = 0.777$	0.281 $P = 0.114$	0.304 $P = 0.085$	**−0.516** $P = 0.003$	**0.487** $P = 0.004$	−0.001 $P = 0.994$
TLX 2			0.103 $P = 0.569$	−0.009 $P = 0.962$	0.278 $P = 0.117$	−0.048 $P = 0.792$	−0.348 $P = 0.051$	**0.421** $P = 0.015$	0.218 $P = 0.222$
TLX 3				−0.261 $P = 0.143$	**0.375** $P = 0.032$	**0.410** $P = 0.018$	−0.177 $P = 0.333$	0.233 $P = 0.193$	0.075 $P = 0.679$
TLX 4					−0.011 $P = 0.951$	**−0.437** $P = 0.011$	0.154 $P = 0.399$	−0.317 $P = 0.072$	0.061 $P = 0.735$
TLX 5						0.155 $P = 0.388$	−0.336 $P = 0.060$	0.327 $P = 0.063$	0.147 $P = 0.415$
TLX 6							**−0.571** $P < 0.001$	**0.571** $P < 0.000$	0.169 $P = 0.348$
Peace								**−0.573** $P < 0.001$	−0.234 $P = 0.197$
Distress									0.191 $P = 0.288$
Moral Distress									

Values are Spearman's non-parametric correlation coefficients and p-values.
Statistically significant p-values ($p < 0.05$) are bolded.

Task load burden and moral distress

Though median scores for moral distress were lower than in prior studies,[12] in-hospital healthcare professionals experienced significant moral distress correlated with two task load items: performance and frustration. While other studies have considered the ethical dilemmas of resuscitation events, only one previous study specifically asked clinicians about moral distress related to the appropriateness of CPR.[3] Most participants felt they had performed well during the resuscitation event, consistent with an earlier study that only 30% of clinicians were worried about making mistakes when performing CPR.[5] However, participants who rated they had not performed well during the resuscitation event reported higher moral distress. Similarly, participants who scored higher on moral distress were more frustrated and felt less at peace.

While moral distress among critical care nurses has been extensively studied in North America,[22–24] moral distress in relation to resuscitation is poorly studied, particularly in non-critical care areas. Although not specifically addressing resuscitation events, studies have found clinicians facing ethical dilemmas, or those who are unable to do what they feel is right due to healthcare system constraints, may experience moral distress.[25] Our findings suggest some, but not all, resuscitation events elicit those experiences. While overall and moral distress had significant associations with frustration, effort, and peace, the relationships were stronger with overall distress. There were no significant associations with moral distress at six-weeks, suggesting awareness of these symptoms may resolve. Future interventions to reduce in-hospital healthcare professional frustration and moral distress may target feelings of success during the resuscitation event, either pre-emptively with training or afterward with clinical debriefing.

Lack of expected significance

This study found several hypothesized associations were not present. For instance, years in the profession and immediate patient survival did not correlate with overall distress. Additionally, years in the profession and patient's length of stay did not correlate with moral distress. These findings are consistent with prior lack of association with moral distress,[26] but are in contrast to other findings associated with profession, age, and years of experience.[27] Because our multidisciplinary study did not stratify by profession due to small sample size, variation across professions may not have been evident. Consistent with a prior study, a patient's death during the resuscitation event did not cause the most stress for nurses.[28] In contrast, that same study found a relationship between years of service in the healthcare profession and stress due to lack of confidence. In one recent review, survival to hospital discharge and "good neurological outcome" ranged from 11% to 28.5% in patients over 70.[29] Consequently, some ICU staff may believe survival is not always the best outcome when quality of life may be compromised.

Findings suggest prioritizing interventions based on specific event factors, such as patient survival, age, or length of stay, may not be effective. Additionally, experience or tenure of staff does not seem to affect moral distress. External factors of the resuscitation event seem to be less predictive of distress than less visible but more innate interpretations like perception of performance or if the event felt chaotic.

Spiritual peace and overall distress

To our knowledge, no prior studies reported the impact of resuscitation events on in-hospital healthcare professionals' perception of being "at peace." In prior literature, this item has been utilized as a measure of spiritual well-being, particularly among patients with life-limiting diagnoses and bereaved family members.[14]

Participants generally reported feeling "at peace" after the resuscitation event, with a slight increase at six weeks. Overall distress was negatively correlated with spiritual peace at both time points, consistent with previous studies correlating "peace" with emotional well-being.[14] Although there is significant overlap, results suggest being at peace is more than simply absence of distress. Previous studies also found a highly significant relationship between the "at peace" question and the Functional Assessment of Chronic Illness Therapy-Spirituality (FACIT-Sp) subscale of purpose and faith, suggesting a meaning-making and religious component.[14] Findings sug-

gest the repercussions of participating in a resuscitation event extend to spiritual well-being. Healthcare professionals who practice their faith and/or have a strong sense of purpose in their role may experience less distress during critical events.[30,31]

Given the highly statistically significant negative correlation between overall distress and spiritual peace, we suggest efforts to address healthcare professionals' distress should include spiritual care practitioners (e.g., chaplains). Chaplains are highly trained, key members of the interprofessional team who routinely respond to resuscitation events to provide embedded spiritual support for patients and families.[32] While some institutions utilize chaplains for staff care,[33] a practice which increased during the COVID-19 pandemic,[34] chaplains tend to be an underutilized resource in addressing care team distress.[35]

Psychological outcomes

Findings indicated minimal symptoms of anxiety and depression among participants after resuscitation events. Though PHQ scores overall were low, participants reported a slight increase in negative symptoms at six weeks, possibly indicating some rumination or negative coping amongst respondents. In contrast to our findings, other studies link CPR and patient death to increased risk of PTSD in nurses.[18] Our study's multidisciplinary sample may have failed to detect nursing-specific outcomes linked to CPR, since not all participants were nurses providing CPR.

Limitations

Our study took place in a single, Midwestern, tertiary care hospital. Participation was highest in the "0–5 years" of experience category. Although our study population was predominantly homogeneous racially, human resources data indicate our sample was similar to the hospital employee population. Future studies should consider recruiting from diverse healthcare settings.

We acknowledge potential contamination with additional resuscitation events and stressful events in the interim between the study event and surveys. While participants were prompted to recall a specific resuscitation event when completing surveys, it is possible clinical and personal stress affected the responses. Another study using the NASA-TLX to measure stress during simulated resuscitation events found additional environmental factors increased perceived workload of the resuscitation event itself.[36]

Though our study retention was high, and response rate was consistent with or slightly above similar studies,[37] response rate and loss to follow-up are potential sources of bias, as is self-report. Lastly, the overall stressful environment in healthcare during COVID-19 was an unanticipated and uncontrolled factor. However, measuring these factors during COVID-19 provided valuable data about the potentially compounding impact of pandemic stressors.

Conclusion

Findings suggest in-hospital healthcare professionals' experiences of resuscitation events are complex and varied. Task load burden correlations with overall and moral distress as well as "peace" warrant greater attention in clinical contexts. Because spiritual care professionals (chaplains) have specialized training to address overall and moral distress as well as spiritual peace, future studies may consider how chaplains can be utilized as a supportive resource.

Declaration of Competing of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

CRediT authorship contribution statement

Shelley E. Varner-Perez: Conceptualization, Methodology, Formal analysis, Investigation, Writing – original draft, Project administration. **Kelly A.L. Mathis:** Conceptualization, Methodology, Formal analysis, Writing – original draft, Funding acquisition. **Sarah K. Banks:** Software, Resources, Data curation, Writing – review & editing, Visualization. **Emily S. Burke:** Software, Resources, Data curation, Writing – review & editing, Project administration. **James E. Slaven:** Methodology, Data curation, Formal analysis, Writing – review & editing. **Gregory J. Morse:** Methodology, Investigation, Writing – review & editing. **Myra K. Whitaker:** Methodology, Investigation, Writing – review & editing. **Ann H. Cottingham:** Conceptualization, Methodology, Writing – review & editing, Supervision, Funding acquisition. **Rami A. Ahmed:** Methodology, Formal analysis, Writing – original draft, Supervision.

Appendix A. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.resplu.2022.100349.

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