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A National Survey of Secondary Traumatic Stress and Work Productivity of Emergency Nurses Following Trauma Patient Care

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Abstract

Background: Secondary traumatic stress is common for emergency nurses working in trauma care, but it is unknown if this secondary traumatic stress negatively correlates to work productivity.

Objective: The purpose of this research was to examine the relationship of secondary traumatic stress to work productivity of emergency nurses who provide trauma patient care in the emergency department.

Methods: This study used a cross-sectional survey design with a systematic random sample of emergency nurses. Respondents ($N = 255$) completed the Impact of Events Scale-Revised (IES-R) and Healthcare Productivity Survey (HPS) based on trauma patient care within the preceding 30 days. A 2-tailed Pearson correlation was calculated to explore the relationship between secondary traumatic stress and work productivity for emergency nurses providing trauma patient care.

Results: Mean IES-R score was 19.1, and HPS score was 2.7. About 38% of respondents reported high secondary traumatic stress, and 29% reported decreased work productivity. While overall correlation between IES-R and HPS was not significant, IES-R-intrusion was significantly correlated with HPS-cognitive demands ($p = 0.003$) and safety and competency ($p = 0.011$), IES-R-avoidance with HPS-safety and competency ($p = 0.003$), and IES-R-hyperarousal with HPS-cognitive demands ($p = 0.002$) and HPS-handle/manage workload ($p = 0.015$).

Conclusions: Secondary traumatic stress and decreased work productivity were significant problems for some emergency nurses. To address this problem, employers can provide stress reduction and management techniques to emergency nurses providing trauma patient care. In addition, emergency nurses need to be proactive in seeking social support and using stress mitigation and reduction programs.

Keywords

trauma nursing; traumatic stress disorders; compassion fatigue; occupational stress; workload

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I work in the emergency department, and we had a trauma code, 16-year-old in full arrest. The patient arrived, White male whose mother had found him in his bedroom hanging from a belt. I'm never used to seeing young people dying. He was so cute, and as we were looking him over, he had animal boxer shorts just like my older son wears. The patient was in ventricular fibrillation, and we worked on him for about 30 minutes, but he never got a rhythm. It truly touched my heart. His parents said he was depressed. It was so sad. It could have been my son, and I still think about it when I see my vicarious carefree 21-year-old college student.

The above exemplar comes from a respondent in the current study providing the context for the secondary traumatic stress experienced by emergency nurses who provide trauma patient care. Figley (1995) describes secondary traumatic stress as an experience closely mirroring posttraumatic stress disorder, the major difference being whether the impacted person directly experienced the trauma. In emergency care nursing, patients are the primary person experiencing a trauma and are at risk of developing posttraumatic stress disorder. The caregivers, including emergency nurses providing trauma patient care, experience the trauma secondarily and are at risk for secondary traumatic stress disorder. The respondent in the above example is among the over 180,000 emergency nurses working in the U.S. (personal communication, Emergency Nurses Association, 2020) who provide trauma patient care, which places them at risk for experiencing secondary traumatic stress (Wolf et al., 2020).

Secondary traumatic stress, a normal reaction to an abnormal event (Figley, 1995), can happen by experiencing or witnessing a highly distressing event such as trauma patient care (e.g., motor vehicle crash, gunshot wound) that is outside the range of normal human events. Symptoms of secondary traumatic stress include intrusion or the re-experiencing of the trauma through nightmares and flashbacks; avoidance of the trauma, including active efforts to avoid triggers and stimuli that may bring back those memories such as asking for a change of patient assignment; and hyperarousal, which can lead to irritability, anger, difficulty concentrating, and exaggerated startle response (Arnold, 2020; Figley, 1995; Stamm, 1999; Wolf et al., 2020).

Emergency nurses are exposed to multiple stressors during their work that can lead to secondary traumatic stress. In addition to trauma patient care, these stressors include providing care to patients who die and other experiences such as conflict with peers and physicians, high workload, discrimination, and workplace violence (Alomari et al., 2021; Higgins et al., 2020). Morrison and Joy (2016) reported that 75% ($n = 80$) of the emergency nurses in their study reported at least one secondary traumatic stress symptom in the last week. Ratrou and Hamdam-Mansour (2020) revealed that almost half ($n = 202$) of the sample in their study reported high to severe traumatic stress.

Work-related stressors, particularly trauma patient care, can result in symptoms of burnout, compassion fatigue, and anxiety (Cook et al., 2021; Higgins et al., 2020; Hinderer et al., 2014; Nolte et al., 2017). Depersonalization, a subcategory of burnout, was shown to be significantly higher for trauma center emergency nurses (Mdn 15.5, IQR 9) compared to trauma center nurses working in intensive care units (Mdn 9.0, IQR 10) and surgery/trauma wards (Mdn 7.0, IQR 7) (Cook et al., 2021).

Bock et al. (2020) reported that 23% ($n = 74$) of nurses had secondary traumatic stress symptoms and significantly reduced workflow. Reduced workflow, described as not being adequately informed and equipped to provide care and being interrupted during care, is but one aspect of work productivity that can be adversely affected during patient care. As a more encompassing construct, work productivity is defined as emergency nurses' ability to provide safe care to patients and compassionate care to patients and families (Gillespie et al., 2010). Workload in this broader sense has not been previously studied in the context of care for traumatically injured patients.

CONCEPTUAL FRAMEWORK

The conceptual framework guiding this study was the Revised Transactional Model of Occupational Stress and Coping (Goh et al., 2010; see Figure, Supplemental Digital Content 1, which displays the conceptual framework to the context of trauma patient care). The model has five assumptions. First, a primary appraisal of an event will determine whether the situation is a threat, challenge, or benign. Several events or situations can be appraised as threats by emergency nurses, including trauma patient care (Wolf et al., 2020). Second, a secondary appraisal of an event will determine what can be done regarding the situation. Evidence supports that nurses' education in stress management techniques or training in critical incident stress debriefing (CISD) can reduce the stress response (Morrison & Joy, 2016). Third, secondary traumatic stress will be experienced following the primary and secondary appraisals. This secondary traumatic stress experience may vary and result in unsafe patient care (decreased work productivity). Fourth, coping strategies will be deployed to mitigate the stress and vary from nurse to nurse: stress management, psychological first aid, and CISD training. Fifth, some degree of stress will continue to be experienced after coping strategies are deployed. This residual stress can potentially impact productivity for weeks, which can be further complicated by multiple stressful events (e.g., cumulative trauma) (Sun et al., 2018).

OBJECTIVE

The purpose of this research was to examine the relationship of secondary traumatic stress to the work productivity of emergency nurses who provide trauma patient care in the emergency department (ED).

METHODS

A cross-sectional survey design was used. The study protocol was approved by the University of Cincinnati Institutional Review Board (IRB approval # 08-11-22-09) prior to its initiation. Respondents were recruited from a systematic random sample of emergency nurses in the U.S. The SURvey Reporting GuidelinE (SURGE) based on the American Association for Public Opinion Research (AAPOR) criteria were incorporated into the development of this paper (Bennett et al., 2011).

Sample

Respondents were drawn from a systematic random sample of members of the Emergency Nurses Association. The member database was organized by U.S. zip code, and beginning with a random starting point, every 12th member was selected for the sample roster. The calculation for every 12th member was based on 36,000 members as a numerator and a sample roster of 3,000 persons as a denominator. The systematic random sampling procedure was performed by the Emergency Nurses Association, and the sample roster was then provided to the research team. Inclusion criteria were being a member of the Emergency Nurses Association, having a valid U.S. mailing address, and providing trauma patient care in the preceding 30 days. There were no exclusion criteria.

An a priori power analysis was conducted using G*Power 3.1.9.2 to determine the minimum sample size. Based on the theoretical assumptions for the relationship between secondary traumatic stress and work productivity, a medium effect size of 0.3 was assumed. Based on alpha 0.05 and power of 99%, a minimum sample size of 161 was needed. If a smaller sample size had participated, 80% power would still have been achieved with 64 respondents. A post hoc power analysis based on $|\rho| = 0.039$, alpha 0.05, and sample size 255, 15% power was achieved.

Instrumentation

Secondary traumatic stress was measured using the Impact of Events Scale-Revised (IES-R). The IES-R is a self-administered 22-item questionnaire based on three clusters of symptoms: intrusion, avoidance, and hyperarousal (Hyer & Brown, 2008). The IES-R subscales showed high internal consistency with a Cronbach's alpha ranging from 0.79 to 0.91. The questions used Likert-scale responses ranging from 0 (not at all) to 4 (extremely). The item responses were summed to yield a stress score ranging from 0 (no secondary traumatic stress) to 88 (high secondary traumatic stress). Scores of 0-9 were categorized as low secondary traumatic stress, 10-19 as moderate secondary traumatic stress, and 20 or greater as high secondary traumatic stress.

Work productivity was measured using the Healthcare Productivity Survey (HPS). The HPS is a 29-item self-administered questionnaire developed to determine self-perceived changes in work productivity following stressful, emergency care situations such as trauma patient care (Gillespie et al., 2010). The tool's content validity was assessed by a panel of clinical and research experts who judged the tool items to be representative of trauma care experiences. Exploratory factor analysis resulted in four subscales: cognitive demands, handle/manage workload, support and communication with patients and visitors, and safety and competency. Internal consistency reliability for HPS subscales ranged from 0.875 to 0.936. Items were Likert-scaled ranging from -2 (decreased work productivity) to +2 (improved work productivity). The item responses were summed to yield a work productivity score ranging from -58 (decreased work productivity) to +58 (increased work productivity).

Demographic information was measured using a demographic survey. The demographic survey asked for respondents' age, gender, race, and educational attainment in nursing.

Respondents also reported their primary work shift (day, evening, night), primary patient population treated in the ED (adult only, pediatric only, general), approximate annual ED census, and urbanicity of ED where worked (urban, suburban, rural). Finally, respondents provided information about whether they had received formal training with their current employer on coping with stressful situations (yes, no) and whether they were offered critical incident stress debriefing after the trauma care event (yes, no).

Procedures

A survey packet consisting of a single open-ended item, IES-R, HPS, and demographic survey was mailed to potential respondents. The open-ended item requested participants to describe their most distressing experience of trauma patient care within the preceding 30 days. This item was used to verify that the data returned were in relation to the care of a trauma patient and not another occupational stressor such as the care of a patient with severe acute myocardial infarction resulting in patient death. All returned surveys described trauma patient care. Instructions for IES-R and HPS similarly requested reflection over the preceding 30 days, specifically in relation to the episode of trauma patient care that they described. Thirty days was selected as a time frame for two reasons: (1) acute stress symptoms are experienced up to 30 days post event before becoming posttraumatic stress symptoms, and (2) a shortened time frame reduced recall bias. Upon completion, the surveys were returned to the investigators using a pre-addressed and stamped envelope. A \$10 gift card was provided for study participation.

Data Management and Analysis

Data were double-entered in a database by two research assistants. The two databases were verified for matches. Any mismatches were corrected before data analysis. Responses to the IES-R items were summed to yield a stress score ranging from 0 to 88, and HPS items were summed to yield work productivity scores ranging from -58 to +58. Descriptive statistics were calculated to describe the study sample. Data were visualized through histograms. A 2-tailed Pearson correlation was calculated to explore the relationship between IES-R (secondary traumatic stress) and HPS (work productivity) scores. Alpha was set at 0.05. Analyses were completed using IBM SPSS Statistics version 26 (Armonk, NY).

RESULTS

Of the 3,000 potential respondents who received the survey packet, 265 (8.8%) respondents returned a survey with 10 cases being deleted due to insufficient survey completion. Two-hundred fifty-five emergency nurses returned fully completed surveys, of which the majority was female ($n = 206$ of 239, 86.2%) and White ($n = 231$ of 254, 90.9%). The mean age of the sample was 44.4 years (range 24 to 69). Most participants had access to CISD after the event ($n = 147$ of 249, 59%). See Table 1 for additional demographic information.

The mean IES-R score for the sample was 19.1 (SD 16.4, range 0 to 70), indicating mild secondary traumatic stress. See Figure 1 for a histogram of IES-R scores. The mean HPS score for the sample was 2.7 (SD 13.7, range -51 to +58), indicating a slightly increased work productivity. See Figure 2 for a histogram of HPS scores. About a third of the

respondents reported high secondary traumatic stress ($n = 97, 38.0\%$) and decreased work productivity ($n = 73, 28.6\%$) (see Table 2).

Overall assessment of the correlation between secondary traumatic stress and work productivity was not significant ($r = -.004, p = .948$). However, several correlations of IES-R and HPS subscales were significant (see Table 3). Specifically, intrusion was negatively correlated to cognitive demands ($r = -.183, p = .003$) and positively correlated to safety and competency ($r = .158, p = .011$). Avoidance was positively correlated to safety and competency ($r = .184, p = .003$). Hyperarousal was negatively correlated to cognitive demands ($r = -.193, p = .002$) and handle/manage workload ($r = -.152, p = .015$).

DISCUSSION

The Revised Transactional Model of Occupational Stress and Coping (Goh et al., 2010) was a useful framework to study secondary traumatic stress and work productivity in emergency nurses who provide trauma patient care. Respondents in our study appraised their trauma care situation as a stressor. Following this primary appraisal, about a third of the study respondents experienced high secondary traumatic stress ($n = 97, 38.0\%$) and decreased work productivity ($n = 73, 28.6\%$). Wolf et al. (2020) similarly found trauma care to be an occupational stressor resulting in secondary traumatic stress with emergency nurses. Further research is needed to determine what strategies can be used when secondary traumatic stress symptoms persist over time to restore the mental health and work productivity of emergency nurses following trauma patient care. The possible cumulative effects of caring for trauma patients is reflected in the fifth assumption of the study framework. This cumulative effect may be buffered by effective use of coping strategies that promote resilience.

Long-term effects of secondary traumatic stress on emergency nurses are still being explored in the literature. Bock et al. (2020) found that nurses with secondary traumatic stress may be at increased risk of developing severe anxiety and major depressive disorders due to secondary traumatic stress over time. Nurses tend to believe in the "Super Nurse" stereotype, where they should be able to cope with all the demands of the workplace (Missouridou, 2017). Our findings for safety and competency could support this Super Nurse stereotype given that in the presence of trauma patient care and subsequent intrusion, avoidance, and hyperarousal, the emergency nurses in our study tended to report increased safety and competency in their work productivity.

While respondents in our study reported increased safety and competency, our findings could actually represent a fixation and persistent double-checking of their clinical decision-making and care, which contributes to this enhanced safety and competency. However, the respondents also reported overall decreases in other aspects of work productivity (e.g., handle/manage workload). This could indicate that a fixation and commitment to safety and competency is achieved only through physical and cognitive costs in other aspects of work productivity. As secondary traumatic stress interventions are developed, they need to reduce the cognitive demands and workload required for many nurses unknowingly experiencing secondary traumatic stress while protecting their work productivity (e.g., patient safety and outcomes).

In a study by Wolf et al. (2020), 55% ($n = 125$) of surveyed emergency nurses reported high to severe levels of secondary traumatic stress. Emergency nurses have long been aware of the stress of their work environment, but the problem of secondary traumatic stress continues (Wolf et al., 2020). Wolf et al. (2020) reported the cumulative effect that trauma care has over time and ultimately impacting nurses' well-being. This stress can lead to difficulty in job performance and poor professional judgment, medical errors, decreased emotional connection with patients and families, and increased absenteeism (Arnold, 2020). In contrast, our findings yielded a significant and positive correlation between intrusive thoughts (secondary traumatic stress) and safety and competency (work productivity). While a fixation on error prevention at the costs of work volume may have occurred, another reason for our respondents' self-reported increased safety practices could be due to system designs. For example, barcoding of medications like morphine and patient wrist bands can prevent erroneous medication errors. In addition, trauma care in emergency nursing is a team activity and the respondents in our study may have worked as a team to assure medical errors were prevented.

System designs such as barcoding and teamwork can prevent negative work productivity even in the presence of secondary traumatic stress. Additional system designs developed for patient safety include performing time outs (Hazelton et al., 2015), matching patient identification bracelets to blood products (Booth et al., in press), and use of Smart IV pumps (Bacon & Hoffman, 2020). While system designs are necessary to address patient safety, additional interventions are warranted for the overall well-being of the emergency nurse that promote resilience. Strategies recommended to promote resilience and potentially prevent or reduce secondary traumatic stress include mindfulness exercises, intentional affective monitoring and self-reflection, emotional regulation/tolerance activities, self-care such as sleep hygiene, and progressive muscle relaxation (Kelly, 2020; McMahon, 2021; Nolte et al., 2017; Sprang et al., 2019). Team-oriented activities such as informal postevent debriefing and networking with persons with similar life experiences (e.g., professional association activities) also may promote resilience (Kelly, 2020; McMahon, 2021).

Limitations

This study has several limitations. First, eligible persons not completing the survey may have had different findings from those reported in this paper. However, given the distribution of stress and work productivity scores, this limitation is minimized and potentially reflects a broad impact of providing trauma patient care. Second, the respondents' various characteristics were not measured, which poses a limitation to the study findings. For example, we did not collect information as to whether the facility where the emergency nurse worked was an American College of Surgeons or state designated trauma center. The respondents who participated and reported higher secondary traumatic stress scores may have worked at a non-verified trauma center where human and other resources to provide trauma care may be more limited. A strength of the study was the distribution of the participants across multiple regions of the U.S., indicating a potential need that any education disseminated for managing secondary traumatic stress could be done on a local or regional level (e.g., chapter or state professional nursing association) versus targeting only verified or non-verified trauma centers. Third, the cumulative exposure to trauma patient

care situations was not measured in this study, which could have impacted individual responses.

CONCLUSIONS

Secondary traumatic stress and decreased work productivity were significant problems for some emergency nurses in this study. Reduced work productivity, in turn, can result in a decrease in the quality of patient care. To buffer this negative effect, employers can provide stress reduction and management techniques to emergency nurses providing trauma patient care. In addition, emergency nurses need to be proactive in seeking social support and using stress mitigation and reduction programs. Further research needs to be done on the cumulative effects of secondary traumatic stress in emergency nurses and identifying the best resources for reducing and mitigating secondary traumatic stress. It is important to examine how secondary traumatic stress affects nurses' work productivity in other areas (e.g., surgery, intensive care, surgical units, rehabilitation care) following trauma patient care.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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KEY POINTS

- Secondary traumatic stress is a normal reaction to an abnormal event
- A third of respondents demonstrated secondary traumatic stress and decreased work productivity following trauma care
- System designs and nurse resilience may mitigate negative impact of trauma patient care

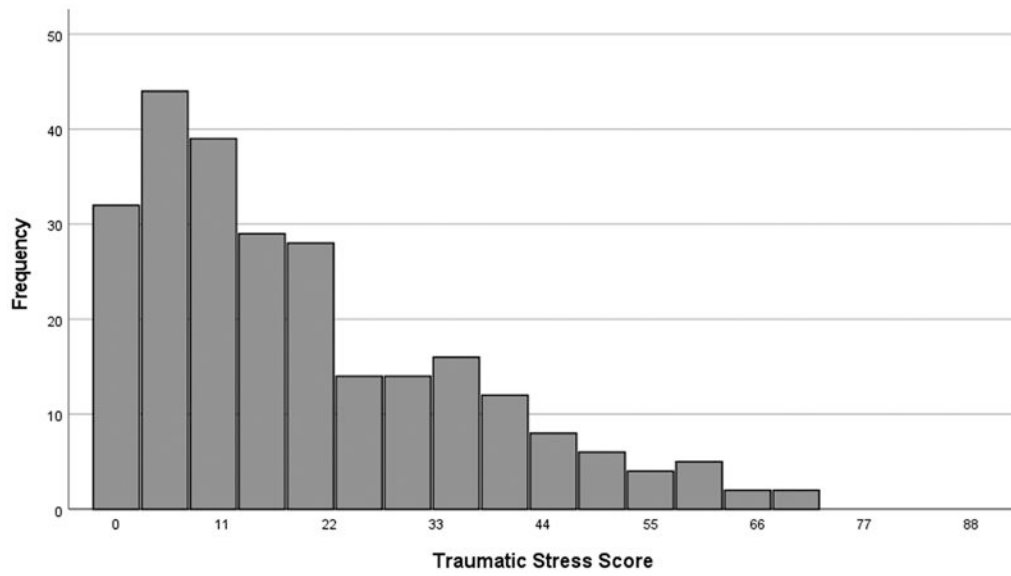


Figure 1.
Frequency distribution of traumatic stress scores

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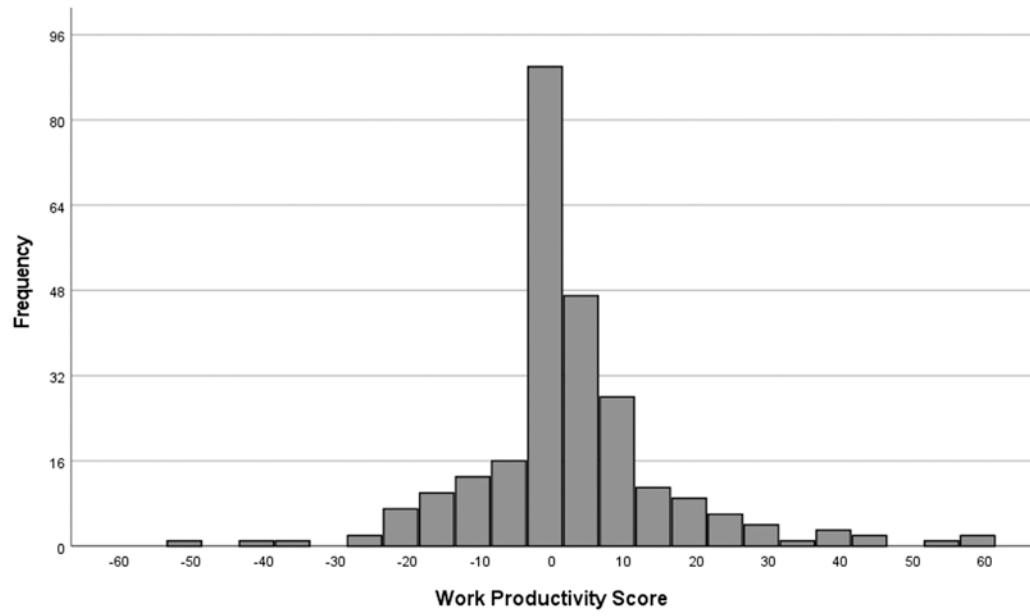


Figure 2.
Frequency distribution of work productivity scores

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Table 1.

Description of respondent demographic and work characteristics.

	<i>N</i>	%
Race ^a		
White	231	90.9
Hispanic	10	3.9
Other race/multiple races	13	5.2
Gender ^b		
Male	33	13.8
Female	206	86.2
Urbanicity ^a		
Urban	109	42.9
Suburban	90	35.4
Rural	55	21.7
Patient Population		
Adults	55	21.6
Pediatrics	10	3.9
General/Adult and Pediatric	190	74.5
Previous training on coping with stressful situations ^c	115	46
Employer provides critical incident stress debriefing ^d	147	59

^aMissing datum from 1 respondent

^bMissing data from 16 respondents

^cMissing data from 5 respondents

^dMissing data from 6 respondents

Table 2.

Comparison of secondary traumatic stress categories to changes in work productivity following care of traumatically injured patients.

Work productivity	Secondary traumatic stress, <i>n</i>			
	Low	Medium	High	Total
Decreased	16	20	37	73 (28.6%)
No change	31	15	13	59 (23.1%)
Increased	44	32	47	123 (48.2%)
Total	91 (35.7%)	67 (26.3%)	97 (38.0%)	

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Table 3.

Correlations between subscales for Impact of Events Scale—Revised (secondary traumatic stress) and Healthcare Productivity Survey (work productivity).

Healthcare Productivity Survey Subscales	Impact of Events Scale—Revised Subscales					
	Intrusion		Avoidance		Hyperarousal	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Cognitive demands	-.183	.003	-.091	.146	-.193	.002
Handle/manage workload	-.111	.076	-.072	.250	-.152	.015
Safety and communication with patients and visitors	-.002	.974	-.031	.618	-.013	.833
Safety and competency	.158	.011	.184	.003	.116	.065

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