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The Effects of Motivational Messages Sent to Emergency Nurses During the COVID-19 Pandemic on Job Satisfaction, Compassion Fatigue, and Communication Skills: A Randomized Controlled Trial: JEN

ABSTRACT (ENGLISH)

Introduction

During the COVID-19 pandemic, emergency nurses have been adversely affected physically, socially, and psychologically by factors such as increased workload, longer working hours, isolation from family, and limited resources. This study aimed to investigate the effect of motivational messages sent to emergency nurses during the COVID-19 pandemic on their job satisfaction, compassion fatigue, and communication skills.

Methods

This was a randomized controlled experimental study. The study was conducted with 60 emergency nurses in 2 training and research hospitals in Istanbul between July 31 and August 31, 2021. The participants were randomly assigned to the intervention and control groups. Participants in the intervention group (n = 30) received daily motivational messages to their mobile phones by short message service for 21 days; those in the control group (n = 30) received no motivational messages. The Job Satisfaction Scale, Compassion Fatigue Scale, and Communication Skills Scale were administered before and after the intervention.

Results

The mean age was 29.8 (SD = 7.5) and 28.7 years (SD = 6.9) in the intervention and control groups, respectively. Before the intervention, there were no significant differences in the groups' scores for job satisfaction (P = .561), compassion fatigue (P = .687), or communication skills (P = .355). After the intervention, the intervention group had significantly higher scores for job satisfaction (P < .001) and communication skills (P <.001) and significantly lower compassion fatigue scores than the control group (P <.001).

Discussion

Our results suggest that motivational messages sent to emergency nurses during the COVID-19 pandemic increase job satisfaction and improve communication skills while reducing compassion fatigue.

FULL TEXT

Contribution to Emergency Nursing Practice

••What is already known about this topic? Lack of motivation in emergency nurses can cause a decrease in job satisfaction and compassion fatigue. Low motivation can also negatively affect the communication skills of emergency nurses.

••What does this paper add to the currently published literature? This study showed that motivational messages increase emergency nurses' job satisfaction and improve communication skills while reducing their compassion fatigue.

••What is the most important implication for clinical practice? It is seen that motivational messages have positive effects on job satisfaction, communication skills, and compassion fatigue of emergency nurses.

Introduction

The COVID-19 pandemic has become one of the most important health problems in the world today.[1] During the pandemic, there was a marked increase in ED admissions of both walk-in and ambulance-conveyed patients. In many countries, a separate triage system and separate physical areas were established for COVID-19 patients.[2] In Turkey, pretriage areas staffed by one of the doctors and nurses on shift were established outside many emergency departments to identify suspected COVID-19 cases. Suspected cases were directed to isolated areas of the emergency department, whereas nonsuspect patients were referred to clean areas based on their severity.[3] As a result, emergency teams in these departments provided care for both emergency patients and COVID-19 patients simultaneously. This has led to an increase in the workload of emergency staff, especially nurses.[4] In addition to the increased workload, other problems faced by emergency personnel during the pandemic include the management of limited resources, the added difficulty of working in personal protective equipment, fear of COVID-19 transmission, being separated from family, and negative interactions with patients' relatives. These issues have adversely affected nurses physically, and the stress, anxiety, and uncertainty have lowered their motivation levels.[5]

Improving nurses' job satisfaction and motivation levels is necessary to increase the effectiveness of nursing services, which are a key component of health services.[6] Job satisfaction, which is an emotional response to the appraisal of one's job and work life, is generally addressed together with the concept of motivation. This is because motivation has the power to influence not only the behaviors and performance of nurses responsible for patient care but also their professional job satisfaction.[7] Nurses' job satisfaction can be enhanced by feelings that they are successful and are well suited to the profession as well as factors such as effective communication and being respected, appreciated, and rewarded.[8] For patients to receive appropriate and effective care, nurses must derive satisfaction from the care services they provide and the unit in which they work.[9] Emergency nurses in particular experience the negative impact on their emotional well-being and ability to provide compassionate care, resulting in compassion fatigue in some nurses.[10]

Compassion fatigue was first described by nurse Joinson[11] as the emotional effect of indirect trauma while helping people who experience direct traumatic stress. Researchers later described compassion fatigue as a natural consequence of the care relationship between 2 people and defined it as a gradual decrease in compassion toward patients over time.[11] Unlike compassion fatigue, burnout is a long-term condition associated with the work environment and can be seen in every profession. Studies have revealed that compassion fatigue is common among workers in intensive care, surgery, and emergency units because these units serve patients experiencing significant emotional pain and physical stress, which can readily lead to physical, emotional, and mental burnout in their caregivers.[12-14] Hegney et al[15] determined in their study that emergency nurses had high levels of compassion fatigue, which was associated with anxiety, depression, and shift-based work conditions. Peters[16] also reported that nurses were at risk of compassion fatigue. Figley[17] reported that compassion fatigue is the cost of nursing care because the basis of compassion fatigue is both the individual needing care and the individual providing care. Job dissatisfaction may increase if measures to counter compassion fatigue are not taken or support is not provided, and the care relationship between nurse and patient may be adversely affected. This can result in poor communication with both colleagues and patients.[18] Strategies to prevent compassion fatigue should be developed so that nurses do not lose their selfless approach toward patients, especially in this period of intense physical and mental fatigue during the COVID-19 pandemic. One study indicated that the increased workload owing to the pandemic and the

resulting stress, compassion fatigue, and burnout were inversely associated with happiness and perceived organizational justice. Therefore, the authors concluded that interventions to improve employees' work and social life are urgently needed.[19] One such intervention may consist of easy-to-send, inexpensive, effective motivational messages (appreciation, gratitude, etc) to promote well-being. Another possibility is social support-based approaches (colleagues, managers, etc) to strengthen professional interpersonal relationships and enable communication.[20]

Nursing is a profession based on human relations, and communication is essential in terms of the quality and effectiveness of patient care because nurses use communication techniques when identifying and solving problems, coping with stress, and providing health education. Communication skills help ensure that messages are understood correctly and promote the development of interpersonal relationships. Inadequate and ineffective communication skills are associated with negative patient outcomes and medical errors and also have a negative effect on pandemic management.[21] Supporting health care professionals psychologically during the pandemic may help them adapt better to this period. A qualitative study conducted in China by Khoo et al[22] revealed that appreciation from colleagues and patients reduced health care professionals' stress and increased their morale. This was reported to positively affect teamwork and communication with patients. A different study showed that motivation made individuals happy and happiness was directly associated with communication.[23] Kandemir et al[24] observed that positive informal communication increased happiness in the workplace and positively affected employee motivation. Emergency nurses have arguably borne the greatest burden during the pandemic, with long working hours and high care loads, and this high level of performance has adversely affected their mental health. Therefore, this study aimed to examine the effect of motivational messages sent to emergency nurses during the COVID-19 pandemic on their levels of job satisfaction, compassion fatigue, and communication skills. We hypothesized that motivational messages would enhance nurses' job satisfaction, decrease their compassion fatigue, and favorably affect their communication skills.

Methods Trial Design

This study was a randomized controlled trial. The study protocol was preregistered publicly (NCT05158504) to ClinicalTrials.gov.tr, which is managed by the National Institutes of Health, National Library of Medicine, Office of Management and Budget, and Department of Health and Human Services for the evaluation and approval of research studies at an international level.

Study Sample

The population of the study comprised 89 nurses working in the emergency departments of 2 training and research hospitals (both designated as pandemic hospitals) affiliated with the Ministry of Health in Istanbul, Turkey, between July 31, 2021, and August 31, 2021. Power analysis was performed to determine the necessary sample size using G∗Power version 3.1 (Franz Faul, Universität Kiel, Germany). In a similar study by Shin et al,[25] the effect size for compassion fatigue was calculated as 0.617. In the power analysis, we determined that a total of 60 people, 30 in each group, were necessary for a study power greater than 95% at a significance level of 5% and effect size of 0.617 (df = 116, t = 1.658).

Inclusion criteria were working in the emergency department, working only the day shift on weekdays, having a mobile phone, and volunteering to participate in the study. In the hospitals where the study was conducted, nurses follow an alternating monthly work schedule with 1 month of night shift and 1 month of day shift. Exclusion criteria for the study included being on leave for any reason (maternity, annual, medical) during the study dates, not completely filling in the data collection forms, or withdrawing from the study. In addition, during the online one-on-one interview with all participants before the study, the participants were asked about their psychiatric history or psychiatric drug

use. Individuals with a psychiatric diagnosis or a history of using psychiatric drugs were excluded from the study. After excluding nurses that did not meet the study selection criteria (n = 24), we decided to include all 65 eligible nurses in the study sample (33 in the intervention group and 32 in the control group) to account for potential losses (73% of the population). As 3 nurses in the intervention group and 2 nurses in the control group did not respond at post-test, the study was completed with a total of 60 nurses, 30 in each group ([Figure]).

Randomization

Randomization was performed using a computer-based random number generator.[26] The random allocation sequence and assignment of the participants to the control and intervention groups were performed by the researchers. Participants who agreed to participate in the study were numbered in the order in which they were enrolled and were assigned to the intervention or control group according to the random number sequence on the randomization list. Owing to the study design, blinding was not possible because the participants knew about the intervention.

Outcomes Measures

Data were collected in face-to-face interviews using a personal information form, the Job Satisfaction Scale, Compassion Fatigue Scale, and Communication Skills Scale. Owing to the COVID-19 pandemic, the first interview with the participants was conducted online and the participants were informed about the study. Data were collected using the personal information form before the intervention (day 1 of the study), and the participants completed the Job Satisfaction Scale, Compassion Fatigue Scale, and Communication Skills Scale once before the intervention (pretest) and again after the intervention (post-test). The primary outcomes of the study were changes in the participants' job satisfaction, compassion fatigue, and communication skills scores after the intervention.

Personal Information Form

Based on the relevant literature, this form contained a total of 8 questions including descriptive characteristics such as the participant's age, sex, education level, professional experience, time working in current unit, weekly working hours, whether they feel the nursing profession suits them, and whether they intend to continue working.[27,28]

Job Satisfaction Scale

This 5-item scale was adapted by Judge, Locke, Durham, and Kluger in 1998 from a longer measure of job satisfaction developed by Brayfield and Rothe in 1951. The Turkish validity and reliability of the scale were conducted by Keser and Bilir[29] in 2019. The items are rated on a 5-point Likert scale from strongly disagree (1) to strongly agree (5), and the average score is obtained. A higher average score indicates greater job satisfaction. The Cronbach alpha value of the scale was previously reported to be 0.85 and was calculated as 0.91 in this study.

Compassion Fatigue Scale

This instrument was developed as a 13-item short form by Adams et al in 2006, and the Turkish validity and reliability study was conducted by Dinç and Ekinci[30] in 2019. The scale aims to measure secondary trauma and occupational burnout. Items are rated on a 10-point Likert-type scale from rarely/never (1) to very often (10). The total score that can be obtained ranges from 13 to 130, with higher scores representing a higher level of compassion fatigue. The Cronbach alpha value of the scale was reported as 0.87 in the validity study and was calculated as 0.96 in this study.

Communication Skills Scale

This scale was developed in Turkish by Korkut[31] in 1996 to determine how people evaluate their own communication skills. The 25 items are rated on a 5-point Likert-type scale from always (1) to never (5), yielding a total score ranging from 25 to 125. The scale consists of 5 subscales: basic skills and self-expression, following communication principles, attention to communication, willingness to communicate, and effective listening and nonverbal

communication. Higher scores reflect a positive perception of one's communication skills. The developer later conducted the validity and reliability study for the scale and reported a Cronbach's alpha of 0.88. In this study, the Cronbach alpha value was 0.96.

Study Procedure Intervention Group

Before the study, the motivational messages were reviewed by an expert panel consisting of 4 nurse academicians and 2 psychologists. The expert panel's evaluation was based on the Davis technique.[32] They scored each statement as irrelevant (1), needs major revision (2), relevant but needs minor modification (3), or very relevant (4). Necessary changes were made to the messages according to the panel's feedback. The resulting 61 messages were determined to have a content validity index of 96%. The pretest was performed before the intervention on the first day of the study. For the next 21 days, participants in the intervention group were sent motivational messages via short message service to their mobile phones 3 times a day (7 am, 12 pm, and 4 pm). The head nurse allowed participants to take a short break (5-10 minutes) to access the messages when they heard the delivery notification sound. The participants received a different set of motivational messages each day. The post-test was performed at the end of the intervention. Examples of the daily motivational messages are presented in Table 1 and Supplementary Material.

Control Group

Participants in the control group underwent the same pretest and post-test assessments as the intervention group, but did not receive motivational messages during the intervention period.

Statistical Analysis

The study data were analyzed using SPSS for Windows version 22.0 (IBM Corp, Armonk, NY). Number, percentage, mean, and SD were used as descriptive statistical methods. Normal distribution was evaluated with kurtosis and skewness. The distribution of descriptive variables by group was evaluated using chi-square analysis. Continuous quantitative data were compared between independent groups using the *t* test, and within-group changes were analyzed using analysis of variance (ANOVA) with repeated measurement. The statement: "Mauchly's test of Sphericity was used to decide whether prerequisite of sphericity is provided or not. As it was decided that prerequisite of sphericity was not provided, the difference between the repeated measures was decided by applying Greenhouse-Geise test." was added to this section. A *P* value of

Ethical Considerations

Permission to conduct this study was obtained from the COVID-19 Scientific Research Evaluation Commission within the Ministry of Health, General Directorate of Health Services (application date: March 18, 2021; approval number: T07_43_13). In addition, written permission to conduct the study was obtained from the participating hospitals (24.04.2021), and institutional ethics committee approval was obtained on May 6, 2021 (decision number: E-46418926-050.99). Written permission to use the scales used in this study was obtained from their owners. The study was conducted in compliance with the principles of the Declaration of Helsinki.

Results

The mean ages of the participants in the intervention and control groups were 29.8 (SD = 7.5) and 28.7 years (SD = 6.9), respectively. Females accounted for 53.3% of the nurses in the intervention group and 43.3% of those in the control group. In terms of education level, most nurses in both groups held bachelor's degrees. Although 36.7% of participants in the intervention group had at least 10 years of professional experience, this rate was 20% in the control group. When their time working in the current unit was evaluated, 40% of the participants in the intervention group and 43.3% of those in the control group had 1 to 5 years of experience in the emergency department. Nearly all of the nurses in both groups worked over 40 hours per week. When asked if they consider the profession a good fit for them, 73.3% of participants in the intervention group and 66.7% of those in the control group said yes. Two-thirds of participants in the intervention group and 46.7% of participants in the control group stated they did not want

to continue working in the emergency department. There were no significant differences between the intervention and control groups in terms of sociodemographic characteristics ($P > .05$) (Table 2).

Comparison of mean job satisfaction scores between the groups showed no statistical difference in the pretest ($t = -0.585$, $P > .05$), whereas the intervention group had a significantly higher scores in the post-test ($t = 3.7$, P P P Table 3).

Similarly, the groups showed no significant differences in Compassion Fatigue Scale total or subscale scores in the pretest ($t = -0.405$, -1.886, 0.364, respectively $P > .05$) but significant differences in mean total score and scores in the secondary trauma subscale and occupational burnout subscale appeared in the post-test ($t = -4.35$, -3.37, respectively P P P Table 4).

In the pretest, there was no statistically significant difference between the groups in mean Communication Skills Scale total score or scores in the subscales of basic skills and self-expression, attention to communication, willingness to communicate, effective listening and nonverbal communication, and following communication principles ($t = -0.93$, -1.115, -1.659, -0.595, -0.043, -0.703, respectively $P > .05$). However, in the post-test, there were significant differences between the groups in all communication skills scores ($t = 3.83$, P P P P Table 5).

Discussion

Emergency nurses are frontline workers facing serious risk, and factors such as growing patient numbers and extended working hours during the pandemic have taken a physical and psychological toll on this group. Nurses are showing negative psychological reactions such as stress-related anxiety and depression, and burnout; lower job satisfaction; and compassion fatigue owing to the increased workload. This demonstrates that nurses need physical, mental, and social support to reduce their psychological burden and enhance the response capacity of the health system.[33]

Maintaining high job satisfaction is strongly associated with organizational success, professional commitment, and quality care.[34] In a cross-sectional study by Yu et al,[35] health workers' job satisfaction scores were found to be higher before the COVID-19 pandemic than during the pandemic. Nia et al[36] also reported that the nurses in their study had reduced job satisfaction owing to the higher workload and stated that, to improve job satisfaction levels, nurses must be given adequate time for sleep and rest, and their social lives should be supported. Other authors have also recommended psychosocial interventions to increase levels of job satisfaction in nurses and other health care professionals.[37,38] A randomized controlled study by Hersch et al[39] indicated that a stress-oriented multidisciplinary education program improved job satisfaction among nurses caring for a tiring and challenging patient group. In addition, Choi et al[40] reported that hospitals' motivational plans and practices had positive effects on employees' job satisfaction. In this study, we determined that emergency nurses who received motivational messages during the COVID-19 pandemic had significantly increased job satisfaction levels, whereas those who did not receive the messages showed a decline in job satisfaction. This suggests that motivation levels must be enhanced to promote high job satisfaction among health workers.

Compassion fatigue is an important issue in the nursing profession, which is based on the need for nurses who will be compassionate and caring toward patients. Preventing compassion fatigue is essential to ensure safe, quality patient care and increase patient and employee satisfaction.[41] It has been reported that most emergency nurses experience compassion fatigue and nurses working in surgical units experience moderate burnout and secondary traumatic stress.[42,43] Barmawi et al[44] determined that intensive care nurses experienced compassion fatigue and use both mental and physical avoidance at and outside of work as a coping mechanism and that they needed counseling or motivation to address this. In a study conducted in the current pandemic, health workers in COVID-19 units and emergency departments were found to have higher levels of compassion fatigue than those in other units.[45] In our

study, we observed significantly lower compassion fatigue levels in emergency nurses who received motivational messages than those who did not. Although compassion fatigue was reported in the literature to be moderately positively associated with positive affect and other personal and social factors, the results of a randomized controlled study indicated that an awareness and training program reduced health workers' occupational burnout and compassion fatigue.[46] Therefore, we believe that in nursing, which is an emotionally and physically challenging profession, nurses must be adequately supported in their professional and social lives, especially during the pandemic, to enable them to work efficiently and avoid a negative impact on the quality of patient care.

Nurses are in direct and continuous contact with patients, and effective communication is both the way nurses provide holistic care to patients and a way to reduce nurses' burnout and increase their job satisfaction.[47] Norful et al [48] observed that nurses' communication and empathy skills declined as their workload increased and that good communication skills were associated with better performance. In another ED study, Rodrigues et al[49] reported that after trainings and meetings to improve nursing care activities and restructure communication among the staff, ED dynamics improved significantly and the health care team demonstrated better cooperation and harmony. In a quasi-experimental study conducted with nursing students and aiming to enhance emergency response capability, quality communication and having up-to-date information improved the students' professional development and had a favorable impact on their practitioner roles.[50] In the present study, we observed that participants who received motivational messages had higher scores on the Communication Skills Scale and all of its subscales than those who did not. In line with these studies, it is seen that emergency nurses' motivation is essential in terms of maintaining their psychosocial well-being. Methods such as asynchronous messaging, digital approaches, and in-person messaging can be used in motivational interventions to reach a wider audience. These are organizational communication methods commonly used to convey motivational interventions.[49]

Limitations

This study has several limitations. First, our results are limited to the participants in this study and cannot be generalized to all nurses working in emergency units during the COVID-19 pandemic. One reason for this is that shift systems and break times differ among institutions. Second, there may be a possibility of biased sampling. Randomization did not occur to achieve what was intended in equipoise between groups. Third, there may be deviations from the intended intervention (participant forgetting her phone, unable to read messages owing to unmeasurable/unknown clinical priorities, permission was obtained from the head nurse only once for the nurses to read the messages, and permission was not obtained each time). Fourth, the participants could not be blinded owing to the study design. This may cause demoralization in the control group and limit the validity of the results. In addition, the changes in nurses after the intervention could not be evaluated owing to self-report. Therefore, it is recommended to design a blinded study in the future. The fifth limitation is that the demographic characteristics of the nurses differ. Another limitation is that personal protective equipment negatively affects break times. Finally, the study included only day shift nurses. For this reason, it does not provide information about the effects of the intervention on compassion fatigue, job satisfaction, and communication skills among nurses working the night shift. Moreover, overall such messages have a short-term effect.

Implications for Emergency Nurses

Although the increased workload in the emergency services during the pandemic decreased nurses' job satisfaction, it increased their compassion fatigue.[4] Motivation has positive effects on employees.[6] In this randomized controlled study, motivational messages were sent to the participants in the intervention group via SMS 3 times a day, and an increase in job satisfaction and communication skills and a decrease in compassion fatigue were found in emergency nurses. Motivation is important and should be provided to increase patient care quality and employee

satisfaction. For this purpose, the use of different methods including professional support such as providing motivational interventions specific to workers' needs and social support consisting of colleagues or head nurses' solidarity can be considered.

Conclusion

The results of this study suggest that motivational messages sent to emergency nurses during the COVID-19 pandemic increase job satisfaction and improve communication skills while reducing compassion fatigue. Motivational techniques can have a major impact on the mental health of emergency nurses during the pandemic. For this reason, promoting and maintaining high motivation among nurses, especially those with a high work load and those in charge of the care and treatment of critical patient groups, are necessary to avoid psychosocial problems. It is considered that providing psychosocial support via SMS is simple and effective. Studies that provide professional support that is helpful in increasing nurses' motivation are highly suggested. It is also strongly suggested to conduct studies that provide social support in the form of cooperation among colleagues and head nurses. Large-scale studies with longer follow-up and larger sample groups including night-shift workers are needed to determine the long-term and larger effects of motivational messages.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author, (S.G. sonay.goktas@sbu.edu.tr) upon reasonable request.

Acknowledgments

We thank the emergency nurses who participated in the study.

Author Disclosures

Conflicts of interest: none to report.

Supplementary Data

Supplementary Data

Supplementary Data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.jen.2022.06.001.

Time	Message purpose and example
7 am	A good morning message to start the day with good energy-Example 1: Radiate your energy all around you, because you have wonderful energy. Good morning…
12 pm	Health-promoting message-Example 1: Breathing exercises stimulate the vagus nerve, the longest nerve in our body. This puts the body into rest, repair, and calm mode. Come on, it's time to stimulate those nerves. Take a deep breath…!
4 pm	"Me time" message-Example: It's time to do something you enjoy that you haven't done in a long time. Life is too short, don't put anything off!

Variable	Intervention group (n = 30)		Control group (n = 30)		Total		Chi-square test	P value
Age (y), mean (SD)	29.86 (7.56)		28.70 (6.95)				0.60	.895
	n	%	n	%	n	%		
Sex								
Female	16	53.3	13	43.3	29	48.3	0.60	.303
Male	14	46.7	17	56.7	31	51.7	Education level	
							High school	6
20.0	4	13.3	10	16.7	4.72	.193	Associate degree	5
16.7	4	13.3	9	15.0	Undergraduate	10	33.3	18
60.0	28	46.7	Postgraduate	9	30.0	4	13.3	13
21.7	Professional experience							
	<1 y	2	6.7	7	23.3	9	15.0	4.36
.224	1-5 y	8	26.7	7	23.3	15	25.0	6-10 y
9	30.0	10	33.3	19	31.7	≥10 y	11	36.7

6	20.0	17	28.3	Time working in current unit				
				<1 y	3	10.0	8	26.7
11	18.3	3.86	.276	1-5 y	12	40.0	13	43.3
25	41.7	6-10 y	11	36.7	7	23.3	18	30.0
≥10 y	4	13.3	2	6.7	6	10.0	Weekly working hours	
							<40 h	5
16.7	2	6.7	7	11.7	1.45	.212	>40 h	25
83.3	28	93.3	53	88.3	Feels the profession suits them			
					Yes	22	73.3	20
66.7	42	70.0	0.31	.389	No	8	26.7	10
33.3	18	30.0	Intends to continue working					
			Yes	10	33.3	16	53.3	26
43.3	2.44	.096	No	20	66.7	14	46.7	34

Variable	Intervention group (n = 30)			Control group (n = 30)			Test value	P value
Mean	SD	Min-Max	Mean	SD	Min-Max	Job satisfaction—pretest	2.86	0.86
1-4.6	3.00	0.90	1.6-4.4	−0.585*	.561	Job satisfaction—post-test	3.54	0.65
2.2-5	2.82	0.81	1.6-4.4	3.775*	< .001	Measurement	F = 29.138†; P <.001	
					Measurement × group		F = 81.181†; P <.001	

Variable	Intervention group (n = 30)			Control group (n = 30)			Test value	P value
Mean	SD	Min-Max	Mean	SD	Min-Max	Compassion fatigue—pretest	48.76	16.72

18-86	50.90	23.48	15-92	−0.405*	.687	Compassion fatigue—post-test	36.73	12.43
16-61	54.53	21.78	16-92	−3.887*	< .001	Measurement	F = 37.296†; P <.001	
		Measurement × group	F = 129.736†; P <.001					
		Secondary trauma—pretest	12.00	5.73	5-30	15.50	8.39	5-31
−1.886*	.065	Secondary trauma—post-test	9.56	4.04	5-20	16.13	7.19	5-30
−4.359*	< .001	Measurement	F = 5.918†; P <.05					
		Measurement × group	F = 17.177†; P <.001					
		Occupational burnout—pretest	36.76	12.33	12-56	35.40	16.45	10-62
0.364*	.717	Occupational burnout—post-test	27.16	9.40	11-42	38.40	15.63	11-63
−3.371*	< . 001	Measurement	F = 56.971†; P <.001					
		Measurement × group	F = 207.639†; P <.001					

Variable	Intervention group (n = 30)	Control group (n = 30)	Test value	P value

Mean	SD	Min-Max	Mean	SD	Min-Max	Total score—pretest	89.40	11.46
72-113	92.83	16.56	59-118	−0.933*	.355	Total score—post-test	100.9	9.31
86-125	88.36	15.37	63-123	3.830*	< .001	Measurement	F = 25.693†; P <.001	
		Measurement × group	F = 131.714†; P <.001					
		Basic skills and self-expression—pretest	31.83	4.12	24-41	33.20	5.30	22-41
−1.115*	.270	Basic skills and self-expression—post-test	36.33	3.13	32-45	31.86	5.09	23-44
4.093*	< .001	Measurement	F = 26.424†; P <.001					
		Measurement × group	F = 89.664†; P <.001					
		Attention to communication—pretest	17.53	2.22	14-22	18.76	3.41	9-24
−1.659*	.103	Attention to communication—post-test	19.66	1.98	16-25	17.56	3.08	9-24
3.136*	.003	Measurement	F = 5 .818†; P <.05					

		Measurement × group	F = 74.207†; P <.001					
		Willingness to communicate—pretest	10.76	2.06	8-15	11.13	2.67	6-15
−0.595*	.554	Willingness to communicate—post-test	11.96	1.77	9-15	10.50	2.40	6-15
2.691*	.009	Measurement	F = 4.836†; P <.05					
		Measurement × group	F = 50.620†; P <.001					
		Effective listening and nonverbal-communication—pretest	18.66	2.57	14-25	18.70	3.37	12-23
−0.043*	.966	Effective listening and nonverbal-communication—post-test	20.53	2.24	16-25	18.13	3.46	12-25
3.188*	.002	Measurement	F = 10.294†; P <.01					
		Measurement × group	F = 36.066†; P <.001					
		Following principles of communication—pretest	10.60	2.14	7-15	11.03	2.60	6-15
−0.703*	.484	Following principles of communication—post-test	12.43	1.61	10-15	10.30	2.35	6-15
4.099*	< .001	Measurement	F = 14.219†; P <.001					
		Measurement × group	F = 77.416†; P <.001					

DETAILS

Subject:	Emergency medical care; Intervention; Happiness; Communication; Hospitals; Nurses; Emergency services; Clinical trials; Workloads; Mobile phones; COVID-19; Patients; Motivation; Fatigue; Job satisfaction; Professional training; Stress; Pandemics; Nursing care; Communication skills; Working hours; Medical research; Burnout; Sympathy; Departments; Coronaviruses; Personal relationships; Disease transmission
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Comparison of Death Anxiety, Death Obsession, and Humor in Nurses and Medical Emergency Personnel in COVID-19 Pandemic: JEN

ABSTRACT (ENGLISH)

Introduction

COVID-19 has created numerous challenges for the health system. Nurses and medical emergency personnel are at the forefront of fighting COVID-19 and exposed to psychological disorders such as death anxiety and death obsession. Humor is a defense and coping mechanism against the anxiety and obsession associated with death. This study aimed to compare death anxiety, death obsession, and humor among nurses and medical emergency personnel during the COVID-19 pandemic.

Methods

This descriptive cross-sectional study was conducted with 230 nurses and medical emergency personnel. To collect data, the Templer death anxiety scale, death obsession scale, and humor styles questionnaire were used. SPSS 19 was used for data analysis. The significance level was considered at $P < .05$.

Results

Mean and standard deviation of death anxiety in the nurses and medical emergency personnel were 6.86 (4.04) and 5.68 (3.57), respectively; these values for death obsession were 29.82 (12.30) and 25.30 (12.66) and for humor 116.75 (30.87) and 118.48 (24.66), respectively. The nurses had significantly higher death anxiety ($t = 2.33$, $P = .02$) and death obsession ($t = -2.68$, $P = .008$) than the medical emergency personnel; moreover, there was no significant relationship among humor, death anxiety ($r = .11$, $P = .10$), and death obsession ($r = .07$, $P = .31$) in nurses and emergency personnel.

Discussion

The results of this study showed that the levels of death anxiety and death obsession were higher in the nurses than the medical emergency personnel. There was no significant difference between the hospital nurses and medical emergency personnel in terms of humor.

FULL TEXT

DETAILS

Subject:	Emergency medical care; Death &dying; Mental disorders; COVID-19; Coping; Obsession; Nurses; Pandemics; Employees; Anxiety disorders; Coronaviruses; Death anxiety; Medical personnel; Physicians; Humor; Anxiety
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Enhancing Hospital-Wide Patient Flow to Reduce Emergency Department Crowding and Boarding: JEN

ABSTRACT (ENGLISH)

Introduction

ED overcrowding and boarding is a global phenomenon that negatively affects patients, hospital staff, and hospital-wide operations. Poor patient flow has been identified as a major contributing factor to ED overcrowding and boarding, which is directly linked to negative patient outcomes. This project implemented a multidisciplinary rounding team that addressed barriers to patient flow in real time. By reducing the inpatient length of stay bed capacity will improve, which in turn will help alleviate ED boarding and overcrowding.

Methods

This before-and-after process improvement project took place on a 30-bed, inpatient medicine floor of a level-I trauma, tertiary, regional transfer center. Multidisciplinary rounding was used to improve care team communication and collaboration. Concepts from a Real-Time Demand Capacity model were used in this project to help develop a plan for capacity issues regarding bed supply and demand. Outcome variables included inpatient length of stay and ED boarding hours.

Results

Implementation of multidisciplinary rounding resulted in a statistically significant reduction of 0.83 days in the length of stay for patients on this floor. By increasing inpatient bed capacity, ED boarding hours for patients targeted to the 3000-medicine floor was reduced by an average of 8.83 hours per month, a reduction >50% from baseline.

Discussion

Increasing inpatient bed capacity helps decrease ED access block, and contributes to reducing ED overcrowding. Implementing a daily multidisciplinary rounding structure on the inpatient floor helped hospital throughput by expediting discharges, which in turn created inpatient bed capacity.

FULL TEXT

Introduction

Emergency department (ED) overcrowding and boarding is a global phenomenon that is linked to negative patient outcomes, places additional stress on ED staff members, and can have a negative impact on hospital financials.[1] ED overcrowding can stem from an array of issues such as increased acuity, poorly managed care, and delays in service provided by radiology, laboratory, and ancillary services.[2] According to Lindner and Woitok,[3] issues that result in ED overcrowding can be broken down into the 3 sections of input, flow, and output, with lack of inpatient bed capacity being an important factor negatively affecting outflow from the emergency department.

Evaluating workflows or process improvement, or providing additional resources to the emergency department will assist in times of severe overcrowding and boarding but is not the ultimate solution.

There is a multitude of issues that contribute to ED overcrowding and boarding, but lack of inpatient bed capacity is usually a key factor.[4] Understanding the negative downstream effects of poor patient flow that is caused by suboptimal inpatient discharge planning can be instrumental in creating organization-wide change. According to Okoniewska et al,[5] ineffective discharge planning because of poor communication between the care team, patient, and family can lead to various delays, ultimately causing a backlog in the hospital system. A key to reducing ED overcrowding and boarding is focusing on improved discharge planning, especially once a patient has been placed into admission status. Senior hospital leaders along with ED leadership must advocate for improved inpatient discharge planning, and multidisciplinary rounds (MDRs) can assist in bridging the gap in communication among the members of the entire care team.

Along with the use of a daily MDR, specific aspects taken from a Real-Time Demand Capacity (RTDC) concept assisted the care team to have a better understanding of aligning inpatient bed capacity with hospital patient demand. According to Rutherford et al,[6] "Failing to achieve hospital-wide patient flow–the right care, in the right place, at the right time–puts patients at risk for suboptimal care and potential harm." By implementing a daily MDR along with an improved understanding of how capacity and demand influence patient outcomes, reducing ED overcrowding and boarding became a mainstay for this project team. In addition, educating the inpatient staff on the negative effects that stem from poor patient flow created a sense of urgency for improving the discharge process and creating inpatient bed capacity.

The purpose of this performance improvement project was to measure how a more structured approach to the inpatient discharge process would affect hospital throughput by creating a multidisciplinary escalation rounding format. Specific milestones such as an expected date of discharge, therapy needs, medication needs, and the discharge destination (skilled nursing facility, rehabilitation unit, etc.) were discussed during the MDR. The care team also addressed any home discharge needs such as durable medical equipment, a walker, cane, oxygen, or continuous positive airway pressure. Creating a "checklist" of specific needs helped streamline the discharge process for this patient population and ultimately led to a more efficient and successful discharge.

Goals of this project included a decreased length of stay (LOS) for patients on the 3000-medicine floor from the baseline of 4.56 days and a reduction in ED boarding hours for patients who were admitted to the 3000-medicine floor, which is 17.25 hours on average.

Methods

This performance improvement project took place between February 2020 and August 2020. It is important to note that the time frame for data collection was during the early stages of the COVID-19 pandemic when major changes to health care services and staffing were taking place. The project setting is a large level-I trauma, tertiary, regional transfer center located in the Southeastern region of the United States, with multiple affiliate hospitals included within its operating umbrella. The hospital is a comprehensive stroke center and a cycle-IV chest pain center with catheterization laboratory availability 24 hours a day, 7 days a week, along with a cardiothoracic service line and pulmonary critical care. The system has 838 acute care beds and serves patients from 50 counties with a total of 36,478 adult inpatient admissions during the fiscal year 2017-2018.[7] This project took place on the 30-bed, 3000-medicine floor, which has a primary patient population admitted to the internal medicine care team. The gap in practice identified included lack of aligning inpatient bed supply with patient demand, lack of a structured discharge planning process, and high amounts of ED boarding hours for patients targeted to this unit. On an average, there was a much higher inpatient bed demand than the available inpatient bed supply.

The priority intervention of this project included a daily MDR meeting that was executed to help bridge the gap in care team communication and to assist with developing solutions for discharge challenges. With regard to multidisciplinary rounding, Okoniewska et al[5] stated, "these rounds represent the opportunity for all health care providers to report their progress or barriers with a patient and to provide a quick snapshot of the patient's discharge status." Barriers with a patient's discharge were addressed in real time with the entire care team providing inputs. A representative from each specialty was able to give valuable inputs to help assist with reducing discharge challenges.

The implementation of a daily MDR began with creating a care team that involved representatives from physicians, nursing, case management, therapy, and pharmacy. After creation of the care team, 11 AM was determined to be the most feasible time to conduct the daily MDR meeting. A structured approach led by the attending physician was used to identify specific barriers and milestones to a patient's progression through the health care system. The goal was not only to identify barriers but also to develop solutions for the obstacles prohibiting patient progression. Education regarding ED overcrowding and boarding was provided to the care team. Understanding the negative effects derived from poor patient flow was the catalyst for change.

Another aspect of this project was taken from an RTDC concept, which was to ensure that time during the MDR was dedicated to discussing the number of incoming patients with regard to the number of expected discharges. An in-depth study published by the *Journal of the American Medical Association* reported that RTDC signifies a culture change in which hospital staff dedicate time to focus and prioritize patient flow along with predicting capacity by forecasting certain measures such as hospital occupancy, arrival times, discharge times, and hospital LOS.[8] Understanding how many incoming patients a floor has and dedicating time to align inpatient bed supply with hospital patient demand is critical for reducing ED boarding hours. Furthermore, according to Boyle et al,[9] hospital demand is not random, and overall daily demand can be predicted with an accuracy of approximately 90%.

The concept of RTDC was used to inform hospital leaders regarding the culture change needed in this hospital. Once the leaders understood the importance of dedicating time to prioritize patient flow, efforts to align capacity and demand were fully supported.

By measuring the average monthly case-mix adjusted LOS (CMALOS) for the 3000-medicine floor, we were able to evaluate if our interventions were successful in reducing the LOS. We also measured the average monthly hours of ED boarding for patients who were admitted to the 3000-medicine floor. Seven months of baseline data (July 2019-January 2020) revealed that ED boarding hours for patients admitted to the 3000-medicine floor averaged 17.25 hours per month. Considering that this project was initiated during the COVID-19 pandemic, it was imperative that patient flow was improved. According to Hartnett et al,[10] ED visits during the COVID-19 pandemic for exposure, encounters, screening, and contact were nearly 4 times higher than that during the pre-pandemic period. Successfully reducing the LOS for inpatients on the 3000-medicine floor should create inpatient bed capacity, removing the access block for patients coming from the emergency department. An independent samples *t* test was performed to evaluate the outcomes of this project.

Results

During this time frame, more than 850 patients were admitted to the 3000-medicine floor. The patient population consisted predominantly of those diagnosed with pneumonia, congestive heart failure, chronic obstructive pulmonary disease, and diabetes. The baseline CMALOS was 4.56 days and the poststudy CMALOS was 3.74 days, with a total reduction of 0.84 days in the overall LOS, which was better than our intended goal of 0.50 days within 6 months. An independent samples *t* test shows a statistically significant reduction from the baseline CMALOS 4.56 (SD = 0.45) compared with the project outcome CMALOS 3.74 (SD = 0.43), $t_{12} = 3.47$, $P = .005$, $d = 1.86$ (Figure 1). After implementation of this project, there was a significant reduction in ED boarding hours for patients admitted to the 3000-medicine floor. This project was initiated in February 2020, and as of August 2020, patients targeted to the 3000-medicine floor boarded, on an average, only for 8.43 hours per month. Overall, this is a diminution of 8.82 ED boarder hours per month, which is > 50% reduction from baseline. According to Beckers Hospital Review,[11] reducing ED LOS by just 1 hour creates bed capacity for an additional 10,000 patient visits per year. Our goal was to reduce ED boarding hours by 10%. This was a huge success for the team. An independent samples *t* test shows a statistically significant reduction in baseline ED boarding hours 17.25 (SD = 4.40) compared with the project outcome 8.43 (SD = 5.97), $t_{13} = 3.29$, $P = .005$, $g = 1.70$. Given the extreme variability in ED boarding hours, a Mann–Whitney *U* test was conducted to ensure statistical significance; *z*-score = 2.37241, $P = .01778$, and the results are statistically significant at *P* Figure 2).

Discussion

ED overcrowding has become a major problem across health care systems and poses a threat to both hospital staff

and patients. “Various studies have developed definitions of ED overcrowding, but in its simplest form, overcrowding exists when there is no space left to meet the timely needs of the next patient requiring emergency care.”[1] When patients arrive to an overcrowded emergency department and the staff are unable to provide appropriate care, negative outcomes can begin to arise. Salway et al[1] posited, “ED overcrowding causes multiple problems for the ED patients and staff, including increased waiting times, increased ambulance diversion, increased LOS, increased medical errors, increased patient mortality, and increased harm to hospitals due to financial losses.” Overcrowding is a biproduct of “boarding,” which is described as holding an admitted inpatient in the emergency department because of a lack of inpatient bed availability.[12] In addition, Pines and Griffey[13] stated, “the medical errors affecting admitted patients in the ED may be related to, or more prevalent during periods of high ED boarding.” The combination of overcrowding and boarding places an added amount of stress on an already busy emergency department.

Understanding that boarding is one of the root causes of ED overcrowding, a major focus of this project was to develop processes that helped to reduce longer boarding hours. In many organizations, leaders tend to focus on improving processes, workflows, and policies that reside inside the emergency department. Research, along with supportive literature, indicates that substandard inpatient processes can be the culprit of poor patient flow.

Challenges were only compounded by the COVID-19 pandemic. According to authors who published data that were collected during February 2020 and April 2020, the number of hospital admissions in their facility progressively increased compared with that during all ED visits in the past 5 years, rapidly exceeding the number of patients discharged.[14] Other obstacles such as staffing shortages and resource management were all directly affected by the COVID-19 pandemic.

Lack of inpatient bed capacity is a leading cause for longer boarding hours for admitted patients who reside in the emergency department, creating overcrowding. In addition, it is important to consider that boarded patients in the emergency department are not being cared for by an ED physician from a medical provider standpoint. These patients are admitted and have been assigned to an admitting physician (hospitalist, intensivist, etc.) who is responsible for going to the emergency department to see the patient. The caveat to this is that boarded patients in the emergency department are being cared for by emergency nursing staff, which affects their ability to properly care for incoming ED patients.

Building on the need for refocusing efforts to the inpatient side of the hospital, additional evidence supported this shift of internal practices. Lack of inpatient beds because of an “exit block” being created between the emergency department and the inpatient side is a key factor in ED overcrowding.[4] Essentially, a full emergency department is a reflection of a full hospital. Delays in rounding, order placement, and completion of prescription plans contributed to a lack of effective communication among members of a patient’s multidisciplinary care team.[15] Ragavan et al[15] also made the argument that an extra day of inpatient stay could be attributed to poor coordination of the care team. To reduce ED boarding, this project focused on improving communication and collaboration among members of the inpatient care team, which has been established as a contributor to delaying patient flow when not performed efficiently. The use of a daily MDR was instrumental in bridging the gap between these major issues.

Inpatient staff acceptance of this project was critical for success. After the idea of a daily MDR was presented, information regarding hospital-wide overcrowding, ineffective discharge processes, and poor patient flow was shared. Building on that information, the connection on how these issues can have negative downstream effects such as ED overcrowding and boarding was established. Understanding how important the inpatient care team is for reducing ED boarding hours created a vested interest. When the staff realized how detrimental ED overcrowding and boarding is for patients and their colleagues, along with the understanding that they could help improve this situation, they fully realized how valuable this project was going to be.

The ability to reduce ED boarder hours to this extent stemmed from successfully improving bed capacity on the inpatient floor. The CMALOS was measured to gauge the performance of improving patient flow. Reducing the LOS for patients admitted to this floor assisted in improving inpatient bed capacity and allowed improved patient flow, which was key in reducing the ED boarding hours for patients assigned to this floor. The Case Mix Index was measured as well. According to Liu et al,[16] “The DRG system classifies inpatients with similar clinical and treatment

characteristics into groups, where patients in the same group are expected to use similar amounts of resources, thus incentivizing providers to enable effective cost management." These DRGs are assigned relative weights, and hospital reimbursements are proportionate to the DRG assigned to a patient. Essentially, a DRG's weight is the Case Mix Index, which is used to measure how sick and resource-intensive patients are. This was measured because the intention of this project was not to reduce LOS by accepting patients who were not as labor intensive. From a financial aspect, this large reduction can provide additional revenue to the organization. According to Beckers Hospital Review,[11] emergency departments with an annual visit rate of 30,000 patients and a 15% admission rate can gain additional revenue by decreasing ED LOS by just 1 hour. A reduction in ED LOS by 1 hour creates bed capacity for an additional 10,000 patient visits per year. The Studer Group[17] reports that the average cost per ED visit is $400. An additional 10,000 ED visits per year, with average revenue of $400 for each visit could amount in excess of $4 million per year. This is a conservative calculation considering that it is based on a reduction of ED LOS by 1 hour. This project was successfully able to reduce ED boarders for this patient population by more than 8 hours at a health care system with ≥ 65,000 annual ED visits with a robust inpatient admission percentage. The issues derived from ED overcrowding and boarding cannot be overcome by ED leadership, nursing staff, or even physicians. Attempting to remedy this situation by placing the responsibility for developing a solution on the shoulders of the ED staff can no longer be the expectation. There must be a hospital-wide understanding regarding the importance of patient flow, discharge planning, and how creating inpatient bed capacity can aid in reducing ED boarding hours. Daily MDRs on the inpatient floors along with a standardized discharge process can effectively reduce the inpatient LOS. This, in turn, creates inpatient bed capacity and can assist with placing admitted patients who are boarding in the emergency department.

Limitations

During this study, 2 specific limitations were identified. The COVID-19 pandemic placed immense pressure on the 3000-medicine floor staff. Both clinical and nonclinical staff were reassigned to other floors to care for patients with COVID-19, which hindered the effectiveness of the daily MDR. There were also times when staff members were quarantined for prolonged periods because of COVID-19–related illnesses, and this created staffing needs. This resulted in room closures on the floor, limiting the census.

This floor was dedicated predominantly for the placement of medicine patients who were being followed up on by the internal medicine team, but there were times when other patient populations would be placed on this floor. When beds were scarce on other floors, 3000-medicine floor beds were used for placing patients from other specialties such as surgery and urology. These patients were generally followed up on by other physicians who did not participate in the daily MDR.

An independent samples *t* test was used to compare baseline data to project data. Although different statistical tests were considered, the decision to use an independent samples *t* test was made so that results could be easily interpreted by all readers.

Implications for Emergency Nurses

Understanding that poor patient flow affects emergency nurses on a large scale is paramount for hospital leaders. As inpatients experience delays with their care or discharge and the LOS is extended, this prohibits another patient from being admitted to that bed. When this happens, the flow of patients through a hospital system is significantly limited and a backlog of patients reside in the emergency department until a bed becomes available.

Emergency nursing staff are tasked with not only caring for incoming ED patients but also being responsible for providing inpatient nursing care to all admitted inpatients who are boarding in the emergency department. It is critical to keep this in mind as the number of patients boarding in an emergency department rises. Emergency nurses must continuously assess and care for all inpatients boarding in the emergency department while simultaneously providing life-saving measures for all incoming ED patients.

One must also remember to factor in the concept that even though these patients are physically in the emergency department, the ED physician is no longer providing care to this patient population. An inpatient physician who has admitted and accepted a patient who is boarding in the emergency department oversees their care. The emergency

nurse is responsible for contacting this physician, who is generally rounding and providing care to patients on the inpatient side of the hospital.

Conclusion

The use of a daily MDR has been a driving factor to strengthen the communication among the care team members and mitigate barriers for patient flow. Using an RTDC model has allowed care team members to better understand the importance of aligning inpatient bed supply and patient demand. Understanding that an overcrowded emergency department is a direct reflection of an overcrowded hospital is critical for hospital leaders. Although providing resources to the emergency department during times of overcrowding and boarding can alleviate some of the pressure, ensuring processes are in place to improve inpatient bed capacity can assist as well. “The problem of emergency department overcrowding is now an institutional problem, requiring institutional solutions.”[4] Multiple issues cause ED overcrowding and boarding, albeit this project proves that by reducing inpatient LOS and increasing inpatient bed capacity, ED boarding hours were significantly reduced for this patient cohort.

Author Disclosures

Conflicts of interest: none to report.

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Networking, Education, and an Opportunity for Innovation: JEN

ABSTRACT (ENGLISH)

The emergency department remains one area where all patients arrive with an unplanned health-related crisis or concern. The challenges the health care system faces are large and complex. Let us all remain optimistic and committed to improving care, providing services our communities need, and growing and expanding the emergency nursing specialty.

FULL TEXT

We have reached the time that the Emergency Nurses Association is hosting our Emergency Nursing 2022 conference, which is taking place this year from September 30th to October 3rd in Denver, Colorado. This annual event is one of great value to emergency nurses for expanding their knowledge, networking with colleagues, and being provided a general opportunity to recharge. This year, these reasons for attending are more important than ever as nurses continue to seek new ways to reconnect to our profession.

I have focused over this year on how to recharge as a way to support nurses in taking care of themselves so that they can better take care of others. I do not believe this effort should end with the close of the calendar year, but rather endure as a strong foundation for caregivers as they continue to balance their work and the impact of their

profession. We remain in a dynamic time, not just within health care, but within the overall workforce. Many have named this the period of the “Great Resignation.” Nursing has experienced the impact and effects of this phenomenon in significant ways. Recruiting into health care is more challenging than ever and turnover continues to climb. I recently spoke with a physician, Dr Thom Mayer, who is committed to finding innovative solutions to our staffing crisis. He proposes that we change the work itself, not the people performing the work, and believes that much current operating procedure is not working. This idea gives me pause; how would we change health care delivery today? Often in my day-to-day work it seems we are continuously seeking better ways to manage high volume and longer lengths of stay as well as various process-related improvements. Have we considered or focused on how to deliver our care differently? Dr Mayer’s idea is one all health care leaders should consider.

Emergency nurses are well positioned to help change how we deliver health care. We often see people at their initial point of care or entry into the health system. The emergency department remains one area where all patients arrive with an unplanned health-related crisis or concern. These arrivals are not scheduled, and often this visit is disruptive to the patient’s life. How can emergency nurses help to improve where care is delivered or become part of new care delivery models? Although the answers to these questions are not simple or straightforward, I believe they are a key piece to our forward motion as a specialty of the nursing profession.

The challenges the health care system faces are large and complex. Emergency nurses can be a powerful and influential factor in the steps to be taken to improve this system. I noted above the Emergency Nursing 2022 conference. With this in mind, networking, learning, and listening to other’s experiences are excellent platforms for idea generating to occur. Let us all remain optimistic and committed to improving care, providing services our communities need, and growing and expanding the emergency nursing specialty.

Author Disclosures

Conflicts of interest: none to report.

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Emergency Nurse Consensus on Most Effective and Accessible Support Strategies During COVID-19: A Delphi Study: JEN

ABSTRACT (ENGLISH)

Introduction

Emergency nurses face significant risk for stress-related complications while working during the COVID-19 pandemic. However, there is limited empirical evidence on the effectiveness and accessibility of support strategies for nurses in this novel situation. Expert consensus may help fill this knowledge gap. Therefore, the study objective was to gain expert consensus from emergency nurses on the most effective and accessible strategies during the COVID-19 pandemic.

Methods

This 2-round Delphi study recruited an online expert panel from emergency nurses practicing during the COVID-19 pandemic within a single Mountain West health system spanning 9 urban and rural emergency departments. Over 10 weeks in the summer of 2021, participants completed 2 sequential surveys to rate and rank employee-led and employer-led support strategies collated from a literature review.

Results

Of 327 recruitment emails sent, 28 nurses joined the expert panel. Emergency nurses reached a consensus on preference for employee-led self-care activities, including enhancing social well-being and strengthening emotional well-being. None of the employer-led strategies reached group consensus regarding high effectiveness, accessibility, and the likelihood of participation. Additionally, emergency nurses favored in-person support strategies over other delivery methods.

Discussion

Numerous studies have explored the impact of the COVID-19 pandemic on health care workers. Although experts and researchers seek to determine the best support strategies, this study highlights how emergency nurses wish to be supported. Employers can tailor support strategies for maximum effect by understanding health care worker perceptions and preferences.

FULL TEXT

Contribution to Emergency Nursing Practice

••The prevalence of burnout, stress, and similar conditions in health care workers is well studied. Although there is a wealth of evidence relating to strategies to prevent and reduce these conditions, evidence to identify which strategies are most effective for emergency nurses is sparse. There is no consensus on how to best support staff.

••The main finding of this paper is that emergency nurses perceive social and emotional well-being support as most effective and engaging; employer-led supports are not favored, and they prefer in-person support.

••Recommendations for translating the findings of this paper into emergency clinical practice include encouraging tailored support strategies for emergency nurses based on their perceptions and preferences.

Introduction

On March 11, 2020, the World Health Organization declared a global pandemic from the novel COVID-19 virus.[1] The pandemic has affected all corners of the world and has placed a tremendous burden on health care workers. Early in the pandemic, numerous professional organizations warned of impending adverse sequelae for these workers owing to their heightened level of physical, emotional, and moral distress stemming from traumatic experiences while working during the pandemic.[2] Since the pandemic began, thousands of nurses reported feeling stress, frustration, exhaustion, anxiety, undervalued, and unsupported.[3] In addition, a prepandemic survey revealed that nurses reported having suicidal ideation more than other types of United States health care workers and were less likely to seek professional help.[4] The effects of the pandemic have almost certainly intensified this dire situation. Organizations including the American Psychiatric Nurses Association,[5] American Nurses Foundation,[6] World Health Organization,[7] The Joint Commission,[8] and the National Academy of Medicine[9] are among the dozens of groups aware of the need for immediate attention and are seeking various ways to support health care workers. The health care workforce must be protected, given that the full extent of the pandemic's impact on health care workers remains unknown.

The prevalence of burnout, stress, anxiety, and other similar occupation-associated conditions in health care workers is well studied; there is a wealth of evidence relating to support resources and strategies to prevent and reduce these conditions. A literature review revealed various support strategies to reduce these conditions and stressors, many of which fit categorical themes. There appears to be a predominance of strategies targeted to the individual, such as self-care activities, and less attention on organization-driven or employer-led strategies, such as providing formal support programs and employee counseling.[10] However, systematic reviews on coping strategies for health care workers during disease outbreaks revealed that both individual and institutional support are helpful.[11]

The current knowledge has various limitations. To begin, the evidence concerning emergency nurses is sparse.[12] As frontline health care workers, emergency nurses are distinctively affected by the nature of their work given that they spend more time in direct patient care than other types of emergency health care workers. Emergency nurses also report higher levels of burnout from the pandemic than other emergency department (ED) health care workers.[13] In addition, coping strategies vary among health care workers,[14] and few comparative studies identify which types of staff well-being support interventions are most effective.[10]

Consequently, there is no consensus on how to best support staff involved in traumatic or disaster-like situations.[15,16] Although the unprecedented pandemic has sparked a barrage of new evidence related to supporting health care workers, most new evidence appears to be limited to expert opinion or "lessons learned" rather than research. To our knowledge, no published evidence explores how to best support emergency nurses in their working environment during a global pandemic. The purpose of this Delphi study is to identify consensus among emergency nurses about the most effective and accessible employer-led and employee-led support strategies during the COVID-19 pandemic. This study may augment the process of tailoring resources for emergency nurses to prevent stress-related complications and enhance overall well-being and will contribute relevant data to the general knowledge base to help shape future research.

Methods

Delphi methodology is a rigorous survey process, first defined by the Research and Development Corporation in the 1950s, that aims to measure consensus among a group of experts through a series of questionnaires with controlled opinion feedback.[17] The technique has gained popularity across various industries, including nursing research,[18-20] and it can be adapted to suit a particular study.[18-21] Moreover, a 2021 systematic review found that, in emergency nursing research, rigorous Delphi studies are versatile, appropriate, and effective for measuring group consensus.[19]

For this study, researchers used a 2-round, modified Delphi study aimed to establish consensus among emergency nurses on the most effective and accessible support strategies during the pandemic. Although the classic Delphi technique typically includes 3 to 4 survey rounds and begins with an open-ended questionnaire, a modified approach may include using a literature review to pregenerate items for the first round,[20,21] conducting the study online,[19] and using variations in total survey rounds.[18-20] Owing to the unique challenges experienced by emergency nurses during the pandemic, modifications for this study included conducting the study online to align with physical distancing safety measures and both reducing the survey rounds and pregenerating a list of evidence-informed support strategies to reduce attrition among time-constrained participants.

To collate a list of support strategies, researchers performed a literature review using the patient/population/problem, intervention, comparison, outcome question, "What are the most effective and accessible resources to ED nurses during a pandemic to decrease burnout?" Concurrent manual and librarian-assisted literature searches included combinations of the terms "health care workers," "health care providers," "nurses," "frontline nurses," "emergency department," "ED," "burnout," "occupational stress," "compassion fatigue," "psychological distress," "support system," 'support program," "support resources," "COVID-19," "pandemic," and "public health emergency." The search was limited to articles published since 2015 in the English language. Queried sources included the CINAHL, MEDLINE, PubMed and ProQuest databases, Google Scholar, and gray literature. A total of 50 articles were found, 23 of which did not meet patient/population/problem, intervention, comparison, outcome criteria, resulting in 27 articles included in the review. The authors reviewed the articles to identify recommended support strategies, and each strategy was then categorized into various themes that were either employee led or employer led (Box 1).

The results of the literature synthesis informed the creation of 2 sequential surveys administered to eligible emergency nurses over 10 weeks (Figure). The surveys queried opinions regarding listed support strategies (Box 1).

Given that Delphi studies do not require a specific number of participants,[18,19,21,22] investigators pragmatically aimed to recruit at least 30 participants across 9 study sites within a single health care system. All employed emergency nurses (registered nurses and licensed practical nurses) who provided direct patient care during the COVID-19 pandemic were eligible for participation, regardless of their employment status (full time, part time, per diem/flex time). In addition, float pool nurses who self-reported working at least 75% or more of typical shifts in the emergency department met eligibility criteria. Nurses not considered employees of the organization, those working outside the ED setting, and nurses not engaged in direct patient care, such as emergency nurse managers or directors, were excluded from participation. The study received institutional review board approval and final authorization on January 28, 2021.

Recruitment occurred over approximately 3 weeks in May 2021 and included various web-based and direct, in-person communication methods. Recruitment included sharing recruitment flyers via organizational communication platforms and posting flyers in ED staff work areas. In addition, all employed emergency nurses received private emailed survey invitations and, if needed owing to no response, a maximum of 2 weekly reminders via REDCap (Vanderbilt University), a secure electronic database platform, to mitigate associated risks with loss of confidentiality.[23,24] Owing to the nature of the study, all participants were employees and considered a vulnerable population. During the study, one investigator served in a supervisory role for potential participants at 1 study site. Safeguards to protect participants and reduce bias included a statement in all study materials, including the informed consent form, that participation was voluntary and the choice to participate or not would have no effect on employment. Participants were allowed to withdraw at any time, without penalty, for any reason without requiring disclosure.

Two sequential surveys were developed in REDCap and emailed to the group. The initial survey asked the panel to use a 6-point Likert scale (1, lowest; 6, highest) to rate their preference for employee-led and employer-led support strategies on 3 dimensions: effectiveness, accessibility, and likelihood of participation ([Box 2]). Effectiveness was defined as perceived positive impact on well-being, and accessibility referred to perceived ease of activating, accessing, understanding, or using a specific support strategy. Employee-led strategies refer to those initiated and acted upon by employees, whereas employer-led strategies refer to those initiated and acted upon by employers. Additionally, the initial survey included a question on the likelihood of participation in strategies accessed or delivered in the following manner: in-person, online (visiting a website or via webinar), by telephone, via an application on a mobile device, and by wearing smart technology. Of note, participants were not required to have used or participated in a specific strategy to offer opinions on perceived potential effectiveness, accessibility, or likelihood of participation.

There are no strict requirements for conducting Delphi studies, and there is no agreement on the best way to conceptualize consensus.[18-22,25] For this study, participants independently rated various support strategies using a 6-point Likert scale to avoid potential pitfalls with a midpoint option.[21] A priori, researchers agreed that only strategies averaging at least a 4 of 6 on the Likert scale would be considered for inclusion in the final survey. A biostatistician used SAS (SAS Institute Inc) version 9.4 to calculate descriptive statistics, specifically central tendency and dispersion measures. To account for outliers in the data set, the study team focused on the interpolated median (IM) and interquartile range (IQR).[21] After consulting with the biostatistician, researchers defined consensus for top-rated strategies as those with an IM ≥4 on a 6-point Likert scale and IQR ≤2. The second (final) survey included only top-rated first-survey strategies, and participants then ranked the strategies from most to least preferred in each category (employer led and employee led) and overall. Because there were so few favorably-rated strategies from which to choose in round two, the final survey provided only 2 options from which to select—“most preferred” and “least preferred.” Incomplete responses from either survey were retained in the data set (ie, not eliminated).

Results

A total of 327 emergency and float pool nurses received targeted recruitment emails. Of those, a total of 52 employees responded to the initial recruitment email, and 28 of those met the inclusion criteria. Twenty-eight completed the initial survey (100% response rate), and 19 of the 28 (68% response rate) also completed the final survey. Of all respondents, 61% identified as female, 39% identified as male, and most were between 35 and 44 years (36%). Two float pool nurses (7%) participated. In terms of years of emergency nursing experience, most of the panel had 1 to 5 years (36%) or >10 years of experience (39%). The bulk of respondents worked full time (82%) and day shift (54%) and practiced in an urban or suburban emergency department (64%) ([Table 1]).

Round 1 results show emergency nurses perceived employee-led self-care activities to enhance social well-being, such as establishing new and enhancing existing relationships with peers, friends, and family, as most effective (IM = 4.1, IQR = 2). Conversely, emergency nurses did not perceive employer-led strategies as effective. There were no top-rated strategies in terms of accessibility for either employee-led or employer-led supports. Only 2 strategies were top rated for likelihood of participation: those for employee-led self-care strategies to enhance social (IM = 4.4, IQR = 2) and emotional well-being (IM = 4.1, IQR = 2). These 2 strategies met the criteria for inclusion in the final survey. Finally, emergency nurses strongly preferred to participate in strategies accessed or delivered inperson compared with other means (IM = 5, IQR = 2) ([Table 2]).

For the final round, participants ranked 2 strategies in terms of likelihood of participation and overall recommended. For both, employee-led self-care strategies to enhance social well-being outranked employee-led activities to enhance emotional well-being.

Discussion

To the best of our knowledge, this is the first study to systematically query emergency nurses about various types of support strategies by looking comprehensively at strategies suggested in the published literature. The purpose of this study was to identify emergency nurse consensus on the most effective and accessible support strategies during the COVID-19 pandemic. Overall, the data suggest emergency nurses perceive employee-led strategies to support social well-being as the most effective support strategy, followed by strategies to enhance emotional well-being. These findings align with a multicenter study showing emergency nurses preferred to cope by spending time with friends and family.[13] Another survey showed that, for health care workers, relying on emotion-focused coping mechanisms may improve symptoms of anxiety and depression.[26] Furthermore, a 2020 scoping review on ameliorating interventions to reduce occupational stressors among ED staff indicated strategies such as mindfulness and relaxation aimed at ED health care workers reduced burnout, stress, and anxiety.[27]

For this study, emergency nurses did not rate any employer-led strategies favorably. Congruently, a recent study conducted in the same health system evaluated nurse responses to both self-initiated and leader-led resilience activities and found that nurses do not engage in leader-led activities.[28] These findings warrant further exploration of why employees do not engage with employer-led support activities or resources. Engaging employees is critical when designing, implementing, and evaluating support systems. Moreover, Fitzpatrick and Valentine[29] explicitly call for nursing organizations to assist health care leaders in building upon organizational practice research to identify effective interventions. Otherwise, organizations risk wasting resources on interventions not rooted in empirical evidence.

Despite physical distancing limitations implemented during the pandemic and the availability of various technological tools to support staff, emergency nurses preferred in-person support. This particular finding may reflect the reality of the day-to-day work life for emergency nurses, where there is minimal, if any, downtime to view a webinar, call a hotline, or log in to an application. However, a cross-sectional study of nearly 1000 doctors and nurses showed that

more than 50% of participants accessed psychological support resources through online media during the pandemic.[30] Although using technology to deliver mental health interventions may be low cost and highly scalable, more research is needed to evaluate effectiveness.[31]

Limitations

Limitations to the study include focusing solely on emergency nurses working in a single health care system in the Mountain West area. Results may not be and were not intended to be generalizable to other types of health care professionals, such as intensive care nurses, physicians, and nonfrontline health care professionals affected by the COVID-19 pandemic. Although there is no requirement for a minimum sample for Delphi studies, participation by emergency nurses in both the initial and final surveys was limited, and this may have introduced nonresponse and attrition biases. The limited participation may be attributed to the unique challenges posed by the peaks and dips of COVID-19 activity at the time of the study and the potential lack of motivation or available time to respond. It is reasonable to assume the dynamic nature of the pandemic may influence support preferences at any given time. In addition, the reported support preferences may be unique to long-term situations with chronic stress compared with short-term events, such as mass casualty incidents. The body of evidence related to COVID-19 has dramatically changed and expanded since the conceptualization phase of this study in early 2020. Thus, there may be new empirical evidence that helps us better understand effective ways to support emergency nurses. Finally, the study measured perceptions of effectiveness and accessibility but did not directly measure those outcomes; thus, researchers recommend caution when equating consensus results with “best” interventions.[21]

Implications for Emergency Nurses

The National Academies of Sciences, Engineering, and Medicine’ report, The Future of Nursing 2020-2030: Charting a Path to Achieve Health Equity, highlights the critical importance of continually supporting the well-being of nurses responding to disaster and public health emergencies through the actions of various organizations within and outside health care, as well as nurses themselves.[32] This study highlights strategies nurses and their employers can take to support nurse well-being through the course of the COVID-19 pandemic and to prepare for future crises.

Conclusion

As we better understand the depth and breadth of pandemic’s impact on the well-being of frontline health care workers, a multifaceted approach may be most effective in addressing short- and long-term support needs. Not all nurses cope with stress the same way. Therefore, support strategies should be dynamic, adapted to local cultures and contexts,[15,27,33] and holistic to include personalized strategies and supportive work environments.[11,27,33] Opportunity exists for future, large-scale research comparing long-term effectiveness and accessibility of support strategies, both for emergency nurses and other health care professionals affected by the pandemic.

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Author Disclosures

Conflicts of interest: none to report.

Characteristic	n (%) of respondents
Survey	
Round 1	28 (100)
Round 2	19 (68)
Sex	
Female	17 (61)
Male	11 (39)
Age*	
< 25	1 (4)
25-34	8 (29)
35-44	10 (36)
45-54	6 (21)
55-64	3 (11)
≥ 65	0 (0)
Years of experience	
< 1 y	3 (11)
1-5 y	10 (36)
5-10 y	4 (14)
≥ 10 y	11 (39)
Employment status†	

Full time	23 (82)
Part time	3 (11)
Flex/per diem	2 (7)
Worksite	
Urban or suburban emergency department	18 (64)
Rural, critical access, or free-standing emergency department	10 (36)
Work shift*	
Day shift	15 (54)
Mid shift	8 (29)
Night shift	5 (18)

Topic	Employee-led strategy	Employer-led strategy
Perceived effectiveness	Self-care activities that enhance social well-being, such as establishing new and enhancing existing relationships with peers, friends, and family	None
Perceived accessibility	None	None
Likelihood of participation	Self-care activities that enhance your social well-being, such as establishing new and enhancing existing relationships with peers, friends, and family. Self-care activities that enhance your emotional well-being, such as practicing stress management, relaxation, mindfulness, and reflective writing/journaling	None

Employee-led strategies
• Self-care activities that enhance your own physical well-being, such as healthy eating, exercise, sleep hygiene, and lifestyle changes

• Self-care activities that enhance your emotional well-being, such as practicing stress management, relaxation, mindfulness, and reflective writing/journaling
• Self-care activities that enhance your spiritual well-being, such as gratitude, acceptance, prayer, and meditation
• Self-care activities that enhance your social well-being, such as establishing new and enhancing existing relationships with peers, friends, and family
• Self-care activities that enhance your financial well-being, such as seeking information on emergency grants, funds, or other financial support for nurses
• Seeking education and training on work-related skills, such as conflict management, communication, and how to work in a team
• Seeking counseling offered or sponsored by your employer
• Performing self-assessments, such as for burnout, stress, or compassion fatigue
Employer-led strategies
• Formal debriefings led by a chaplain, social worker, or other peer
• Formal education or training on self-care strategies for your physical well-being, such as healthy eating, exercise, sleep hygiene, and lifestyle changes
• Formal education or training on self-care strategies for your emotional well-being, such as practicing stress management, relaxation, mindfulness, and reflective writing/journaling
• Formal education or training on self-care strategies for your spiritual well-being, such as gratitude, acceptance, prayer, and meditation
• Formal education or training on self-care strategies for your social well-being, such as establishing new and enhancing existing relationships with peers, friends, and family
• Formal education or training on work-related skills, such as conflict management, communication, and team-building exercises
• Leadership rounding, huddles, check-ins with staff, and access to experts for consultation
• Formal recognition from leadership and staff, such as a “kudos” board and “thank you” cards, and verbal support
• Ensuring a safe work environment, such as providing adequate PPE
• Establishing formal and anonymous processes for listening to staff feedback, such as staff forums and suggestion boxes

• Offering individual (1:1) support for employees, such as mentorship or counseling
• Offering financial support, such as subsidizing hotel rooms for staff
• Supporting social gatherings, such as book clubs, journal clubs, coffee talks
• Supporting spiritual health, such as holding moments of silence, ethics rounds or consultations
• Establishing support groups, such as peer support groups and psychological first aid responders

DETAILS

Subject:	Emergency medical care; Employment; Social well being; Nurses; Emergency services; Employers; Research &development--R &D; Stress; Access; COVID-19; Health care; Selfcare; Emotional well being; Recruitment; Participation; Employees; Pandemics; Medical research; Burnout; Nurse led services; Medical personnel; Literature reviews; Nurse led care; Nursing; Coronaviruses
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I am So Tired and We Pretend: JEN

ProQuest document link

FULL TEXT

I am So Tired

Awake lying in bed
Thinking
What will my day be like today? Not good. I am so tired.
Driving to work
Thinking
Will I be able to make a difference today? No, because I am so tired.
Arriving at work and opening emails
Thinking
How am I going to make it through another day? I am so tired.
Trying to make a difference
Thinking
How many more resignations will come today? Everyone is so tired.
Asking everyone “How are you doing today?”
Thinking
I am not doing well, but I will keep on smiling even though I am so tired.
Participating in what I have to

Thinking
Do I actually have anything to contribute? No. I am so tired.
Taking everything personally
Thinking
Are the staff tired because of me? No, but I am so tired I don't accept that.
Working 11-12 hour days
Thinking
Do the staff really think I have no idea? Yes, and I am so tired I can't care.
Driving home after a long day
ThinkingAnd crying . . . the day is over and I am so tired.
We Pretend
Fear and frustration
The pandemic was here
Fear and frustration
Rules changed through the year
Fear and frustration
People sick and dying
Fear and frustration
It was not for a lack of trying
Fear and frustration
Resignations keep coming
Fear and frustration
Staff were succumbing
Fear and frustration
Staff showing their ability
Fear and frustration
Trying to create stability
Fear and frustration
When will it end
Fear and frustration
We are good, we pretend

DETAILS

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Evidence-Based Protocol for Administering First Dose of Cephalosporins via Intravenous Push in the Emergency Department: JEN

ABSTRACT (ENGLISH)

[...]IV cephalosporins are typically administered via the IVPB route in the emergency department. First is the fluctuation in availability of small-volume parenteral solutions, often due to manufacturing issues and natural disasters. [...]the shift toward high value care and the importance of controlling costs and being good stewards of limited health care resources have created the opportunity to explore the feasibility of IVP delivery of IV antibiotics. [...]education was distributed to nursing staff both electronically via email and posts to the staff's private Facebook group and face-to-face during morning staff huddles.

FULL TEXT

Problem Description

Traditional practice has dictated that solutions with an osmolality of 600 to 900 mOsm/L, such as intravenous (IV) antibiotics, be administered via the intravenous piggyback (IVPB) route. This practice is due to concern for phlebitis, local irritation, and infiltration during peripheral administration of hypertonic solutions. IV cephalosporins, when reconstituted with 0.9% sodium chloride injection, have an osmolality ranging from 575 mOsm/L with ceFAZolin to 1040 mOsm/L with Cefepime[1] and subsequently fall into the category of solutions with an osmolality high enough to be of concern. As a result, IV cephalosporins are typically administered via the IVPB route in the emergency department. However, 3 recently published articles[2-4] have demonstrated safe administration of IV antibiotics via the intravenous push (IVP) route.

Current practice at the project site was to administer the first dose of all IV antibiotics in the emergency department via the IVPB route. Multiple factors combined to create an interest to explore IVP delivery of IV antibiotics in the emergency department. The overarching long-term goal of this work is to streamline nursing clinical practice and reduce the number of steps required for bedside nurses to complete routine medication administration tasks. Project-specific and contextual factors here include (1) fluctuations in availability of small-volume parenteral solutions due to manufacturing issues and natural disasters, (2) need for timely administration of antibiotics per Sepsis Core Measures, and (3) importance of controlling costs and being good stewards of limited health care resources.

Available Knowledge

Three key events have escalated interest in exploring the feasibility of IVP delivery of IV cephalosporin antibiotics in the emergency department. First is the fluctuation in availability of small-volume parenteral solutions, often due to manufacturing issues and natural disasters. Historically, this has been an ongoing challenge, and most recently, production was notably affected after hurricane Maria struck the island of Puerto Rico as a category 4 storm in 2017. Mazer-Amirshahi and Fox[5] reported that Baxter supplies approximately 50% of United States hospitals with small-volume saline bags (250 mL or less), and the manufacturing plant in Puerto Rico where these products are primarily made was significantly impacted by the storm, resulting in a severe supply shortage.

Next, the 2016 Surviving Sepsis Campaign guidelines recommended administration of broad-spectrum antibiotics within 1 hour of presentation in patients with sepsis and septic shock. Logistical challenges, such as immediate medication preparation and nurse availability to administer the medication, may interfere with successfully achieving the metric of timely antibiotic administration. Gregorowicz et al[6] evaluated the time difference between IVP and IVPB administration of β-lactam antibiotics in 274 patients diagnosed with sepsis in the emergency department. The results demonstrate that IVP administration was associated with an approximately 32-minute time savings to β-lactam antibiotics administration and an approximately 32-minute time savings to completion of infusion of a broad-spectrum antibiotic. No adverse events related to infusion were reported in either group. The authors concluded that use of an IVP strategy may improve timeliness of antibiotic administration without sacrificing patient safety.

Finally, the shift toward high value care and the importance of controlling costs and being good stewards of limited health care resources have created the opportunity to explore the feasibility of IVP delivery of IV antibiotics. McLaughlin et al[3] reported the cost of infusion supplies as $9.53 for IVPB administration versus only $0.83 for IVP administration, almost 11.5 times for IVPB administration. In addition, the authors reported that IVP administration provided cost savings to the patient as the billing costs are 4.5 times higher for IVPB administration than for IVP administration. In their project, by changing to IVP administration of IV cephalosporins in the emergency department, the authors reported institutional savings of $10,000 during the 3-month project period, annualized to $40,000 per year.

Rationale and Specific Aims

The purpose of this quality improvement project was to assess initial feasibility of implementing an evidence-based protocol for administration of first dose of IV cephalosporins via IVP in the emergency department. Currently, the Food and Drug Administration (FDA)[4,7] has approved cephalosporins and 8 other antibiotics (meropenem, aztreonam, chloramphenicol, ampicillin, ampicillin/sulbactam, nafcillin, oxacillin, and colistimethate sodium) for administration via IVP. Piperacillin/tazobactam is not FDA approved for IVP administration, but research in the previously published literature[4] has demonstrated administration IVP through a peripheral line to be safe and tolerable for adult patients.

We chose to focus specifically on cephalosporins for this quality improvement project because they are FDA approved for IVP administration, as well as because of the existing literature[2,3] demonstrating safe administration via the IVP route. We chose the first dose owing to the pharmacodynamic effect of some antibiotics, such as cephalosporins, being time dependent. For time-dependent antibiotics, increasing the duration of infusion increases the duration for which the drug concentration remains above the minimum inhibitory concentration, and studies have reported improved clinical cure and survival with extended or continuous infusions. In theory, changing the rate of infusion to IVP administration may negatively impact the time above the minimum inhibitory concentration. Butterfield-Cowper and Burgner[8] compared the time above the minimum inhibitory concentration between 30-minute and 5-minute infusions and included cefepime; they reported only minor differences in time above the minimum inhibitory concentration between 30-minute and 5-minute infusions. However, the data are limited and do not currently support the practice of IVP administration over 5-minutes beyond the first dose.

Previously published practice improvement project of IVP cephalosporin antibiotics in the emergency department by McLaughlin et al[3] and the color-coded chart provided by Rafeq[9] served as the informal models for this project. Similar to McLaughlin et al,[3] this project focused on administration of first dose cephalosporins via IVP in the emergency department and evaluated cost savings and nurse satisfaction with practice change. The color-coded chart provided by Rafeq[9] was adapted for use by the project site. The desired outcome was institutional cost savings and nurse self-reported satisfaction with the practice change and its effect on streamlining clinical practice. Other antibiotics approved for IVP administration and the timeliness of antibiotic administration were not assessed.

Methods Design

This was a quality improvement project using a color-coded information chart, informatics medication prescribing change, and nurse education intervention to assess the feasibility of IVP cephalosporin antibiotics in the emergency setting.

Context

The project setting was a 27-bed emergency department at a community hospital located in East Central Illinois with an annual volume of approximately 28,000 patients per year. Inclusion criteria were adult patients in the emergency department with a new prescription (first dose) for nurse administration of an IV cephalosporin. The project duration was 6 months, between December 2020 and June 2021. Seventy-two emergency nurses were employed at the site, with 60 emergency nurses on the email distribution list we received.

Intervention

An interdisciplinary team including representatives from medical staff, pharmacy, and nursing worked collaboratively to develop a site-specific protocol describing administration of IV cephalosporins via the IVP route. A color-coded

chart provided by Rafeq[9] that recently appeared online provided the inspiration for the new protocol. The original example provided the name of the antibiotic, the dose, and the diluent volume. The example was adapted into a new evidence-based chart to meet site-specific needs; rate of administration was added and standardized as 5 minutes for all IVP cephalosporin antibiotics for ease and simplification. The preferred solution was sterile water for injection because it has an osmolality of 0, although 0.9% normal saline was also approved for use as a secondary solution if sterile water for injection was not available. Once completed, the protocol was approved by the facility's Chief Medical Officer.

Next, the project lead worked with the institution's informatics department to make changes to the computerized prescription, or order, entry system in the electronic medical record. The intention was to change the default prescription sentence for all IV cephalosporins administered in the emergency department to the IVP route. In actuality, the default route was changed for generic terms at the onset of the project and applied to brand name terms after 3-month interim analysis revealed the unintended omission from the requested changes. Education to providers was distributed electronically via email and included snapshot pictures of the changes made to the computerized order entry system.

Finally, education was distributed to nursing staff both electronically via email and posts to the staff's private Facebook group and face-to-face during morning staff huddles. In addition, nursing staff was also provided the color-coded chart (see [Table 1]) detailing instructions for administration to include antibiotic, dose, diluent solution and volume, and rate of administration. These charts were placed in clearly visible spots in the unit's medication rooms and at the nurses' stations.

Nurses were instructed to monitor for adverse reactions during administration of IVP cephalosporins for the duration of the patient's ED stay. Phlebitis, local irritation, infiltration, and reactions occurring during or immediately after administration or noted at any time during the patient's ED stay were to be reported. Nurses were instructed to use the facility's existing electronic safety reporting system and complete a safety event monitoring (SEM) report in the event a patient experienced an adverse reaction. The SEM report did not included structured fields for phlebitis, local irritation, or infiltration. Any reports submitted related to medication administration and/or medication safety were tagged and directed to the pharmacy department for review and follow-up.

Measures and Study of The Interventions

Primary outcomes measured were (1) number of doses of IV cephalosporins administered via the IVP route, (2) number of adverse events reported, (3) institutional savings utilizing site-specific estimated costs of supplies, (4) nurse satisfaction with practice change, and (5) the perceived effectiveness of practice change in streamlining nursing clinical practice as assessed by postintervention electronic survey. Data sources for the number of doses, adverse events, and institutional cost savings were routinely collected in administrative datasets accessible to the hospital pharmacy department, including the electronic medical record repository and the facility's SEM reporting system. Emergency nurse satisfaction and perceived effectiveness of the practice change were assessed using a 2-item electronic survey developed for the purposes of this present project. The items were the following:

•**(1)**Cephalosporin antibiotics can be given IV push over 2 to 5 minutes. Knowing this, I would prefer to:

•**(a)**administer IV push

•**(b)**administer as an IV piggyback

•**(c)**other

(2)

McLaughlin et al[3] reported that by switching IV cephalosporins to the IVP route, nurses reported spending less time gathering equipment and infusion supplies, entering nursing orders for carrier fluids, and documenting a secondary infusion. Do you agree with these findings?

•(a)Yes

•(b)No

•(c)No opinion

No patient data were collected.

Survey Procedures

After 1 week of project completion, an electronic survey using Survey Monkey was sent to 60 staff nurses included in the department email distribution list. In addition, staff were provided a link to the survey on the staff's private Facebook group. The survey was left open for 2 weeks. A reminder was sent using the same methods at the end of week 1.

Analysis

Descriptive statistics were analyzed. Interim analysis was conducted at 3 months. Final analysis was conducted at the conclusion of the project at 6 months.

Ethical Considerations

The project was deemed quality improvement by facility's Ethics Committee and, therefore, did not require review by the Internal Review Board. No individual involved in the project had any conflicts of interest to disclose.

Results Number of Doses By Route and Interim Corrections

A total of 761 doses of IV cephalosporins were administered via IVP route during the 6-month project period. A missed opportunity identified during the project period was that several doses of IV cephalosporins were still ordered to be administered via the IVPB route. At the 3-month check, we discovered that 134 doses of IV cephalosporins had still been ordered to be administered via IVPB. At this time, the project lead learned that informatics changes in the medication ordering process in the electronic medical record were only made to the generic names of IV cephalosporins and that if a provider typed the brand name of the IV cephalosporin into the EMR prescribing/ordering system, it still defaulted to the IVPB route. Additional changes to EMR ordering process to include addition of brand names of IV cephalosporins resulted in only 25 orders for IVPB route in the final 3 months of the project. In total, 159 doses of IV cephalosporins were still administered via the IVPB during the 6-month project period.

Adverse Events Reported

In the institution's SEM system, 0 adverse events were reported.

Cost Savings

Using the facility's estimated cost of supplies for administration via IVP route was $0.80 compared with IVPB route of $5.23, estimated department savings were $3,371.23 during the project period. With 159 doses of IV cephalosporins still administered by IVPB during the 6-month project period, this resulted in an estimated cost savings loss for those doses of $704.37. If all doses of IV cephalosporins had been administered via the IVP route, the estimated department savings during the 6-month project period would have been $4,075.60, annualized to a department savings of $8,151.20 per year.

Nurse Satisfaction and Perception of Effectiveness

A total of 30 out of 60 (50%) responses were received to the electronic survey. Of the respondents, 28 (93.3%) favored IVP route, and 25 (83.33%) felt that practice change streamlined clinical practice by reducing time spent gathering equipment/infusion supplies, setup, and documenting secondary infusion (Table 2) (Supplementary Figure).

Discussion Summary

This project provides evidence to support that a site-specific protocol for administering first dose of IV cephalosporins via IVP route in the emergency department was feasible and cost-effective. In addition, administration of IV cephalosporins via IVP in the emergency department was favored by the majority of emergency nurses, and nurses report that the practice change streamlined nursing clinical practice by reducing time spent gathering equipment/infusion supplies, setup, and documenting secondary infusion. Results were consistent with the findings of others.[4,5,7] Administration of IV cephalosporins via IVP route has the potential to address systems issues such as periodic fluctuations in availability of small-volume parenteral solutions as well as clinical issues such as need for timely administration of antibiotics and the desire for minimal fluid volume in certain patient populations. A strength of this work was using objective data and measurements obtained directly from the electronic medical record and the facility's SEM reporting system. Pragmatically, this project design can be easily replicated without using additional resources outside of usual clinical operations.

Future Research

Recommendations for future research include replicating the project over longer periods of time and prospectively collecting data on adverse events that may have occurred later after administration and ED disposition. In addition, other recommendations include administration of first dose of IV cephalosporins via IVP in clinical areas other than the emergency department, an observational time study or time and motion study to evaluate the difference in nurse time spent preparing/administering IV cephalosporins IVP versus IVPB, and inclusion of other antibiotics that are FDA approved for IVP administration.

Limitations

This project has several limitations. The data were limited to medications administered to adult patients in a single department at a single institution. These factors limit the generalizability of the results. In addition, notification and tracking of adverse events were time limited to the patient stay in the emergency department and dependent on nurses completing a SEM report. It is possible that an adverse event did occur but occurred after the stay in the emergency department or was not reported by the nurse. Next, this project did not evaluate the impact of the practice change on timeliness of antibiotic administration as per the Sepsis Core Measures. The survey used to evaluate nurse satisfaction has not been tested for validity or reliability as it was developed for the purposes of this project. There was a possibility of response bias in the nurses who completed the survey. This project only explored administration of IV cephalosporins via IVP and did not include any of the other antibiotics currently approved by the FDA[4,7] for IVP administration. The project informatics intervention was not implemented as intended until after the 3-month interim analysis.

Implications for Emergency Nurses

This project, as well as the work of McLaughlin et al,[3] is the first to specifically address administration of IV cephalosporins via the IVP route in the emergency department. Given the fluctuations in availability of small-volume parenteral solutions, need for shortened time to first dose to meet Sepsis Core Measures, and the importance of controlling costs and being good stewards of limited health care resources, a transition away from IVPB traditional administration practice is necessary. In addition, nurses favored the practice change and described it as being effective in streamlining nursing clinical practice and reducing the number of steps required to complete routine tasks. Our protocol and quality improvement project here can be considered for replication at other practice sites.

Conclusions

Our protocol for administering the first dose of IV cephalosporins via IVP route in the emergency department at our site appears to be feasible and cost-effective. In addition, administration of IV cephalosporins via IVP in the emergency department was favored by emergency nurses. These nurses report that the practice streamlines

nursing clinical practice by reducing time spent gathering equipment/infusion supplies, setup, and documenting secondary infusion. Results suggest that the protocol may be applied to administration of other IV antibiotics in the emergency department.

Author Disclosures

Conflicts of interest: none to report.

Supplementary Data

Supplementary Data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.jen.2022.03.004.

Antibiotic	Dose (g)	Diluent volume (mL) (0.9% NaCl or SWFI)	Rate of administration (min)
CeFAZolin	1	10	5
CeFAZolin	2	20	5
CefTRIAXone	1	10	5
CefTRIAXone	2	20	5
Cefepime	1	10	5
Cefepime	2	20	5

	IVP	Percent	IVPB	Percent	Other	Percent
Q1: Preferred method for administration of IV cephalosporins	28	93.3%	2	6.7%	0	0%

DETAILS

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Association of Cannabis Use and At-Risk Alcohol Use With Intimate Partner Violence in an Urban ED Sample: JEN

ABSTRACT (ENGLISH)

Introduction

Urban ED patients have elevated rates of substance use and intimate partner violence. The purpose of this study is to describe the risk profiles for intimate partner violence among urban ED patients who report at-risk alcohol use only, cannabis use only, or both types of substance use.

Methods

Cross-sectional survey data were collected from study participants (N = 1037; 53% female; ages 18-50) following informed consent. We measured participants' past-year at-risk drinking (women/men who had 4+/5+ drinks in a day), cannabis use, psychosocial and demographic characteristics, and past-year physical intimate partner violence (assessed with the Revised Conflict Tactics Scale). We used bivariate analysis to assess whether rates of intimate partner violence perpetration and victimization differed by type of substance use behavior. Multivariate logistic regression models were estimated for each intimate partner violence outcome. All analyses were stratified by gender.

Results

Rates of intimate partner violence differed significantly by type of substance use behavior and were highest among those who reported both at-risk drinking and cannabis use. Multivariate analysis showed that women who reported at-risk drinking only, cannabis use only, or both types of substance use had increased odds for intimate partner violence perpetration and victimization compared with women who reported neither type of substance use. Men's at-risk drinking and cannabis use were not associated with elevated odds of intimate partner violence perpetration or victimization.

Discussion

Brief screening of patients' at-risk drinking and cannabis use behaviors may help identify those at greater risk for intimate partner violence and those in need of referral to treatment.

FULL TEXT

Contribution to Emergency Nursing Practice

••Urban ED patients have elevated rates of substance use and intimate partner violence.

••Among a sample of married/partnered ED patients seeking nonemergent/low-acuity care, rates of intimate partner violence perpetration and victimization differed significantly by substance use behaviors. Rates were highest among those engaging in cannabis use only and those reporting both at-risk drinking and cannabis use. In gender-stratified multivariate logistic regression analyses, the association between at-risk drinking only, cannabis use only,

and both at-risk drinking and cannabis use and each intimate partner violence outcome remained significant for women but not men.

••Brief screening of substance use patterns may help identify those at greater risk for intimate partner violence. These patients can be prioritized to receive preventive counseling and referrals.

Introduction

Intimate partner violence (IPV) remains a significant public health problem that can result in physical and mental health morbidity.[1] While a complex array of factors is associated with risk for IPV, a large body of research links alcohol use with both its occurrence and severity.[2] For example, in an analysis of Wave II of the US National Epidemiological Survey of Alcohol and Related Conditions, usual quantity of drinks was associated with elevated risk for bidirectional (ie, perpetration and victimization) IPV and victimization only.[3] A recent meta-analysis of substance use and IPV found that measures of problematic alcohol use (eg, abuse, dependence, and drinking problems) were stronger correlates than consumption measures (eg, alcohol use or frequency) for IPV victimization but were statistically similar for IPV perpetration.[4] The alcohol myopia model proposes that acute alcohol consumption results in cognitive impairment, which creates a narrowing effect on attention (ie, alcohol myopia).[5] Giancola et al[6] expanded upon the model to propose 5 putative mechanisms (negative affect, angry affect, hostile cognitive rumination, self-awareness, and empathy) that link this theoretical framework with alcohol-related aggression, such as IPV.

In terms of the cannabis-IPV association, a review of 30 studies reported that distal cannabis use (eg, frequency of use in the past year) was modestly associated with distal reports of IPV (eg, frequency of IPV perpetration in the past year).[7] On the basis of meta-analysis, Cafferky et al[4] reported that the effect size between cannabis use and IPV perpetration and victimization was not substantially different from that of amphetamines or cocaine. Cognitive impairment resulting from cannabis use may inhibit conflict resolution and thereafter contribute to conflict and aggression.[7]

The role of cannabis vis-à-vis IPV is garnering increased research attention for several reasons. First, other than tobacco, cannabis is the most widely used drug among those who drink.[8] Its prevalence is likely to increase, given trends toward legalization of medicinal and recreational cannabis use. Second, those who use alcohol and cannabis may be at greater risk for alcohol-related consequences compared with drinkers who do not use cannabis. For example, an analysis of a United States national sample found that those who used both substances in the past 12 months were more likely to report legal, health, work, fighting, and relationship problems compared with those who used alcohol only.[9] To date, there has been limited research with ED-based samples that has analyzed how odds for intimate partner aggression may differ between those who only drink or use cannabis versus those who use both substances.[10,11] In one study among a sample of young adults recruited from an urban emergency department, dating abuse perpetration was more likely on days when males reported alcohol and cannabis use (odds ratio [OR] = 4.54) or alcohol use only (OR = 5.35) compared with those who use neither alcohol nor cannabis; no associations were seen for females.[10] Understanding how odds for IPV may differ among patients who engage in problem drinking only, cannabis use only, or both behaviors could help identify those who may be in need of further screening. This is important because rates of IPV, substance use, and other social problems are elevated among underserved patients seeking medical care in urban safety-net ED settings.[11-15] These emergency departments are part of essential hospitals that provide a substantial volume of care to low-income patients, the uninsured, and others who face social and economic hardships.[16] From a prevention standpoint, the ED visit presents an opportunity for staff to screen patients and discuss potential treatment or interventions for those reporting risky

drinking and drug use.[17,18]

Previous analyses of the data herein found that approximately 23% of the sample reported past-year IPV,[12] and that IPV is linked with problem drinking behaviors (eg, frequency of intoxication and at-risk drinking, defined as women/men who had 4+/5+ drinks in a day) and cannabis use.[12,19,20] We extend these findings by describing the risk profiles of study participants who reported at-risk drinking only, cannabis use only, and both at-risk drinking and cannabis use in relation to past-year IPV victimization and IPV perpetration. We expected that each type of substance use behavior would be associated with both IPV outcomes, and that the magnitude of effect would be greatest among those who report at-risk drinking and cannabis use.

Methods

The project was approved by the Institutional Review Board of the hospital at which the study occurred. Participants provided informed consent and received a $30 grocery store gift card for completing the survey.

Sample and Data Collection

This cross-sectional study was based on patients seeking nonemergent care (ie, not requiring immediate medical attention; low or nonemergent presentation) at the emergency department of an urban level I trauma center in Northern California. The hospital is part of a county-wide integrated public health care system. As such, it serves a population with low socioeconomic status, many of whom are uninsured and rely on the hospital for routine medical care. Study eligibility criteria were the following: 18 to 50 years old; English or Spanish speaker; resident of the county in which the hospital is located; and married, cohabiting, or in a romantic (dating) relationship with the same person for the past 12 months. Patients who were intoxicated, experiencing acute psychosis or suicidal or homicidal ideation, were cognitively/psychologically impaired and unable to provide informed consent, in custody by law enforcement, or in need of immediate medical attention (Emergency Severity Index[21] levels 1-2) were ineligible and excluded.

Survey data collection was conducted from February 27 to December 15, 2017. Owing to staffing constraints, we did not seek to proportionately recruit patients from all ED shifts. Instead, 2 trained, bilingual research assistants per shift staffed the emergency department during weekday peak volume hours (9 am-9 pm) to recruit eligible patients to the study. Figure shows the recruitment sequence. The research assistants identified potentially eligible patients through a multistep process. First, they searched the emergency department's electronic patient information system for currently registered ED patients between ages 18 and 50 years (N = 3386) who had been triaged at Emergency Severity Index levels 3 to 5. Second, the research assistants located and conducted face-to-face screening with patients in the ED waiting room or in a treatment cubicle (N = 2212). Third, the research assistants offered eligible patients the opportunity to participate in a confidential, face-to-face survey interview for which they would receive a $30 grocery store gift card incentive (N = 1184). The research assistants obtained informed consent in a private area adjacent to the ED waiting room or in the patient's room without others present (N = 1066). Twenty-nine patients terminated the survey interview before completion. This was due primarily to interruption for medical services (eg, patient transported to ultrasound or X-ray). Thus, 1037 participants (53% female) completed the survey. The research assistants conducted the screening and survey interview using computer assisted personal interview techniques with tablet computers running the Qualtrics platform. Average survey interview completion time was 37 minutes (SD = 20.7). Sample characteristics are shown in Table 1.

Measurements Main Outcome

IPV. Past 12-month physical IPV was measured with the 12-item physical assault subscale in the Revised Conflict Tactics Scale.[22] Participants were asked about violent behaviors that they may have perpetrated against their spouse/partner, and that their spouse/partner may have perpetrated against them. This allows for identification of

the participant as a perpetrator of violence and/or as a victim of violence. Cronbach's α for the scale was 0.85.

Independent Variables

At-Risk Drinking. Participants who drank alcohol in the past 4 weeks were asked, "What was the greatest number of drinks you had on any day in the past 4 weeks?" A "drink" was defined as a 12-ounce can of beer, a 5-ounce glass of wine, or a 1-ounce shot of liquor. Participants who drank alcohol in the past year (but not in the past 4 weeks) were asked about the greatest number of drinks they had on any day over the past 12 months. Women and men were considered at-risk drinkers if they had had 4 and 5 or more drinks, respectively, on any 1 day in the past 4 weeks (past 12 months for past-year drinkers). This is in accord with criteria on at-risk drinking as specified by the National Institute on Alcohol Abuse and Alcoholism.[23] Abstainers were coded "0."

Cannabis Use. We created a dichotomous cannabis use variable coded positively for participants who reported that they used marijuana or hashish in the previous 12 months. Recreational cannabis use was legalized in California in November 2016.

Spouse/Partner Hazardous Drinking. We used the 3-item AUDIT-C (Alcohol Use Disorders Identification Test-Consumption) to measure the participant's assessment of his/her spouse/partner's drinking.[24,25] The 3 questions cover how often the partner drinks, how many standard drinks the partner has on a typical day, and how often the partner has 6 or more drinks on 1 occasion. Male and female spouses/partners with a score above 4 and 3, respectively, were categorized as hazardous drinkers. Cronbach's α was 0.81.

Spouse/Partner Cannabis Use. Participants were asked whether their spouse/partner used marijuana or hashish in the previous 12 months. We created a dichotomous variable (spouse/partner cannabis use), coded positively based on participant report.

Other Covariates. Participants self-reported their gender and the gender of their spouse/partner. We used these reports to create a dichotomous variable for relationship type (same-sex or heterosexual). Self-reported race/ethnicity was recoded into 4 racial/ethnic categories: White; African American; Hispanic; and other (includes multiethnic/multiracial). Age was used as a continuous variable. Household food insufficiency over the past 12 months was measured with a 1-item screener.[26] We used a modified version of the Adverse Childhood Experiences (ACE) scale to measure exposure to 6 ACE: (1) mentally ill person in the home; (2) parent/caregiver alcoholism; (3) sexual abuse; (4) physical abuse; (5) psychological abuse; and (6) violence directed against the respondent's mother.[27] Cronbach's α was 0.74. Impulsivity was measured with a 3-item scale that has been used in previous IPV studies.[28-30] Cronbach's α was 0.79. Perceived neighborhood disorder was measured with Hill and Angel's[31] 10-item measure of neighborhood disorder. Cronbach's α was 0.88. Post-traumatic stress disorder (PTSD) was assessed with 4 items from the Primary Care Screener for PTSD.[32] A score of 3 or more is considered positive. Cronbach's α was 0.83. We created a dichotomous illicit drug use variable coded positively for participants who reported that they used amphetamines, cocaine, heroin, or pain relievers (eg, opioids) not prescribed for them in the previous 12 months. Participants were asked whether their spouse/partner used amphetamines, cocaine, heroin, or pain relievers (eg, opioids) not prescribed for them during the same timeframe. We created a dichotomous variable (spouse/partner illicit drug use), coded positively based on participant report.

Statistical Analysis

The study's initial sample size estimate called for the enrollment of 800 married, cohabiting, or dating adults (50% female). This was based on calculations that using linear regression analyses, power would be 80% to detect a small overall effect (R^2 = 0.02) with 20 predictors, α = 0.05. Power would be 85% to detect small incremental changes of adding single variables to the regression equations (ΔR^2 = 0.01) with 19 prior predictors, a prior R^2 of 0.10, and α = 0.05.

Analyses were conducted with IBM SPSS Statistics v. 25 (IBM Corp, Armonk, NY). We calculated frequencies for categorical variables and means and standard deviations for continuous variables. We stratified analyses by gender because previous findings showed significant gender differences in substance use.[33,34] We conducted chi-square tests of independence to assess the bivariate relationship between at-risk drinking/cannabis use patterns and IPV. We estimated adjusted ORs [aORs] and 95% CIs with gender-stratified multivariate logistic regression models for 2 outcomes: IPV perpetration and IPV victimization. We created a 4-level categorical variable for participants' drinking and cannabis use coded as at-risk drinking only, cannabis use only, both at-risk drinking and cannabis use, and neither at-risk drinking nor cannabis use (reference category). Because previous results showed that odds for IPV were elevated among participants whose spouses/partners were hazardous drinkers (ie, positive AUDIT-C screener),[12,20] we created a similar 4-level variable for spouse's/partner's drinking behavior and cannabis use coded as hazardous drinking only, cannabis use only, both hazardous drinking and cannabis use, and neither hazardous drinking nor cannabis use (reference category). Each multivariate model included both of these 4-level variables (ie, participants' alcohol and cannabis use; participants' description of their spouse's/partner's alcohol and cannabis use) and the following covariates previously shown to be related to IPV: demographic (age, race/ethnicity, food insufficiency) and psychosocial factors (perceived neighborhood disorder, impulsivity, ACE, PTSD), illicit drug use, and spouse/partner's illicit drug use.[12,19,20] We also included a covariate for relationship type (same-sex or heterosexual) in each multivariate model. Missing data ranged from 0% to 1.6% for the variables in the study and were dropped from the analysis through listwise deletion. The multivariate analysis is based on complete data from 464 men and 525 women.

Results

Sample characteristics by gender are shown in [Table 1]. There were significant gender differences in age, ACE, alcohol and cannabis use patterns, and illicit drug use. A greater proportion of women (5.1%) were in a same-sex relationship than men (2.3%). Bivariate analyses ([Table 2]) showed that rates of IPV perpetration and victimization differed significantly by substance use type for men and women.

The results of the multivariate models ([Table 3]) showed that women who reported at-risk drinking only, cannabis use only, or both substance use behaviors had elevated odds for IPV perpetration (Model 1) and IPV victimization (Model 2) compared with those who did not engage in at-risk drinking or cannabis use. For example, women who engaged in at-risk drinking only had a 4-fold increased odds of IPV perpetration (aOR = 4.04; 95% CI 1.80-9.06) and a more than 2-fold increased odds of IPV victimization (aOR = 2.47; 95% CI 1.06-5.77). Women who reported cannabis use only had a 3-fold increased risk for IPV perpetration (aOR = 3.45; 95% CI 1.54-7.76) and IPV victimization (aOR = 3.32; 95% CI 1.46, 7.59). The magnitude of effect for both outcomes was greatest among women who reported both cannabis and at-risk drinking. Compared with women who reported neither substance use behavior, those who reported both cannabis and at-risk drinking had an 8-fold increased odds of IPV perpetration (aOR = 8.45; 95% CI 3.52-20.28), and nearly 4-fold increased odds of IPV victimization (aOR = 3.81; 95% CI 1.55-9.32). Spouses'/partners' hazardous drinking and cannabis use patterns were not related to increased likelihood of women's IPV perpetration or victimization.

In contrast to the results seen for women, men's at-risk drinking and cannabis use patterns ([Table 4]) were not associated with their IPV perpetration (Model 1) or IPV victimization (Model 2). There were significant associations, however, between spouse/partner cannabis use and hazardous drinking patterns, as reported by men, and both IPV outcomes. For example, men who reported that their spouse/partner engaged in hazardous drinking only had a more than 2-fold increased odds of IPV perpetration (aOR = 2.69; 95% CI 1.11-6.51) and a 4-fold increased odds of IPV victimization (aOR = 4.02; 95% CI 1.92-8.45) compared with men who reported that their spouse/partner did not

engage in either substance use behavior. Men who reported that their spouse/partner used cannabis only had a more than 2-fold increased odds of IPV victimization (aOR = 2.80; 95% CI 1.19, 6.56). Magnitude of effect for IPV perpetration (aOR = 4.63; 95% CI 1.67, 12.86) and IPV victimization (aOR = 5.03; 95% CI 1.93, 13.07) was greatest among men who reported that their spouse engaged in both hazardous drinking and cannabis use.

Discussion

This study highlights the risk profiles of at-risk drinking only, cannabis use only, and both at-risk drinking and cannabis use for physical IPV perpetration and victimization among a sample of underserved urban ED patients seeking nonemergent care. The results are especially relevant for identifying those who may be at risk for IPV involvement among ED patients with lower acuity presentations. Several findings are noteworthy. The bivariate analyses showed that rates of IPV perpetration and victimization differed significantly by type of substance use behavior for men and women. In most cases, IPV rates were highest among those who reported both at-risk drinking and cannabis use and lowest among those who reported neither type of substance use. Results of the multivariate analyses, however, revealed distinct gender differences regarding hypothesized associations. For example, our expectation that study participants who report at-risk drinking only, cannabis use only, or both substance use behaviors would have elevated odds for IPV perpetration and victimization compared with those who report neither substance use behavior was confirmed for women but not for men. Similarly, our expectation that the magnitude of effect for each IPV outcome would be greater among those who reported both at-risk drinking and cannabis use was confirmed only for women. These gender differences are unexpected insofar as they run counter to findings that typically link men's substance use with IPV in community-based studies[35-38] and ED-based studies.[10,39] Despite the significant bivariate results seen for men's substance use behaviors and each IPV outcome, the logistic regression results suggest that when these associations are considered within the context of a multivariate model that accounts for other correlated factors, the associations are diminished to a nonsignificant level. The lack of significance in the multivariate model may also indicate that categorical assessment of men's substance use is not a robust enough measure to adequately capture the association. Previous analysis of the data herein, for example, found that men's frequency of intoxication was significantly associated with frequency of their past-year IPV involvement (perpetration and/or victimization).[20] Another explanation for the observed null associations between men's at-risk drinking and cannabis use and IPV in the multivariate models may be the result of underreporting of substance use behaviors, which would produce downwardly biased estimates. Alternatively, lack of heterogeneity among the sample may explain the null associations between men's IPV and their substance use.[40]

Interestingly, although men's own substance use was not associated with either IPV outcome, the multivariate results showed that their spouse's/partner's hazardous drinking and cannabis use was associated with men's IPV perpetration and victimization. For example, the findings showed that compared with men who reported that their spouse/partner did not engage in hazardous drinking or cannabis use, men whose spouses/partners engaged in hazardous drinking only had a more than 2-fold increased odds of IPV perpetration and a 4-fold increased odds of IPV victimization. Odds for IPV perpetration and victimization were most elevated among men whose spouses/partners engaged in both hazardous drinking and cannabis use. One potential explanation for these results is that women's substance use may precipitate couple conflict and, thereafter, physical aggression. This may be due in part to stigma associated with women's substance use,[41] especially heavier drinking (ie, drinking that exceeds the US dietary guidelines of 1 drink or less in a day for women, when alcohol is consumed).[42]

Limitations

The findings should be evaluated in the context of the study's limitations. First, the cross-sectional design precludes making causal inferences regarding the study's observed associations. Second, the sample was obtained from a

single urban emergency department, which may limit generalizability. Third, owing to survey time constraints, no data were collected concerning psychological abuse, injury, or sexual coercion among the participants. Fourth, a dichotomous measure of cannabis use was used in the analysis, which does not capture disordered use. The impact of this variable on IPV risk may therefore be underestimated in the analysis. Fifth, it is unknown whether participants or their spouse/partners who reported both problem drinking and cannabis use engaged in these behaviors simultaneously (ie, drank and used cannabis at the same time) and whether spouse/partners engaged in simultaneous alcohol and cannabis use. Those who engage in both behaviors at the same time, for example, may have increased likelihood of alcohol-related problems and consequences compared with those who use both substances but not at the same time.[9] Similarly, it is unknown whether participants and their spouses/partners engaged in these substance use behaviors together or independently of the other (or some combination thereof). Additional research using more granular longitudinal methods, such as ecological momentary assessment, will be needed to tease apart these effects. The participants' spouses and romantic partners weren't interviewed; absence of dyadic reports on the occurrence of IPV may result in an underestimation of IPV prevalence.[43] Finally, recall bias may have affected participants' estimation of events over the previous 12 months.

Implications for Emergency Nurses

This study has several implications for emergency clinical care. First, the results imply that a substantial proportion of married/partnered patients seeking nonemergent care in the emergency department may have experienced IPV in the past year. Although these patients may not be presenting with their chief complaint related to partner aggression, clinical staff should be aware that IPV is prevalent among urban ED patients, affects both men and women, and is often bidirectional (ie, each partner may experience perpetration and victimization).[13] Training emergency department nurses to screen patients for IPV is an important first step toward increasing IPV case identification and providing patients with appropriate referrals and resources.[44]

Second, using brief screeners to assess the patient's substance use patterns may help identify those in need of further counseling and/or referrals. For example, emergency clinical care staff can use the National Institute on Alcohol Abuse and Alcoholism–recommended single-question screener to inquire about past-year at-risk drinking: "How many times in the past year have you had X or more drinks in a day?" where X is 5 for men and 4 for women, and a response of ≥1 is considered positive.[45] Among those who screen positive, clinical care staff could use the 3-question AUDIT-C screener to further assess the patient's frequency of alcohol use and number of drinks per occasion.[24,25]

Third, cannabis use is becoming increasingly prevalent, and this trend is likely to continue as more states enact medical and recreational cannabis legalization. Clinical staff should consider asking patients about their cannabis use and should be aware that those who screen positively for at-risk drinking and use cannabis may be at elevated risk for IPV involvement. Similarly, the 1-question screener, "How many times in the past year have you used a drug or used a prescription medication for nonmedical reasons?" can be asked of patients.[46] A positive screen could be followed with asking the patient to relay the type of drug, quantity, frequency, and consequences of use.

Conclusions

Despite its limitations, this study contributes to our understanding of how at-risk drinking and cannabis use may be related to IPV perpetration and victimization among urban ED patients seeking nonemergent care. While the results varied by study participant gender, the findings indicate that at-risk drinking only, cannabis use only, and both types of substance use are linked with increased odds for each IPV outcome, with parallel findings seen for spouse/partner substance use patterns. The gender differences seen in the results warrant further investigation in future ED-based studies. The findings suggest that problem drinking and cannabis use behaviors of each member of

the couple should be considered in relation to IPV. Meanwhile, ED staff can use brief screening questions to assess the patient's at-risk drinking and cannabis use when screening patients for IPV and formulating treatment and prevention strategies.

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The authors declare that the study's protocol for the protection of human subjects was approved by the Alameda Health System Institutional Review Board. Informed consent was obtained from all study participants.

Variable	Men (n = 484) % or mean (SD)	Women (n = 550) % or mean (SD)	χ^2 or t P value*
Age	36.5 (8.2)	34.0 (8.5)	< .001
Missing = 0			
Race/ethnicity:			
Black/African American	26.2	31.3	ns
Hispanic	52.9	47.6	
Other	14.5	14.5	
White	6.4	6.5	
Missing = 0			
Relationship type			
Same-sex	2.3	5.1	< .05
Heterosexual	97.7	94.9	

Missing = 6			
Perceived neighborhood disorder	6.1 (5.4)	6.8 (5.6)	ns
Missing = 0			
Impulsivity	5.3 (2.5)	5.4 (2.6)	ns
Missing = 3			
Adverse childhood experiences	1.1 (1.4)	1.5 (1.6)	< .001
Missing = 2			
Food insufficiency	44.7	54.5	ns
Missing = 6			
PTSD positive screener	22.1	27.6	ns
Missing = 2			
Participant’s drinking and cannabis			
At-risk drinking only	21.7	11.2	< .001
Cannabis use only	17.7	14.5	
Both at-risk drinking and cannabis use	12.7	9.4	
Neither	47.8	64.8	
Missing = 12			
Illicit drug use	17.0	8.1	< .001
Missing = 8			
Spouse's/partner’s drinking and cannabis:			
Hazardous drinking only	11.3	12.9	ns
Cannabis use only	10.1	16.6	

Both hazardous drinking and cannabis use	8.0	9.6	
Neither	70.6	60.8	
Missing = 16			
Spouse's/partner's illicit drug use	4.6	6.9	ns
Missing = 17			
IPV:			
IPV Perpetration	14.6	19.3	ns
Missing = 8			
IPV Victimization	22.2	17.3	ns
Missing = 8			

Type of IPV by gender	At-risk drinking only	Cannabis use only	At-risk drinking and cannabis use	Neither at-risk drinking nor cannabis use
Men (N = 473)				
% IPV perpetration	10.9	23.5	36.1	7.5
χ^2 = 37.73, 3df, P <.001				
% IPV victimization	20.8	37.6	39.3	12.8
χ^2 = 33.48, 3df, P <.001				
Women (N = 542)				
% IPV perpetration	29.5	39.2	54.9	7.7

χ^2 = 96.54, 3df, P <.001				
% IPV victimization	23.0	39.2	41.2	7.7
χ^2 = 71.36, 3df, P <.001				

Type of substance use	IPV perpetration (Model 1)	IPV victimization (Model 2)
	aOR (95% CI)	aOR (95% CI)
Participant's drinking and cannabis:		
At-risk drinking only	4.04 (1.80-9.06)*	2.47 (1.06-5.77)†
Cannabis use only	3.45 (1.54-7.76)*	3.32 (1.46-7.59)*
Both at-risk drinking and cannabis use	8.45 (3.52-20.28)‡	3.81 (1.55-9.32)*
Neither (reference group)	1.00	1.00
Spouse's/partner's drinking and cannabis:		
Hazardous drinking only	1.12 (0.48, 2.61)	1.95 (0.85, 4.46)
Cannabis use only	1.02 (0.45, 2.31)	1.36 (0.59, 3.14)
Both hazardous drinking and cannabis use	0.77 (0.31, 1.90)	1.57 (0.63, 3.88)
Neither (reference group)	1.00	1.00

Type of substance use	IPV perpetration (Model 1)	IPV victimization (Model 2)
	aOR (95% CI)	aOR (95% CI)
Participant's drinking and cannabis:		

At-risk drinking only	1.01 (0.39-2.63)	1.50 (0.71-3.14)
Cannabis use only	1.50 (0.58-3.84)	1.62 (0.74-3.57)
Both at-risk drinking and cannabis use	2.58 (1.00-6.61)	1.16 (0.49-2.74)
Neither (reference group)	1.00	1.00
Spouse's/partner’s drinking and cannabis:		
Hazardous drinking only	2.69 (1.11-6.51)*	4.02 (1.92-8.45)†
Cannabis use only	2.40 (0.92-6.25)	2.80 (1.19-6.56)*
Both hazardous drinking and cannabis use	4.63 (1.67-12.86)‡	5.03 (1.93-13.07)‡
Neither (reference group)	1.00	1.00

DETAILS

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Ability to Care in Acute Situations—The Influence of Simulation-Based Education on New Graduate Nurses: JEN

ProQuest document link

ABSTRACT (ENGLISH)

Introduction

Simulation-based education is frequently used in transition programs for new graduate nurses. Simulation-based education is implemented as a measure to practice nursing skills, gain experience, and prepare nurses for caring in challenging situations, such as acute situations. However, concerns about the data supporting the use of simulation are obtained from small studies that do not use validated measurement scales.

Objective

This study aimed to explore the influence of simulation-based education on new graduate nurses' perceived ability to provide care in acute situations.

Methods

A total of 102 new graduate nurses participated in simulation-based education as a mandatory part of an introductory program. They completed a premeasurement and a postmeasurement using the Perception to Care in Acute Situations scale. The Wilcoxon signed-rank test and the paired samples *t* test were used to test the statistical significance of outcomes for the simulation-based education, with the alpha set at 0.05. Cohen's *d* formula was used to calculate the effect size.

Results

The Wilcoxon signed-rank test on the total scale score showed that simulation-based education resulted in a statistically significant change in the nurses' perceptions of their ability to care in acute situations (N = 99; Z = 7877; *P* < .001). The paired samples *t* test showed that the mean posteducation score was significantly higher (*P* <.001) in the total score. Cohen's *d* formula (−1.24) indicated a large effect size on the total score.

Discussion

Simulation-based education can provide an effective means of improving new graduate nurses' perceived ability to provide care in acute situations.

FULL TEXT

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Connecting the Dots! From Bench to Stretcher Side: JEN

ABSTRACT (ENGLISH)

Owing to the competition in generating knowledge based on high-level evidence and obtaining elevated journal impact factors, journals strive to publish randomized controlled trials and research-focused articles to ensure a heightened number of citations. Given the need of stretcher-side emergency nurses to hit the ground running and gain access to peer-reviewed and evidence-based knowledge, JEN has decided to shift its focus to clinically relevant articles that provide an updated review of common topics in emergency nursing. To review the author guidelines or submit a manuscript for consideration, go to https://www.jenonline.org/.Author Disclosures Conflicts of interest: none to report.Acknowledgments We acknowledge Andrew Reil, BSc, MS, Academic Development Center,

Mount Royal University, Calgary, Alberta, Canada, for figure development.

FULL TEXT

The *Journal of Emergency Nursing* (JEN) strives to support emergency nurses in everyday practice. Owing to the competition in generating knowledge based on high-level evidence and obtaining elevated journal impact factors, journals strive to publish randomized controlled trials and research-focused articles to ensure a heightened number of citations. Although this practice can be justified, it has led to a gap or disconnect between stretcher-side emergency nurses and the translation of knowledge. As we receive more feedback from JEN readers, we are deliberate about ensuring that our readership is listened to and provided with pragmatic knowledge ready to digest and apply. Given the need of stretcher-side emergency nurses to hit the ground running and gain access to peer-reviewed and evidence-based knowledge, JEN has decided to shift its focus to clinically relevant articles that provide an updated review of common topics in emergency nursing. To achieve this goal, JEN is extending the call for scholars and emergency nurses to submit papers and case studies that are relevant to their practice, which can inform and improve clinical practice. Owing to the nature of the publication process and built-in timelines, this transition of focus will not be immediately visible, but will be visible in future issues.

For nearly 50 years, JEN has served as a platform for emergency nurses as authors and readers to share vital instruction, knowledge, information, and experiences. JEN is a clinical nursing journal and is in a unique position to disseminate scholarship across the continuum of research, evidence-based practice, and quality improvement. In addition, JEN serves as a platform to disseminate practice-based emergency care solutions and innovations by publishing clinical papers, specialty section papers, clinical practice guidelines, and invited commentaries.

Over the past several years, since the onset of the COVID-19 pandemic, the world has witnessed the endurance, devotion, selflessness, and strength practiced by the health care community, emergency nurses in particular. This is in addition to the already enduring dedication and hard work that members of the emergency nursing specialty have steadfastly demonstrated as a matter of course in times less acutely challenging than these but as demanding.

In acknowledgment of JEN's longstanding respect for emergency nurses and the nursing profession, the JEN editorial team is using this opportunity to voice JEN's renewed statement of dedication to the support of these workers and to the continued provision of a platform for the advancement of the nursing profession and for each nurse's path.

JEN emergency nurse readers over the years have provided candid feedback regarding the articles they value in JEN and have communicated that they value articles by and for emergency nurses and articles directed toward the practitioner. While a new 2022 reader survey is currently in the works and the JEN staff is anticipating receiving survey feedback from JEN readers, current informal routes of communication and feedback carry the strong message that JEN readers continue to value and rely on emergency nurse–authored and emergency nurse–directed clinical care articles.

As a dedicated source for the dissemination of professional expertise, hands-on experience, lessons learned, and practice development, JEN renews its encouragement of submissions from nurse authors to inform the practice of emergency nursing. This includes welcoming section articles focusing on relevant emergency nurse experiences, advice, narratives, and shared learning opportunities.

JEN readers and authors, we ask that you share your experiences in the field and emergency practice. Sharing your knowledge, expertise, and unique experiences in the fast-paced, high-intensity emergency setting, caring for patients on what may be the worst day of their lives, strengthens the JEN mission. As the flagship publication of the Emergency Nurses Association, it is an honor to have the means to support the publication of these works. We strongly encourage you to, along with our editorial team, be an active participant in advancing emergency nursing and being a part of JEN as the pre-eminent journal for emergency nursing. To review the author guidelines or submit a manuscript for consideration, go to https://www.jenonline.org/.

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Effectiveness of 2 Pretreatment Methods in Antifogging of Goggles in a COVID-19 Isolation Ward: A Randomized Controlled Trial: JEN

ABSTRACT (ENGLISH)

Introduction

This study aimed to compare the effectiveness of the pretreatment of goggles with iodophor solution and antibacterial hand sanitizer to reduce the fogging of goggles.

Methods

A total of 90 health care workers were divided into a control group (*n* = 30), an iodophor solution group (*n* = 30), and an antibacterial hand sanitizer group (*n* = 30). This study evaluated the degree of fogging of goggles and the light transmission, comfort, eye irritation, and the impact of goggles on the medical work of staff.

Results

The antibacterial hand sanitizer group had the lowest amount of goggle fogging and the most transparent view. Participants in the control group reported the worst light transmission and comfort level, followed by the iodophor solution group. In contrast, the goggles in the antibacterial hand sanitizer group had the best light transmission and comfort level. The iodophor solution group participants reported more eye irritation. Participants in the control group reported that the goggles severely impacted their medical work, with a less severe impact reported by the iodophor solution group. The antibacterial hand sanitizer group did not report any impact on their medical work.

Discussion

When the goggles were internally coated with antibacterial hand sanitizer solution (diluted 1:1 with distilled water), the antifog effect was significant. Moreover, the goggles treated with antibacterial hand sanitizer had a clearer field of vision, were reported as non-irritating to the eyes, and significantly improved the efficiency of COVID-19 health care workers, including emergency nurses and providers.

FULL TEXT

Contribution to Emergency Nursing Practice

••Fogging of goggles can seriously affect the quality of medical work of health care staff and pose an unnecessary threat to the lives of patients.

••There is a lack of simple, effective and readily available methods to minimize and prevent the issue of goggle fogging.

••This study's findings can facilitate the prevention of fogging of medical goggles and streamline the work of nursing staff worldwide in the fight against COVID-19.

Introduction

COVID-19 is highly contagious and has spread worldwide.[1] The main transmission routes that have been identified include respiratory droplets and contact transmission. Aerosolized transmission can occur in relatively closed environments; prolonged exposure to high aerosol concentrations and general population susceptibility can increase the risk of transmission.[2,3] Viruses can be transmitted by droplets in special working environments, such as in emergency departments among emergency clinicians treating patients with COVID-19. This exposes frontline emergency care staff to severe occupational hazards. Therefore, health care workers must take strict personal protective measures to prevent COVID-19 transmission during treatment.

Typically used personal protective equipment (PPE) in China includes surgical masks, double gloves, long-sleeved overalls, and goggles.[4] Goggles are made of plastic material and play an essential role in protecting medical workers from COVID-19. They help prevent eye contact with aerosolized pathogens and are a critical barrier to break the chain of viral infection.[5] The importance of professional medical goggles for health care workers involved in the management of COVID-19 has also been highlighted in published literature.[6,7]

However, in practice, exhaled gases from health care workers can easily fog up goggles, resulting in reduced light transmission and obstructed vision. This can seriously reduce the comfort of health care workers wearing them. Further, large amounts of fogging could potentially put emergency care clinicians at a risk of making errors during emergency procedures that require the clinician to have clear and unobstructed vision. The success of procedures like endotracheal intubation, cardiopulmonary resuscitation, or the insertion of peripheral intravenous catheters depend on clinicians' ability to see clearly. Obstructed vision during these procedures could significantly affect the quality of medical care delivered and pose an unnecessary threat to patient safety.[8] The effective use of goggles is also very important for emergency nurses and providers, as they are often required to take the lead in performing life-saving medical procedures.

Unfortunately, there is a lack of simple and effective solutions to prevent the fogging of goggles. To the best of our knowledge, only a few studies with small samples (*n* 9 short reports,[10] or letters[11,12] have been published to date, and there is a lack of randomized controlled trials comparing the effectiveness of various methods of antifogging. Therefore, a randomized controlled trial was designed to innovatively compare the effectiveness of 2 pretreatment methods in reducing goggle fogging for health care workers in isolation wards. This study aimed to determine a feasible and straightforward method to prevent goggle fogging for frontline health care workers in the fight against COVID-19.

Materials and Methods Study Design

This randomized, single-blind controlled study was approved by the Ethics Committee of the 900th Hospital of the United Nations Security Forces (2021-008) and performed per the revised Declaration of Helsinki principles. Written informed consent was obtained from all participants before the study. The trial was registered in Clinical Trials.gov (registration number ChiCTR2100054392).

Setting and Participants

A total of 98 health care workers working on the frontline of the isolation ward of Wuhan Taikang Tongji COVID-19 Specialist Hospital in December 2021 were selected as study participants. As per the inclusion criteria, participants included those aged 20 to 60 years, of either sex, medical and nursing staff, and those working in the COVID-19 isolation ward and skilled in wearing protective gear and providing daily medical care for patients in isolation. Health care workers who could not wear PPE for prolonged periods (> 3 hours) were excluded.

Materials

We used 90 pairs of 3M brand (1621AF, Xuzhou Chuquan Electromechanical Technology Co, LTD, China) goggles

made of polycarbonate. The iodophor solution (item number: 29924671903, Shanghai Likang Disinfection Hi-tech Co, LTD, China) and antibacterial hand sanitizer (item number: Q/ALX42, Shandong Lilkang Medical Technology Co, LTD, China) used in this study were both products of Lilcom Medical Technology. The iodophor solution is a disinfectant solution with polyvinylpyrrolidone iodine as the main active ingredient, with an effective iodine content of 0.20% to 0.22% (Weight/Volume, W/V). Antibacterial hand sanitizer contains chlorhexidine gluconate [0.2% ± 0.02% (W/V)] as the main active ingredient.

Randomization and Interventions

This was a parallel-group randomized controlled trial in which all participants were enrolled in the same period and randomly allocated to 3 different groups at the same time for the same duration of follow-up. Using computer-generated randomization codes provided by laboratory biostatisticians, a simple randomization procedure was used to assign participants to 3 single-blind (participants were blinded) treatment groups in a ratio of 1:1:1. The 90 codes corresponded to 90 participants who were randomly sorted into 3 groups of 30 participants. The code was kept by the researcher involved in the evaluation of the effects of the trial, who provided the pretreated goggles to participants, with each goggle package consecutively numbered and prepared according to the randomization scheme.[13,14]

A total of 90 health care workers were divided into 3 groups. These were the control group (goggles were coated with distilled water, $n = 30$), iodophor solution group (goggles were coated with iodophor solution, $n = 30$), and antibacterial hand sanitizer group (goggles were coated with antibacterial hand sanitizer and distilled water, mixed at a 1:1 ratio, $n = 30$).[9-12]

The pretreatment of the goggles was conducted by a dedicated group who were trained in advance to ensure uniform coating for each pair of goggles. The training covered ratios, volumes and drying methods for pretreating goggles. The 3 standard sets of pretreatments for goggles were derived from the results of several pretests and clinical experience. For the control group, 2 mL of distilled water was used to coat the inner side of the goggles and a hairdryer was used (Philips, power 1000 Watts, low speed, 30 seconds) to dry them. For the iodophor solution group, an iodophor solution was used to coat the inner side of the goggles. A dry cotton ball with 1 to 2 mL of iodophor solution was used to apply a thin layer. Further, the inner surface of the goggles was coated evenly at various locations, taking care not to apply it too thickly so as to prevent any impact on vision and staining of the goggles. A hairdryer was used to dry the goggles after applying the solution. For the hand sanitizer group, antibacterial hand sanitizer solution was diluted with 1 mL of distilled water at a ratio of 1:1 to coat the goggles.[15] Dry cotton balls were used to apply an appropriate amount of antibacterial hand sanitizer, creating a thin layer. Application of the solutions with dry cotton balls ensured even coverage across the entire surface of goggles and that the line of sight was not affected by excess solution in the form of droplets. Following application, the goggles were also dried with a hairdryer and then considered ready to use.

Group participants did not know which group they would be assigned to or which antifog treatment method would be more effective. The 3 groups of participants used goggles with 3 different pretreatments on the same working day and wore the goggles for 4 hours per shift. Goggles were not to be removed until the end of the trial, which was the end of the participants' 4-hour shifts. There were no significant differences in the temperature and humidity of the working environment among the 3 groups during the day of trial (the temperature in the isolation ward was maintained at 22 °C-24 °C and the humidity at 40%-60%). All participants wore their goggles following the COVID-19 protocols for donning and doffing PPE.[16]

Assessments Goggle Fogging Level

The primary outcome measure of this study was the degree of fogging of goggles. The degree of fogging of the

goggles was divided into 4 grades (Figure 1): fog that covered 80% of the goggle area. At the end of the 4 hours of medical work, the goggle fogging grading of the 3 groups of health care workers involved in the study was judged, photographed, and recorded. The locations were photographed with consistent light levels and the same brand of camera (D750; Nikon camera, Japan). Photographs were taken within 2 minutes of participants removing their goggles. Nine assessors were trained to score the fogging immediately after taking the photographs. At the end, one dedicated inspector checked the scores against the goggle fogging photos.

Questionnaire

A questionnaire (see Appendix) was orally administered to all 3 groups of health care professionals immediately after the trial by one dedicated person (after wearing the goggles for 4 hours). This researcher-designed questionnaire was pretested with nurses working in isolation wards (these nurses were not involved in the formal trial) and revised accordingly before implementation. The survey included participant-reported light transmission of the goggles, comfort of wearing the goggles, goggle irritation to the eyes, and whether the goggles had any impact on medical practice (also participant-reported). The 3 groups of health care professionals rated the above 4 measures according to their perception: 10 = very good light transmission, very comfortable, no irritation to the eyes, and no impact on any medical work/patient care; 7 to 9 = good light transmission, comfortable to wear, less irritation to the eyes, and no effect on general medical work/patient care work; 4 to 6 = poor light transmission, average comfort, significant irritation to the eyes, and a small-scale impact on medical work/patient care; and 0 to 3 = very poor light transmission, incredibly uncomfortable to wear, severe irritation to the eyes, and profound implications for medical work/patient care. Eye irritation scores are inversely proportional (lower numbers indicate higher levels of irritation). The highest score possible for the 4 items is 40, with higher scores representing better overall results and satisfaction.

Statistical Analyses

The sample size was calculated using A'Hern's single-group phase 2 method. With a deviation estimate of 7% obtained from a preliminary experimental result, we estimated that 28 patients in each group would be required, for a total of 84 participants ($\alpha = 0.05$, $\beta = 0.1$). To account for a potential dropout rate of 10%, we aimed to enroll more than 90 participants. All experimental data were statistically analyzed using SPSS Windows software version 25.0 (Chicago, IL). For baseline characteristics of participants, the mean and SD were used to describe the degree of sample variation among the groups. The chi-square test for experimental normally distributed measures was performed using Levene's test (0.05). One-way analysis of varience and Fisher's least significant difference tests were used for the sample mean in each group that met the requirements of the chi-square test. The Kruskal–Wallis H tests measured data that did not meet the requirements of the chi-square test. The experimental data were expressed as mean (SD), and *P* **Results Study Population**

Initially, 96 health care workers working in the frontline of the isolation ward were included. Six of them were later excluded based on the inclusion criteria (self-reported inability to wear goggles and strict PPE for more than 4 hours, possible discomforts such as vomiting and vertigo). Finally, 90 participants were randomly allocated to 3 groups: control (distilled water, $n = 30$), iodophor solution ($n = 30$), and antibacterial hand sanitizer ($n = 30$). Health care professionals in all 3 study groups completed the trial successfully (Figure 2). Baseline characteristics of participants were similar in the 3 groups (Table 1).

Comparison of the Degree of Fogging of Goggles Among the 3 Groups of Health Care Workers

The fogging levels of goggles were measured by a trained researcher and compared among the 3 groups of participants after 4 hours of wear. The photographed comparison chart (Figure 3) shows that the degree of fogging of the goggles differed significantly among the 3 groups. The goggles worn by participants in the control group were

tinted with distilled water, almost entirely fogged and severely impeded participants' visual field (Figure 3A). In the iodophor solution group, the fogging was reduced compared with the control group (Figure 3B), but the visual field was still affected. The goggles in the antibacterial hand sanitizer group showed almost no fogging and the visual field was bright and clear (Figure 3C).

The degree of fogging of the goggles among the 3 groups was further quantified and analyzed, as shown in Table 2. There was an increase in the number of cases where the proportion of goggles fogged 2 = 17.917, *P* 2 = 9.144, *P* = .003). When comparing the number of goggles covering 50% to 80% of the area (moderate fogging) in the 3 groups, the number of cases was similar and not statistically different (χ^2 = 3.621, *P* = .164). The number of goggles with > 80% fog coverage (heavy fogging) was significantly lower in the antibacterial hand sanitizer group than in the control group (χ^2 = 26.667, *P* **Questionnaire Results**

A researcher-designed questionnaire was orally administered to each of the 3 groups of health care workers at the end of the trial. The results of the questionnaire are shown in Figure 4. When comparing the light transmission and comfort level of the goggles among the 3 groups, the control group reported the worst light transmission and the lowest comfort level. The iodophor solution group reported improved light transmission (F = 3.379, *P* Figure 4A) and comfort compared with the control group (F = 1.483, *P* Figure 4B). The antibacterial hand sanitizer group reported the best light transmission (vs control, F = 6.103, *P* P Figure 4A) and the best comfort level (vs control, F = 5.448, *P* P Figure 4B) of the goggles, with statistically significant differences compared with the other 2 groups. On comparing reported levels of eye irritation among the 3 groups, participants who wore the goggles treated with distilled water and antibacterial hand sanitizer reported little to no eye irritation (control vs antibacterial hand sanitizer, F = 0.517, *P* > .05; Figure 4C). The iodophor solution group reported more irritation to the eyes than the other 2 groups (vs control, F = −5.069, *P* P Figure 4C).

Finally, the 3 groups of clinical staff rated whether the different treatments of goggles interfered with medical care. Lower rating levels indicated higher interference. The control group reported the lowest rating and reported the highest interference with medical care related to fogging, indicating severe interference with medical care. The iodophor group reported a better rating than the control group (F = 4.464, *P* Figure 4D). The antibacterial hand sanitizer group reported the highest rating compared with the other 2 groups. The antibacterial hand sanitizer did not interfere with medical care (vs control, F = 6.500, *P* P Figure 4D). Our dedicated statistician summed the 4 scores above, which revealed that the control group had the lowest overall score and the iodophor solution group had a better overall score than the control group (F = 4.1786, *P* Figure 4E). However, the antibacterial hand sanitizer group had the highest overall score, significantly better than the other 2 groups (vs control, F = 17.4643, *P* P Figure 4E).

Discussion

Our innovative study was designed as a randomized, single-blind controlled study. Frontline clinicians caring for COVID-19 patients wore goggles pretreated with 3 solutions (distilled water, iodophor solution, and antibacterial hand sanitizer) to measure the fogging of the goggles. The results of our study suggest that goggles pretreated with the antibacterial hand sanitizer (diluted with distilled water at a 1:1 ratio) were the most effective at preventing fogging after 4 hours.

Numerous reports claim that the eyes may be the gateway for COVID-19 to invade the body and that the virus can cause infection through the conjunctiva.[17,18] One of the current requirements of the Chinese government for medical staff caring for patients infected with COVID-19 is to maintain eye protection. In China, wearing goggles is an integral part of the daily routine of health care workers in the COVID-19 ward. In addition, the more acutely ill and infectious patients are admitted to isolation wards, so clinical staff working in isolation wards are required by the

government to use goggles rather than face shields. Adequate safety measures to avoid exposing the eyes to hazardous environments can effectively interrupt the spread of COVID-19 and protect emergency clinicians on the front lines performing endotracheal intubation, cardiopulmonary resuscitation, and other life-saving medical procedures.[5]

However, the goggles currently used can easily fog, creating issues for staff during their clinical work. Owing to temperature differences between the inner and outer surfaces of the goggles, moist, warm air emitted from staff during respiration can condense into tiny droplets on the inner surface, which obscures the clarity and visibility of the goggles and can seriously compromise the safety of patient care.[19] In addition, the fogging of goggles can blur the vision of the clinician.[20] Some health care workers may also experience eye strain, dizziness, nausea, and vomiting, which directly affect the efficiency and safety of health care workers.[13] Effectively preventing fogging of goggles can enhance the protection of health care workers caring for patients acutely infected with COVID-19.

Few studies have been conducted on antifogging measures for goggles worn during COVID-19. Provided that COVID-19 is still widespread worldwide,[21] there is an urgent need for effective antifogging measures of goggles. One study, which interviewed health care workers and searched databases, concluded that using washing-up liquid or hand sanitizer is the most effective method for preventing goggles from fogging.[12] However, the above findings are empirical attempts,[9-11] and there are no randomized controlled trials on the effectiveness of several pretreatment methods to reduce goggle fogging. Antifogging agents and detergents used for swimming goggles may also be effective for medical goggles.[10,22] However, these antifog sprays need to be purchased separately, may be cost prohibitive,[10] and may not be readily available or feasible to purchase in rural or under-resourced settings. In the hospital/unit of study, antifog sprays were not commonly available or in stock and were not easily accessible. Therefore, iodophor solution and antibacterial hand sanitizer were compared in this study, as both items were easily accessible in the COVID-19 wards.

In our study, both iodophor solution and antibacterial hand sanitizer showed more effective antifogging than the control group (distilled water). The main component of the iodophor solution is polyvinylpyrrolidone iodine, which is smooth. It can form a protective film on the surface to provide an antifogging effect and is more commonly used in laparoscopic lens antifogging.[23] However, in the application of iodine for laparoscopic antifogging, it was found that there may be several problems after iodophor solution application: (1) this method is effective for antifogging for the first 30 minutes after application, but the effect is poor after 30 minutes; (2) iodophor solution is a colored liquid, which may affect the operator's judgment of the color of intra-abdominal organs when providing clinical care; (3) this method is not suitable for people who are allergic to iodine. Our study confirmed the above problems when using iodine-treated goggles. In this study, pretreatment of the goggles with iodophor solution prevented fogging of the goggles for a brief period. However, as the working time increased (generally after 2 hours), participants reported the iodophor solution coated goggles gradually fogged up. The reason for this may be that the active ingredients of the iodophor solution evaporate, resulting in poor light transmission and visual field loss. Our study also found that the goggles had a teal color after the application of iodine vapor, which affected the vision of the medical staff. Notably, the goggles were found to irritate the eyes after the application of iodine vapor, further aggravating the discomfort of the health care staff and thus affecting their medical work. Contrastingly, the main ingredient of antibacterial hand sanitizer is chlorhexidine gluconate. It is a surfactant that reduces the surface tension of water droplets, provides an antifog effect when applied to goggles, and has non-volatile properties.[24] In our study, the antifog effect and antifogging time of goggles which were internally coated with antibacterial hand sanitizer were significantly better than that in the iodine voltage-coated group. It is also relatively inexpensive and simple to use, and the treated goggles have good transparency, less impact on vision, and were reported to be gentle and non-

irritating by the participants. Notably, one of the non-negligible advantages of pretreating goggles with antibacterial hand sanitizer diluted with distilled water is that the material is readily available in the hospital environment and easily accepted and used by health care workers.

Strengths

It is worth mentioning that our study tested a solution that is readily available in most health care facilities that may allow clinical staff to wear goggles continuously for a 4-hour work period. Test intervals of various time lengths have been implemented in existing studies to assess the effect of different pretreatment methods on fogging of goggles.[15] The reason we designed the goggles to be worn for 4 hours is based on the shifts (4 hours in the morning and 4 hours in the afternoon) that Chinese hospital staff work in isolation wards. We designed this trial to investigate a more suitable method of preventing goggle fogging for our specific working hours. In the future, we will consider further modifying the study protocol to consider the effects of time intervals and different roles and workloads on goggle fogging.

Limitations

There are some limitations to this study. For example, this was a single-center clinical study with a small sample size (n = 90). Therefore, a multi-center, large sample clinical study is needed to further validate the antifog effect of antibacterial hand sanitizer on goggles. We designed the trial with the intention of enrolling an all-nurse sample, but during recruitment, we were unable to recruit sufficient numbers of eligible nurses. In order to further investigate the antifog effect of different solutions in different roles and divisions of work, the target group was modified to include providers in addition to nurses. This study is part of a larger research project, which will be followed by a study on the development and application of functional protective gear specifically for nurses. It is notable that our sample contained primarily emergency nurses and providers (Figure 5). Moreover, since this study was performed to determine the single-time use of different agents, the effect on glasses with regular use needs to be studied with longer follow-up. The fogging degree can also be impacted by perspiration from the participants. Strenuous or high workloads in the isolation ward may have influenced our results. Although we have tried to ensure consistency in the nature of work of the participants (all work in the COVID-19 isolation ward), a participant's workload is likely to be affected by their role (Figure 5).

Implications for Emergency Nurses

Our study has important implications in an emergency clinical practice setting. In the context of the current global epidemic of COVID-19, the number of seriously ill patients continues to increase worldwide. Health care professionals, especially emergency nursing staff, need to be able to safely and efficiently practice on the front lines. The fogging of goggles significantly impedes patient care. This finding of our study can help prevent the fogging of medical goggles and facilitate the work of health care workers worldwide in the fight against COVID-19, especially for emergency nurses and providers who need to wear goggles for extended periods of time.

Conclusion

In summary, in the practical application of COVID-19 medical work, the use of antibacterial hand sanitizer (with chlorhexidine gluconate as the main active ingredient) diluted at a ratio of 1:1 with distilled water and internally applied to goggles was effective in preventing fogging compared with iodine and distilled water alone. Frontline clinical staff reported a clearer view through their goggles after using goggles treated with antibacterial hand sanitizer diluted with distilled water. In addition, because of easy access to the materials involved, this method is easily accessible to clinical staff and could be easily reproduced in other clinical settings.

Data Availability Statement

All data generated or analyzed during this study can be made available. Further enquiries can be directed to the

corresponding author.

Statement of Ethics

This study was approved by the Ethics Committee of the 900 Hospital of the Joint Logistics Team (2021-008) and performed per the revised Declaration of Helsinki principles. The trial has been registered in ClinicalTrials.gov (registration number ChiCTR2100054392).

Author Disclosure

Conflicts of interest: none to report.

This study protocol was approved by the Military Biosecurity Research Special Program (20SWAQK48). Hubei Wuhan Anti-epidemic Special (TKTJKY2020050). 900th Hospital Clinical Application Research Special (2020L041).

Appendix

Questionnaire on fogging of 3 goggle pretreatment methods in isolation area

1. What is your gender

2. A. Male B. Female

2.

What is your professional role

•A. Doctor B. Nurse

3.

Your age

4.

Your length of time employed

5.

What is your highest educational background

•A. Master degree or above

•B. Undergraduate degree

•C. Junior college

•D. High school / technical secondary school and below

6.

How long do you wear goggles at one time (hour)

•A. 1-2 hours B. 3-4 hours C. 5-6 hours D. more than 6 hours

7.

Is there fog when wearing goggles?

•A. Yes B. No

8.

When does fogging start while wearing goggles?

•A. 0-1 hour B. 1-2 hours C. 2-3 hours D. 3-4 hours E. more than 4 hours

9.

Is wearing goggles irritating to the eyes?

•A. Yes B. No

10.

What is your comfort score when wearing goggles?

•(10 points: very comfortable without affecting any medical care work;

•7-9 is relatively comfortable, and the general medical care work is not affected;

•4-6 moderate comfort, affecting a small part of medical care work,

•1-3 uncomfortable, seriously affecting medical care;

•0 is very uncomfortable, which completely affects the medical and nursing work)

•Comfort level

•10 9 8 7 6 5 4 3 2 1 0

11.

What is your professional title?

Characteristics	Control group, (n = 30); n (%)/mean (SD)	Iodophor solution group, (n = 30); n (%)/mean (SD)	Antibacterial hand sanitizer group, (n = 30); n (%)/mean (SD)
Male sex, n (%)	12 (40)	9 (30)	13 (43)
Age (y)	37.3 (4.2)	35.2 (4.7)	35.9 (3.7)
Professional category			
Nurse	9 (30)	8 (27)	11 (37)
Nurse practitioner	2 (7)	2 (7)	3 (10)
Charge nurse	3 (10)	4 (13)	4 (13)
Associate chief nurse	3 (10)	2 (7)	3 (10)
Chief nurse	1 (3)	0 (0)	1 (3)

Doctor	21 (70)	22 (73)	19 (63)
Resident doctor	2 (7)	2 (7)	3 (10)
Attending doctor	8 (26)	9 (30)	8 (26)
Associate chief doctor	6 (20)	8 (26)	5 (17)
Chief doctor	5 (17)	3 (10)	3 (10)
Years of working experience			
< 10 y	11 (37)	10 (33)	13 (43)
≥ 10 y	19 (63)	20 (67)	17 (57)

Area	Control group, (n = 30), n (%)	Iodophor solution group, (n = 30), n (%)	Antibacterial hand sanitizer group, (n = 30), n (%)	χ^2	P value
Dense fog covers <30% of the goggle area	0 (0)	5 (17)*	13 (43)†‡	17.917	.000
Dense fog covers 30%-50% of the goggle area	2 (7)	8 (27)*	12 (40)*	9.144	.003
Dense fog covers 50%-80% of the goggle area	9 (30)	10 (33)	4 (14)	3.621	.164
Dense fog covers >80% of the goggle area	19 (63)	7 (23)*	1 (3)†‡	26.667	.000

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Improving Timeliness of Pediatric Emergency Department Admissions: JEN

ABSTRACT (ENGLISH)

Introduction

The goal of this quality improvement project was to improve timing, communication, and continued care for pediatric patients who present to the emergency department at a Level I pediatric trauma center and require inpatient admission.

Methods

Using continuous improvement methodology, a patient flow process was created to improve the throughput of pediatric patients requiring inpatient admission from the emergency department, aimed at decreasing the time from decision to admit to actual admission. The new workflow included ED and inpatient nursing collaboration, with nursing leaders coordinating patient transfer.

Results

Baseline data indicated that, in 2019, patients admitted to a short-stay pediatric unit from the emergency department had an average time of 106.8 minutes from decision to admit to the actual admission. After the implementation of a new admission process, time from decision to admit to actual admission decreased from a mean of 106.8 minutes to 82.84 minutes for patients admitted to a short-stay unit. This illustrates an improvement from 59.75% to 68.75% of patients admitted within 60 minutes from ED admission to arrival on a short-stay unit. This model was then replicated throughout other units in the hospital.

Discussion

There are no known benchmark data to guide practice for rapid admission from the pediatric emergency department to inpatient units and continuing care. This quality improvement project demonstrates a model that has been successful admitting patients in an efficient, time-controlled manner. Additional research is needed to document benchmarks for admission timing and to demonstrate other measurable outcomes in patient care.

FULL TEXT

Contribution to Emergency Nursing Practice

••What is already known about this topic? Despite the importance of continuation of care following ED evaluation, there is sparsely documented information about timeliness for admission and no data exist to document ideal admission time frame.

••What does this paper add to the currently published literature? Outcome data regarding adult patients have been published. This paper is a novel approach to addressing movement from the ED to inpatient care for pediatric patients, thus ensuring appropriate continuity of care, especially for acute and critically ill children.

••What is the most important implication for clinical practice? A standardized practice for patients being admitted to inpatient units from the ED was initiated and improved timing from decision to admit by a mean of 24 minutes.

Background

Our hospital is a large pediatric hospital located in the mid-Atlantic area of the United States. It is part of a larger children's health system with primary and specialty services in the Northeast and in Florida. It includes the only Level I pediatric emergency department (ED) and Level I pediatric trauma center in the state, which typically provide services for more than 60,000 patients over the course of a year and offer care to the most vulnerable patients and families. Critical for patient care, the flow of patients through the emergency department is also vitally important for access to care, affecting the patient experience and the nursing practice environment.[1,2] Organizational data indicated an increase in the number of patients being held in the emergency department as a barrier to patient disposition across the continuum of care. As noted in January 2019, 61.1% of our patients did not reach the inpatient units within 60 minutes of being ready for transfer. Between January and December of 2019, before implementation of improvement interventions, the mean time from patient readiness to arrival on the unit was 122.49 minutes. A lack of a standardized process was noted as the main barrier to meeting our target.

Problem Identification

Patients at our pediatric hospital can access care at multiple locations, including the emergency department. Our department has prioritized flow within the department, as well as during patient disposition. Our ED flow consists of patient arrival, initial assessment, treatment, reassessment, and disposition. These processes contribute to satisfaction and overall successful patient care outcomes. When demand exceeds capacity, patients determined to need admission occupy ED space and flow is interrupted, leading to dissatisfaction and the inability to serve other patients requiring emergent care.[1,3,4] Patients who are unable to progress through to the intended admission location are then held within the emergency department to continue care, which is not ideal for patients or their providers. An evidence-based process was needed to assure a seamless transition for patients admitted from the emergency department.

Review of current protocols and creation of best practices for ED flow were included in the consideration of the emergency department's ability to transfer patients for continued care. Communication and data documentation were extremely important starting points. During daily management huddle, emergency clinical nurses and other emergency care team members raised concerns regarding the ED front-end process and control over the patient care they provide. With the emergency department being a high-volume, high-acuity, fast-paced care environment, multiple competing processes may cause poor patient flow. This results in the inability to consistently locate patients for "next steps" in care and for staff to have control over the environment where they provide care. Multiple patient arrivals at the same time caused bottlenecks resulting in unnecessary patient movement and potential obstruction to disposition decisions.[5]

In 2015, the ED team introduced the concept of immediate rooming when rooms are available and revamped the front-end process for when rooms are not available, with a goal to have patients in rooms and the bedside care team and support staff interacting with the patient within 15 minutes of arrival.[4,6] Other goals, which were achieved, included reducing patient travel from a maximum of 9 stopping points to 6 when no rooms in the emergency department were available (Table 1), finding the correct patient in the ED waiting room 100% of the time, and limiting duplicative staff interaction with the primary care team. Achieving these goals streamlined communication, improving care for the patient/family while increasing efficiency of staff. The percentage of patients placed in rooms within 15 minutes increased from 59% to 85% overall and increased to 95% when a room was readily available.

Management of the internal ED patient flow led to the next challenge of improving flow to inpatient areas of the hospital, which was the emphasis for this quality improvement (QI) project. We considered acuity of illness, risk of deterioration in status, and opportunity to provide inpatient and specialty services. This important goal was incorporated in the Nursing Strategic Plan, with an initial goal of decreasing the length of stay (LOS) within the emergency department but to then improve the overall satisfaction of patients and families across the continuum of care. A primary strategic goal alignment was for 65% of patients arriving on the inpatient units within 60 minutes from their baseline time of "patient ready" in the hospital electronic health record. Determining methods to succeed with this process was the problem identified and addressed through QI methodology.

Available Knowledge

The Centers for Disease Control and Prevention reports a total of 130 million ED visits per year, with 12.4% of these resulting in hospital admission.[7] In both adult and pediatric hospitals, approximately 70% of hospital admissions come from the emergency department. In pediatric hospitals, 10% of all ED visits result in admission.[8] In 2018, the national median time interval from decision to admit to hospital admission across all EDs reporting was 116 minutes, but this represents only a small percentage of emergency departments and does not differentiate hospital type, patient characteristics, or geographical locations, especially urban versus rural.[8]

A substantial percentage of patients admitted to inpatient units come from the emergency department, which means patient flow within the emergency department and outside of the emergency department is extremely important, but there are no universal guidelines nor benchmarks available to gauge patient movement across hospital areas.[2,9] Models to improve throughput in the emergency department itself, especially from the waiting room to initial care, and to streamline admission to critical care units across all populations have been published.[9-13] Communication, as a critical part of handoff, and the ability of the ED staff to recognize and predict acute and critically ill patients are other aspects of study.[14] However, we were unable to find data that present appropriate or recommended timing of ED patients admitted to inpatient areas. In most cases, this concept is measured by family satisfaction with ED care and access to care, specifically.[15]

Patient handoff is a comprehensive process associated with ED LOS and an important component to guarantee an efficient inpatient admission.[9,14,16] Communication is key to smooth transfer from one unit to another, especially for ED patients who are admitted with various levels of complexity.[17] One hospital used a conference call approach to disseminate information for pediatric patients who were moving from the emergency department.[14] An electronic version of Situation, Background, Assessment, Recommendation was used by an emergency department for the inpatient nurse to view patient data and then call the emergency department for additional details.[18] Wolak et al[9] published results of changing handoff processes, also using Situation, Background, Assessment, Recommendation, for patients admitted to inpatient areas. This adult-focused study noted an average LOS of 154 minutes from time to admit decision.

Prediction of ED patient risks for admission and for deterioration in status has been studied, but primarily focused on individual hospitals/organizations.[10,11,19,20] Patient acuity on admission from the emergency department is another discussion point. Nadeau et al[11] conducted a retrospective review of pediatric patients admitted to 1 inpatient unit and then transferred to an intensive care unit (ICU) within 24 hours. Of 82,397 admitted patients, 1% were transferred to the ICU. Another study in a large Canadian hospital attempted to decrease the incidence of rapid response calls that required transfer to the ICU. The study focused on adult patients admitted to inpatient units from the emergency department within 24 hours. The authors used a Modified Early Warning Score along with other patient characteristics such as presence of a Foley catheter to predict risk at time of admission.[13] These studies reinforce the need for patient risk identification and admission to an appropriate unit in a timely manner from the

emergency department. Barak-Corren et al[21] presented a multivariate prediction model that along with specific patient characteristics, including previous admissions, current medications, and ED risk acuity scoring, can predict the need for hospitalization of patients arriving to the emergency department as early as 10 minutes from check-in. This type of prediction assists in getting patients to the correct level and environment of care and is also helpful for the purpose of admission planning and decreasing the total LOS in the emergency department.[21] Rowland et al[22] described a similar predictive model for children admitted to nonspecialist hospitals in England, called the Pediatric Admission Guidance in the ED score, which assists in determining risk for admission. Similar to other published prediction models, this one also used a quantifying method to document potential for admission. An adult model focused on improving discharge times of inpatients to have available beds for ED admissions.[12] Obviously, providing health care in an efficient manner in any setting is important, but care in the emergency department is unique given that many patients presenting there are not previously known by providers or staff, acuity can change momentarily, and decisions for disposition can take extended periods of time.

Despite the availability of rapid access to care in the emergency department and accurate patient acuity evaluation, attention to timing of transfer to inpatient units has not been a priority in research. However, it is essential to improve access for patients waiting in the emergency department for continuation of care, considering the lack of resources ED providers have to provide inpatient care. Streamlining admission from the emergency department to the ICU or a medical-surgical unit is critical.[10,23]

Methods

To address the throughput in the emergency department and from the emergency department, a patient flow process improvement event was held using continuous improvement efforts. A continuous improvement event uses a QI structure that does not require institutional review board approval, given that it does not include development, testing, or evaluation involving human subjects. However, a query was submitted to the institutional review board at our institution, and they concluded that the project was not research. The data obtained for this project were de-identified and aggregate, and the results are not considered generalizable. This event emphasized the need to align with previous ED improvement efforts.

An interprofessional team with emergency clinical nurse participation completed an analysis of the flow of patients to the inpatient units, noting barriers within this environment, which included lack of a standard process, absence of visual indicators, and fragmented communication between teams. Process mapping was the tool used to outline results with the goal of disposition of patients within 60 minutes of the decision to admit, and an admission model (Table 2) was created to include specific steps to support improving patient flow on admission. Once the new process was implemented, barriers were discussed daily at the Patient Care Services huddle to improve communication, using daily visual data metrics and huddle discussion to monitor success and to escalate noted opportunities. High inpatient volume throughout the hospital limited the initial success of the admission model. Teams were encouraged to escalate barriers in real time. The most common barrier that was escalated was related to bed availability because of high inpatient census. Daily metrics were provided for nursing leadership and ED clinical teams to assess and measure success and to document trends in barriers. Trending issues allowed the team to identify ongoing issues, such as extended length of time for inpatient room turnover.

Once the potential new process was outlined, a unit known as 4 West, a fast-paced, short-stay unit, was chosen as the pilot unit to implement the new emergency department to inpatient model. The 4 West patient flow supervisor, a designated lead and expert nurse, had the task of collaborating with the interdisciplinary team to coordinate patient flow and adjust resources to ensure optimal care delivery and continuum of care. The patient flow supervisor played a vital role in the process of admitting and discharging patients, ultimately guiding throughput of patients admitted

from the emergency department. Direct communication between the emergency department and the receiving unit was instrumental in early identification and planning for patients. Given that our short-stay area is a fast-paced unit, with continuous admission and discharge expectations, it proved the best place to pilot the change with the end goal of rolling out the tested admission goal and admission process to the remainder of the medical-surgical inpatient units.

Efficiency added to the quality outcomes of this admission model; therefore, patients arriving from the emergency department were given a “reservation” or pull time when “ED ready to admit” was identified through the electronic health record. The emergency department and unit-based nurses determined a time when they would complete a handoff at the patient bedside in the emergency department to exchange this information. Although bedside handoff is a standard within our organization, completing the handoff in the emergency department was a new outcome as a result of this project. The nurses met in the ED patient room, and the medical-surgical nurse received a standardized report, performed a safety check with Pediatric Early Warning Score[24] assessment, and transported the patient back to the floor. The Pediatric Early Warning Score is a severity of illness score developed for hospitalized children, which provides objective patient criteria and allows for early identification of patients at risk for cardiopulmonary arrest.[24] Completing this assessment decreased the frequency of unnecessary rapid response team calls and transfer of newly admitted patients to an ICU within our organization.

Evaluation of the pilot for transition of pediatric ED patients revealed that, in 2019, 59.75% of patients were admitted within 60 minutes. Once we successfully and efficiently placed patients in ED rooms and demonstrated a decrease in inpatient admission timing, the QI group decided to introduce this model to other units within the hospital, with the intention of all units participating in the same admission process as ED patients.

Assumptions included the fact that streamlined inpatient care can decrease incidents, flawless communication ensures continuity of care, and shortened stays in the emergency department result in more efficient inpatient services. Evaluation of patient and family experience was linked to improving “likelihood to recommend” scores, supporting the enterprise’s vision, and assisting in maintaining patient location within the only children’s hospital in the state. The nursing department strategic plan incorporated the goals of decreasing LOS within the emergency department and improving satisfaction of patients and families across the continuum of care. Real-time, daily metrics continued to provide nursing leadership and clinical teams success stories and the opportunity to address barriers and continue to improve processes.

Results

Aggregate data comprised a population of pediatric patients ranging from 0 to 21 years of age admitted from the emergency department to medical-surgical and critical care units. Figure indicates the percentage of patients deemed ready to admit and physically transferred to the inpatient unit within 60 minutes of this decision. The improvements in the admission model, a registered nurse–initiated “pull process,” reservation time, and a coordinated handoff led to a significant decrease in overall admission time. Admission time is also illustrated in Figure, documenting an improvement from 38.9% to 80.0% of patients who were ready for admission to arrival within unit within 60 minutes from January 2019 to January 2021. This represents an overall improvement of 41.1%.

Before the implementation of the improvements outlined in the article, the mean transfer time from the emergency department to the inpatient unit was 122.49 minutes (January to December 2019); postimplementation the mean time was 83.63 minutes (January to December 2020), a difference of 39 minutes. These data indicate overall improvement, but there is no information that supports what an “ideal” admission time frame is nor what patient outcomes improve as a result. A visual cue provided by our electronic medical record created a signal that offered the largest improvement in visibility.

Discussion

The coronavirus disease 2019 (COVID-19) pandemic has wreaked havoc in the emergency department across both pediatric and adult patient populations. Early in the pandemic months, “lockdowns” resulted in an overall decrease in communicable diseases among children, so emergency departments in children’s hospitals were operating at a much slower pace and inpatient admissions were limited by several variables including suspension of nonurgent surgical procedures.[25,26] Overall volume within our department decreased by 33% during this time frame. This project was started before the COVID-19 pandemic, so results obtained between preproject and postproject may not fully represent the “typical” ED patient flow for this institution, which was described early in the article. An annual ED census of 60,000 patients does not normally mean 168 patients per day, given that fluctuations have always included “seasonal” pediatric problems. Although adult hospital emergency departments were overflowing, pediatric emergency departments were slower but quickly escalated to much higher daily census. At times, 1.5 times as many patients per day were seen in our hospital as previously at the same time of year, despite Centers for Disease Control and Prevention data that indicate that pediatric ED volumes did not increase over 2019.[27] In latter months of the pandemic, pediatric hospitals also experienced nursing shortages, with excessive turnover in staff, and these hospitals have different issues when hiring new staff than their adult counterparts. Nurses experienced in adult care can move between institutions and require less orientation than adult-trained nurses who are moving to a pediatric hospital, which was sometimes the case at our institution, adding another barrier to ED patient flow during this past year.

As we continue to collect data on the average time to admit from the emergency department, many variables must be considered, some of which were not in place before January 2020. The members of the team who created this new model of care were successful, despite many variables beyond their control.

Limitations

As previously mentioned, the COVID-19 pandemic may have affected the design of this process and should be considered a potential limitation. An additional limitation of this study was the use of data from only 1 children’s health care system, which could result in bias and impede applicability and reproducibility of the methods for other institutions. The QI methodology does not support the ability for the data to be generalized in any setting; it only provides a framework for the process. In addition, this study measured time frame only; it did not document other patient outcomes. Patient acuity data were also not collected, which could assist in determining if rapid, streamlined admission from the emergency department increases the opportunity to efficiently identify and address deterioration in status. Seasonal shifts in acuity and volume of ED patients are also factors that are not easy to control. In times of exceedingly high inpatient census, the emergency department can be used as an inpatient “hold” area, which philosophically eliminates aims to provide care in the best possible environment by the most qualified providers. Unfortunately, there are no benchmark data to compare results or ideal metrics to continue to aim to achieve. There also may be different perspectives between adult and pediatric patients, where decision to admit may be urgent for some and not for others. However, improving throughput in any ED setting can only result in overall improved patient access and patient/family satisfaction. The QI project implementation took place over the course of the pandemic, perhaps affecting the number of patients requiring admission in the pediatric ED setting.

Implications for Emergency Nurses

Emergency departments are tasked with providing care to many patients, often exceeding their capacity. Creating a streamlined process for patients admitted from the emergency department to the inpatient setting improves efficiency of clinical care and patient access to services not available in the emergency department. Improving patient throughput in the department allows ED providers and nurses additional time to offer services to a larger

volume of patients with varied acuity presentations.

Implementing a standard work process for patient admission, while also incorporating effective communication, provides a road map to efficiently move patients from the emergency department to the inpatient setting. This is a model that can be replicated for other hospital areas and benchmarks for comparison of results. In this model of care, collaboration between interdisciplinary teams representing the emergency department and various inpatient units is integral to facilitate the movement of patients through the system, ultimately allowing more available physical space/treatment rooms to care for patients arriving to the emergency department. Thus, by improving throughput and expediting admission to inpatient units, the providers, nurses, and support staff initiating care in the emergency department are encouraged to evaluate patient needs and predict disposition for inpatient acute and critical care in a timely manner, which can result in improved patient outcomes and patient/family satisfaction.

Conclusion

Improving the time from decision to admit to actual admission to an inpatient unit was the goal of this ED QI project, with secondary aims to increase patient and family satisfaction. Methods have been continuously evaluated and data collected to document the success or sometimes failure of this method to achieve the intended goal.

Decreasing the time for patients to reach the inpatient unit was our ultimate measure of success. Additional factors that demonstrated success included the availability of inpatient beds, that is, clean or ready for admission based on discharge timing of previous patients or environmental services efficiency or both. Although our pilot improvement project was originally implemented on a short-stay unit, where turnover is imperative for unit success, we were able to replicate this process in all inpatient medical-surgical and critical care areas. We believe this methodology can be successfully replicated throughout our organization and plan to evaluate the results in the future.

Author Disclosures

Conflicts of interest: none to report.

Initial rooming process	Improved rooming process
1. Security screening	1. Security screening
2. Quick registration	2. Quick registration
3. PIVOT	3. PIVOT
4. Waiting room	4. Rapid assessment
5. Rapid assessment	5. Waiting room
6. Waiting room	6. Roomed in ED
7. Registration	
8. Waiting room	

9. Roomed in ED	

Step	Process step	Step number	Instructions
1	Decision to admit patient from ED (ED provider)	1.1	ED provider enters “ED Inpatient Bed Request” order into EHR (includes the patient’s name, age, MRN, diagnosis, service, and/or trach/vent and medically complex)
2	Bed assignment (nursing supervisor/unit PFS)	2.1	Nursing supervisor assigns patient to designated unit via Voalte text to the receiving unit PFS, using Voalte Quick Text for Admission
2.2	Unit PFS assigns patient bed and nurse; Group Voalte sent to nursing supervisor, ED flow supervisor, ED RN, inpatient/CC RN, and unit clerk to communicate room, receiving nurse, and room readiness status	3	Patient is ready to be admitted
3.1	When the patient is ready to be admitted, the ED provider contacts (text/call) the admitting resident/service for physician-to-physician handoff	3.2	Admitting resident/service contacts the nursing supervisor to review the patient and their admission, service/team, and unit
3.3	Admitting service enters “Admit to Inpatient” order into EHR	3.4	Nursing supervisor posts the unit, room number, and team to the bed board
3.6	The inpatient/CC PFS uses the Admission Quick Text to update the team on the reservation time	4	RN to RN handoff report
4.1	ED RN monitors track board for patient to be admitted “green” status and initiation of the ALOS timer	4.2	ED nurse completes all ED patient care orders and RN ready for admission checklist
4.3	The inpatient/CC nurse prepares to receive the patient and pulls the patient at the set reservation time	5	Patient transport to accepting floor
5.1	MD, ED, and RN boxes will be checked when patient is ready to leave the ED	5.2	Inpatient/CC RN will arrive at the ED and receive IPASS Report at the set reservation time

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What a Rat Race: A Case Study of Rat Bite Fever in an Emergency Department: JEN

ABSTRACT (ENGLISH)

Rat bite fever is an acute illness caused by bacteria from rodents. In the United States, rat bite fever is considered rare; however, actual incidence is unknown because of lack of mandatory disease reporting requirements. Risk of development of rat bite fever after being bitten by a rat is approximately 10%. Early treatment is imperative as death is a potential complication. The following case study demonstrates the gravity of the syndrome.

FULL TEXT

Contribution to Emergency Nursing Practice

••In 2020, the CDC reported an increase in rodent activity.

••Rat bite fever is an acute illness caused by bacteria from rodents.

••This potentially debilitating or lethal syndrome requires astute assessment skills by ED clinicians to diagnose and provide timely interventions that reverse or limit the long-term consequences of this rodent-based infection.

Case Report

A 59-year-old man arrived in the emergency department with a chief complaint of a rat bite to the second and third fingers of his right hand. The patient stated that he was bitten 10 days before his arrival while attempting to kill a rat in his kitchen. The patient described the onset of profound weakness that began 5 days after the bite. He was so weak that he could not get up out of his chair and was consequently stuck in his chair for 5 days. He had attempted to summon assistance by yelling, but no one heard him. On the day of his ED visit, he had garnered enough strength to get out of the chair onto the floor, crawl to the phone, and call 911.

Upon physical examination of the bite area, it was noted that the skin was healed with no visible redness or swelling. The patient was awake and alert; however, he was intermittently hallucinating, stating that he had been “seeing people walk through walls.” There was no vomiting, lymphadenopathy, chest pain, shortness of breath, or joint pain; however, while in the emergency department, he started complaining of back pain. His bilateral lower extremities were cool, clammy, and mottled. The palms of his hands were peeling and red. The patient had a medical history of hypertension, atherosclerotic heart disease, and obesity.

Initial vital signs were as follows: oral temperature 38°C, heart rate 103 beats per minute, respiratory rate 22 breaths per minute, blood pressure 187/93 mm Hg, oxygen saturation 99% on room air, and a bedside blood glucose of 121 mg/dL. The patient had been incontinent of both stool and urine before arrival. His abdomen was soft, nontender, and nondistended. His electrocardiogram showed nonspecific ST-T wave abnormalities.

A septic workup was initiated as part of the ED nursing protocol. Blood samples were drawn and sent to the laboratory for testing including a complete blood count (CBC), coagulations studies, metabolic panel, C-reactive protein, lactate and 2 sets of blood cultures. The patient's CBC showed a white blood cell count of 16.2 k/uL with 90% neutrophils. Hemoglobin was 12.9, hematocrit 36.6%, and sed rate was greater than 130 mm/h. Coagulation studies reported a prothrombin time of 12.7 seconds, international normalized ratio 1.2 seconds, and partial thromboplastin time 26.9 seconds. Metabolic panel reported a sodium of 134 mEq/L, potassium 4.6 mEq/L, blood urea nitrogen of 48 mg/dL, creatinine 1.5 mg/dL, glucose 147 mg/dL, and total creatine kinase 469 units/l. The patient's C-reactive protein was 32.3 mg/dL and lactic level was 1.8 mmol/L. The patient tested negative for influenza A and B. This patient was seen pre-COVID; therefore, no COVID testing was performed. The patient received acetaminophen for his fever and an intravenous 0.9 normal saline bolus of 30 mL/kg. The patient also received intravenous Unasyn 4.5 grams and vancomycin for antibiotic coverage.

A CT of the chest, pelvis, and abdomen was completed to rule out differential causes. There were no acute findings on the chest CT, and the pelvis/abdomen CT showed nonobstructive renal calculi. A magnetic resonance imaging of the brain was negative for any acute abnormalities. A lumbar puncture was completed and showed an elevation in the white blood cells at 54 and a protein count of 400. The cerebrospinal fluid cultures were negative.

At the conclusion of all assessments and diagnostic testing and in conjunction with his history, presenting illness, and signs and symptoms, the patient was diagnosed with sepsis secondary to rat bite fever.

Rat bite fever occurs when a person is bitten or scratched by a rodent. This syndrome may result from contact with rats, mice, squirrels, weasels, gerbils, and rat-eating carnivores such as dogs, cats, and pigs.[1]

Signs and symptoms of rat bite fever include chills, fever, vomiting, headache, back and joint pain, a red rash to the hands and feet, and polyarthralgia. Symptom onset is 1 to 2 days after contact.[2] The bite itself usually heals very quickly.

Rat bite fever is most commonly diagnosed by history, symptoms, and blood culture results. The blood cultures will show the causative organism, usually *Streptobacillus moniliformis*, a Gram-negative bacillus commonly colonized in the nasopharyngeal passages of rats.[1,3] The white blood cells are generally elevated up to 30,000/mm^3 with an increase in the number of immature cell types in the blood sample. The CBC will also show a mild to moderate anemia.[1] The patient may have a significantly prolonged sed rate. The sed rate, or erythrocyte sedimentation rate, reveals inflammatory activity in the body. A syphilis test can also aid in the diagnosis of rat bite fever, as it will result in a false positive test in 25% to 50% of cases.[1]

Complications of rat bite fever include endocarditis, myocarditis, meningitis, pneumonia, and abscesses of body organs.[1] Other complications include nephritis, chronic anemia, and severe diarrhea with a resultant weight loss. If not treated, the mortality rate of rate bite fever can be 7% to 13%.[4]

The primary treatment of rat bite fever is antibiotics, commonly amoxicillin, penicillin, erythromycin, or doxycycline.[1] If the patient develops endocarditis, ceftriaxone, gentamycin, and streptomycin may be used.[1] Remaining treatment is symptomatic and includes completing the sepsis bundles as applicable.

In this case study, the patient was hospitalized for a significant period of time. This is frequently observed in patients with rat bite fever. Patients are dehydrated and deconditioned because of the extreme weakness and often require intravenous hydration and antibiotics for an extended time.

This patient was admitted from the emergency department to a telemetry bed. He continued to receive intravenous fluids and antibiotics as well as daily laboratory work to monitor white blood cell counts, blood urea nitrogen, and creatinine. Owing to the weakness, subcutaneous heparin was administered every 12 hours to prevent deep venous thrombosis, and the patient received physical and occupational therapy throughout his hospitalization. He remained

hospitalized for 3 weeks. Upon hospital discharge, it was recommended that he receive 4 more weeks of intravenous ceftriaxone 2 grams daily with home health; therefore, the patient had a peripherally inserted central catheter line placed before his return home. Upon discharge to his home environment, he was told to follow up with infectious disease, neurology, and his primary care provider to ensure a full recovery.

As with many rare but potentially debilitating or lethal syndromes, rat bite fever requires astute assessment skills by ED clinicians to diagnose and provide timely interventions that reverse or limit the long-term consequences of this rodent-based infection.

Author Disclosures

Conflicts of interest: none to report.

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Critical Clinical Events and Resilience Among Emergency Nurses in 3 Trauma Hospital-Based Emergency Departments: A Cross-Sectional Study: JEN

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ABSTRACT (ENGLISH)

Introduction

Emergency nurses experience occupational stressors resulting from exposures to critical clinical events. The purpose of this study was to identify the critical clinical events for emergency nurses serving 3 patient populations (general, adult, pediatric) and whether the resilience of these nurses differed by the patient population served.

Methods

This study used a cross-sectional survey design. A total of 48 emergency nurses were recruited from 3 trauma hospital-based emergency departments (general, adult, pediatric). Clinical Events Questionnaire, Connor-Davidson Resilience scale, and an investigator-developed demographic questionnaire were used to collect data from respondents.

Results

All respondents were female (n = 48, 100%), and most were White (n = 46, 96%). The average age of participants was 39.6 years, the average number of years as a registered nurse was 12.7 years, and the average number of

years as an emergency nurse was 8.8 years. Clinical events considered most critical were providing care to a sexually abused child, experiencing the death of a coworker, and lack of responsiveness by a colleague during a serious situation. The least stress-provoking event was incidents with excessive media coverage. Nurses were less affected by the critical events they experienced more frequently at work. Nurses in the 3 trauma settings had high level of resilience, with no statistically significant differences between groups.

Discussion

The occupational stress from exposure to significant clinical events varied with the patient population served by emergency nurses. It is important that interventions be adopted to alleviate the effect of work-related stressors and promote the psychological health of emergency nurses.

FULL TEXT

Contribution to Emergency Nursing Practice

••Emergency nurses are exposed to numerous critical (stressful) clinical events in the workplace.

••Providing care to a sexually abused child, experiencing the death of a coworker, and lack of responsiveness by a colleague during a serious situation were considered the most stressful critical clinical events by emergency nurses, while the least stress-provoking event was incidents with excessive media coverage.

••Emergency nurses should be educated on work-related stress, its impact on their health, sentinel events and tipping points in relation to stress symptoms, and effective strategies to promote resilience.

Introduction

Emergency nurses are exposed to a steady stream of critical clinical events as part of their normal nursing practice. Critical clinical events are those patient care situations that evoke extreme distress in nurses.[1] Examples of critical clinical events include witnessing a death, seeing the impact of physical or sexual abuse of a child, simultaneous treatment of severely injured patients, and being physically assaulted during the course of patient care.[2,3]

Background

The National Institute for Occupational Safety and Health[4] defines work-related stress as any adverse physical or psychological reaction to overwhelming job requirements that exceeds the capabilities of the worker to adapt. Nursing is a highly demanding profession, and nurses are subject to a wide variety of work-related stressors. Emergency nurses, in particular, experience high levels of work-related stress as they face numerous critical clinical events during their daily work. In previous studies on occupational stress in emergency departments, emergency nurses reported exposure to different types of clinical stressors during their work. Heavy workload, sexual abuse or death of a child, workplace violence, providing critical care for a family member or friend, and inability to provide quality care were rated as the most stressful events in the workplace by emergency nurses.[2,3,5]

According to the American Psychological Association,[6] chronic exposure to work-related stress has negative effects on individuals' mental and physical well-being and can contribute to health conditions such as heart disease, immune problems, anxiety, and depression. Maladaptive strategies to occupational stress such as overeating or drinking alcohol can complicate stress effects further.[6] Work-related stress also decreases workers' productivity and job performance and affects job satisfaction. The findings of research with emergency nurse samples showed that stress at work is related to decreased job performance,[7] burnout,[8] intention to leave,[9] and compassion fatigue.[10]

Work-related stress cannot be totally avoided for nurses working in emergency departments. Therefore, it is crucial for emergency nurses to develop resilience through adopting effective coping strategies. Examples of effective coping strategies adopted by emergency nurses are using self-control of emotions and responses to stressors, positive reappraisal,[11] asking for advice from others, and focusing on the benefits of a negative or challenging

situation.[12] Despite the use of effective coping strategies to promote resilience in emergency nurses, several personal and work-related factors were found to influence resilience in ED health care workers. Being married, having more years of professional experience, and working night shift are associated with greater resilience.[13]

Conceptual Framework

The framework for this study was the Cognitive Activation Theory of Stress developed by Ursin and Eriksen.[14] This theory describes the relationships between life stressors, an individual's responses to stressors, and the consequences on the individual's health. There are 4 key assumptions for the Cognitive Activation Theory of Stress: (1) there must be an event or situation with the potential to cause someone stress, (2) the stressor must be experienced, (3) the person will experience a state of heightened arousal, and (4) the person will experience a reaction to the stressor.[14] The following background is organized based on the 4 assumptions.

Stress Situations

Several events or situations are linked to stress in nurses. Specific nursing situations include providing disaster management and relief,[15] experiencing workplace violence,[2,3] seeing patients die,[3] and providing trauma care.[16] In addition, specific personal events (eg, illness of a loved one) are stress provoking factors for nurses.[17]

Stress Experience and Arousal

Duffy et al[18] measured the prevalence of secondary traumatic stress among a sample of emergency nurses. The authors evaluated the participants based on the frequency of symptoms related to secondary traumatic stress (intrusion, avoidance, and arousal). They found that most (64%) respondents met the diagnostic criteria for secondary traumatic stress based on the symptoms reported.

Stress Reaction

Richardson explained that effective coping strategies promote resilience,[19] which is the ability of a person to thrive during stressful situations.[20] Several demographic, personal, and lifestyle factors influence an individual's resilience.[21,22] Studies with emergency nurses show that nurses use different types of coping mechanisms to manage workplace stress and promote resilience.[11,12]

Scientific GAP

The literature reflects that there are likely multiple clinical events perceived as "critical." Due to the nature of the ED environment, several critical clinical events are not totally avoidable such as experiencing sudden patient death or dealing with multiple clinical events at the same time. Therefore, one of the logical next steps in reducing the potential negative impact of critical clinical events on emergency nurses is to identify those clinical events perceived as most critical (or distressing). It is not known whether critical clinical events experienced by emergency nurses vary by patient population served; therefore, research needs to be conducted exploring this difference.

Resilience is an important indicator of an individual's ability to cope with stressors. Several studies addressed the effect of emergency nurses' demographic characteristics on their resilience. However, there is a need for studies that investigate the effects of different work-related factors such as the type of patient population served on emergency nurse resilience. The purpose of this study was to identify critical clinical events for emergency nurses serving 3 patient populations (general, adult, pediatric) and whether the resilience of these emergency nurses differs by the patient population served.

Methods Study Design

This study was conducted using a secondary data analysis of cross-sectional data collected in a previous study. Based on the scientific gap, the following research questions were answered:

1. What are the prevailing critical clinical events in a sample of emergency nurses based on the patient population served?

2. Does emergency nurse resilience differ by the patient population served?

The reporting of this study adhered to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines tailored for cross-sectional studies.[23]

Settings and Sample

A total of 48 participants in the original study were recruited from 3 trauma hospital-based emergency departments: urban general teaching hospital providing care to both adults and pediatric patients, suburban adult teaching hospital, and urban pediatric teaching hospital. From each site, 16 emergency nurses participated in the study; respondents worked in only 1 study site (no overlap with employment). In the year preceding the original study, the numbers of trauma team activations were 2900 in the general trauma center, 456 in the adult trauma center, and 306 in the pediatric trauma center. Each site had an interprofessional trauma team that responded when activated. Trauma team members were composed of emergency nurses, emergency physician, trauma resident, trauma surgeon, and support personnel such as paramedic, radiology technician, and laboratory technician.

Participant recruitment occurred between December 2009 and April 2010. The original study used a qualitative design with focus group interviews with emergency nurses on the stressors they experienced in the work environment. The respondents were asked to complete cross-sectional surveys before starting the focus group interviews to stimulate their thoughts regarding the stressors they encounter in the workplace. A total of 48 participants responded to the study invitation. Inclusion criteria were being employed full or part time, having an unrestricted registered nurse licensure, and providing emergency care. Exclusion criteria were managers or other direct supervisors who evaluate the performance of the potential respondents. Convenience sampling was used to recruit respondents.

A post hoc power analysis was computed based on the parameters of the variable with the most significant difference between groups (violence, including verbal abuse, threats, and physical abuse by one member of staff toward another). Based on effect size 0.251, alpha 0.05, sample size of 48, and 4 covariates, achieved power was 30.3%. In order to achieve an optimal minimum power of 80% with effect size 0.251 with 3 groups and 4 covariates, a minimum sample size of 157 is recommended for a future replication study within a population similar to this study.

Human Subjects Protections

Approval was granted by the university and 3 hospital Institutional Review Boards. Respondents were informed that participation was voluntary and not a condition of their employment. Signed written consent was obtained from all participants.

Variables and Instruments Clinical Events

Clinical events were measured using the Clinical Events Questionnaire (CEQ).[1] The CEQ is a 29-item instrument used to measure perceived stress of different clinical events using a 5-point Likert scale ranging from 0 to 4. Higher scores reflect greater negative perception of the clinical events. Using factor analysis, O'Connor and Jeavons[1] determined that the questionnaire's 3 subscales accounted for 51.5% of the variance. Internal consistency reliability for the subscales was 0.90 (grief), 0.92 (emergency), and 0.81 (risk).

Resilience

Resilience was measured using the Connor-Davidson Resilience scale (CD-RISC).[24] Responses were provided using a 5-point Likert scale ranging from 0 to 4. The total score ranges between 0 and 100, where higher scores indicate greater resilience. CD-RISC exhibited evidence of reliability through internal consistency reliability (Cronbach's alpha = 0.89) and test-retest reliability (intraclass correlation coefficient = 0.87). Moreover, the CD-RISC demonstrated validity using factor analysis, convergent validity, and discriminant validity.[24]

Patient Population Served and Respondent Characteristics

Patient population served was determined by the site of the emergency department in which respondents completed their survey packet. Survey packets were color-coded to ensure that data were correctly attributed to their respective group (general, adult, pediatric). Respondents also completed an investigator-developed demographic and work characteristics questionnaire. Survey items solicited respondents about their personal demographic and work characteristics. Demographic characteristics were age, gender, race, ethnicity, educational attainment, years of experience as a registered nurse, and years of experience as an emergency nurse. Work characteristics were shift worked, average number hours worked per week, and whether formal training was received by current employer on how to cope with stressful patient situations.

Procedures

Respondents were recruited through mailbox invitations and presentations at department meetings. Potential respondents communicated with a site facilitator to participate and came to a scheduled focus group session. At the start of each research session, respondents read and signed the study consent form and were given a paper copy of the survey packet used for the current report. All enrolled respondents (n = 48) completed the study procedures. Data were collected anonymously. Data then were entered into an electronic database by 2 graduate assistants. Data entry reliability was confirmed before data analysis.

Data Analysis

Descriptive statistics (eg, frequencies, percentages) were used to describe the characteristics of the study sample. Analysis of variance and Fisher exact test were used to test whether there were significant differences in the demographic and work characteristics between the 3 groups based on the patient population served (general, adult, pediatric). A mean score across participants was generated for each item in CEQ. Items were rank-ordered from highest mean score to lowest mean score. The total CD-RISC score for each respondent was calculated. Analysis of covariance (ANCOVA) was used to compare mean scores for leading critical clinical events and CD-RISC scores based on patient population served. Covariates were based on those demographic and work characteristic variables identified to have statistically significant differences between patient population served. Tukey post hoc analyses along with 95% confidence intervals were conducted for items demonstrating statistical analysis from ANCOVA. Alpha was set at 0.05. Analyses were completed using SPSS Statistics 27 (IBM Corp). Figures were created using RStudio.

Results

All participants were female (n = 48, 100%), and most were White (n = 46 of 48, 96%) and non-Hispanic (n = 40 of 41, 98%). The mean age of participants was 39.6 years (range 24-62 years). The mean number of years as a registered nurse was 12.7 (range 1-42 years), and the mean number of years as an emergency nurse was 8.8 (range 1-28 years). There were significant differences in age (F[2,45] = 8.929, *P* P P = .001), and shift worked (Fisher exact *P* Table 1).

Clinical events that were perceived as most stressful were providing care to a sexually abused child (M = 3.50, SD = 0.68), observing the death of a coworker (M = 3.48, SD = 0.88), and the lack of responsiveness by a health care professional during a serious situation (M = 3.19, SD = 0.73) (see [Table 2]). The least stress provoking events were dealing with incidents with excessive media coverage (M = 1.48, SD = 1.07), unusual situations involving patients without death (M = 1.54, SD = 0.85), and emergency situations such as cardiac or respiratory arrest (M = 1.85, SD = 1.03) (see [Table 2]).

Several group comparisons reflected significant group differences based on patient population served; for example, violence, including verbal abuse, threats, and physical abuse by one member of staff toward another (F[2,41] =

6.533, *P* = .003), death of a patient after prolonged resuscitation (F[2,41] = 5.707, *P* = .007), multiple trauma with massive bleeding or dismemberment (F[2,41] = 5.370, *P* = .008), unexpected patient death (F[2,41] = 5.344, *P* = .009), emergency situation (eg, cardiac arrest or respiratory arrest) (F[2,41] = 5.023, *P* = .011), caring for severely burned patient (F[2,41] = 4.226, *P* = .021), and providing care to a coworker's family member who is dying or in a serious condition (F[2,41] = 3.317, *P* = .046). Figures 1-7 display boxplot graphs for stressors with significant differences between the 3 emergency nurse groups.

The results of post hoc analysis showed that emergency nurses who provide care for pediatric patients rated multiple stressors significantly higher than emergency nurses caring for general or adult populations. Emergency nurses who served pediatric patients perceived violence, including verbal abuse, threats, and physical abuse by one member of staff toward another as a stressor (M = 3.06) significantly higher than emergency nurses who served adult patient population (M = 2.19, *P* = .020). Likewise, emergency nurses providing care to pediatric patients rated the death of a patient after prolonged resuscitation (M = 3.00) higher than emergency nurses who served adult patient population (M = 1.75, *P* = .002) and emergency nurses who served general patient population (M = 1.94, *P* = .011). Moreover, emergency nurses who served pediatric patients perceived multiple trauma with massive bleeding or dismemberment as a stressor (M = 2.88) significantly higher than emergency nurses who served adult patient populations (M = 1.69, *P* = .002) and emergency nurses providing care for general populations (M = 2.00, *P* = .029). The remaining significant differences between groups are presented in Table 3. Interestingly, despite ANCOVA results that indicated significant differences between the 3 groups for the stressor caring for severely injured patient, post hoc analysis results revealed no significant differences between the groups. Figure 6 displays a boxplot graph visualizing the responses to this critical clinical event.

Resilience strategies overall were heavily used by study respondents (81.5 [8.3]). Comparison of overall resilience scores across the groups revealed no significant difference in the overall resilience among the 3 groups (F[2,41] = 0.199, *P* = .820): general emergency nurses (79.6 [7.4]), adult emergency nurses (82.9 [7.9]), and pediatric emergency nurses (81.5 [9.7]). Figure 8 displays a boxplot of resilience scores by patient population served.

Discussion

There were 2 research questions addressed in this study; the first was to identify the most stressful clinical events experienced by emergency nurses and whether these events were perceived differently by nurses serving 3 patient population groups, and the second was to examine whether emergency nurse resilience is influenced by the patient population served. This study addressed the gap in the literature by investigating whether the most stressful critical clinical events and resilience differed among emergency nurses based on the type of patient population served. In general, the results of this study indicated that emergency nurses experience several stressful clinical events at work, and several of these stressors are perceived differently by nurses based on the patient population served. Importantly, emergency nurses showed a high level of resilience regardless of the patient population served.

Sexual abuse of a child was ranked as the most stressful event experienced by nurses in this study. This finding is similar to the findings of research by Elder et al[3] and Greenslade et al.[5] Compared with the findings of previous studies, the current study found different highly stressful events for emergency nurses (ie, the death of a coworker and the lack of responsiveness by a colleague during a serious situation). However, this could be due to different assessment methods used to identify these stressors across the studies.

Regarding the stressors with the least impact on emergency nurses, the current study found that dealing with media was rated as the lowest stress-provoking event in the workplace, which is consistent with findings of previous studies.[3,5] Because of the nature of the role of the nurse, emergency nurses are more concerned with providing care to patients during serious events than dealing with media coverage on these events. Other least stress-provoking

events reported by the emergency nurses were experiencing emergency situations and witnessing unusual events involving patients without death. This is not surprising, given that these events are common in the ED environment, and emergency nurses are used to managing these situations.

The present study shows that the stress from critical clinical events perceived by emergency nurses varied based on the patient population served. Across the 3 patient populations served, emergency nurses working in adult-based trauma centers were less affected by most of the other stressful critical clinical events. In contrast, compared with other emergency nurses, emergency nurses who served pediatric patient populations were found significantly more vulnerable to stressors such as violence including verbal abuse, threats, and physical abuse by one member of staff toward another, unexpected death of a patient after prolonged resuscitation, multiple trauma with massive bleeding or dismemberment, unexpected patient death; being involved in emergency situations (eg, cardiac or respiratory arrest), and providing care to a coworker's family member who is dying or in a serious condition. Evidence shows that stressful clinical events (ie, patient death after resuscitation) are more likely to occur in adult emergency departments than in pediatric emergency departments.[25] Generally speaking, desensitization against stressful events results from the increased exposure to these events[26]; therefore, emergency nurses might become less vulnerable to the stressors they experience frequently when providing care to their patients. Alternatively, emergency nurses could develop strong coping mechanisms to the stressful situations they encounter at high rates in the work environment, which would help them better deal with these situations. The high resilience in the study population supports this assertion.

In terms of resilience, emergency nurses in this study showed high resilience regardless of the patient population served. Emergency nurses in the present study mainly used coping strategies such as adaptation and positive thinking to promote resilience. These coping strategies were reported by nurses in studies by Gholamzadeh et al[11] and Lu et al.[12] This stresses the importance of adopting positive coping strategies to promote emergency nurse resilience against occupational stressors. However, having high resilience could be a barrier for emergency nurses to seek help from Employee Assistance Programs or other psychological counseling services, as these nurses could rely more on self-initiated strategies to cope with psychological stressors than seeking outside help.

As the majority of the current study respondents were White, findings on resilience should be interpreted with caution. Evidence from literature shows that racism-related stress experienced by nurses from minority racial groups could negatively impact those nurses' resilience. Therefore, one's self-identified race could affect responses to perceived occupational and personal stressors.[27]

Demographic characteristics have an impact on an individual's perceived stress as well as resilience.[13,28] Participants in this study were all female and predominantly non-Hispanic (98%) and White (96%); the demographic characteristics of the sample in this study are quite homogeneous and dissimilar to the demographic characteristics for the registered nursing workforce. The 2020 National Nursing Workforce Survey shows that 90.5% of registered nurses in the United States are female, 80.6% are White, and 94.4% are non-Hispanic.[29] These differences limit the transferability of the study findings to a general nurse population.

The original study, from which the data for this secondary analysis were derived, was conducted before the COVID-19 pandemic. Recent stressors experienced by emergency health care workers due to the COVID-19 pandemic were inadequate personal protective equipment, insufficient guidance on disease management, frequently changing work practices, uncertainty surrounding the decision-making process, concerns of acquiring the disease and transmitting it to others, and increased workload.[30-32] These stressors led to high levels of traumatic stress, anxiety, and burnout among emergency health care workers.[32] However, studies showed that high resilience by adopting positive coping behaviors has enhanced emergency nurses' hardiness against stressors experienced during the

pandemic.[33]

Limitations

There are some limitations for the present study. The first limitation is the cross-sectional survey study design, which limits the ability to depict cause-effect relationships. The second limitation is related to the sampling method and size; a total of 48 emergency nurses were recruited through convenience sampling in this study. Recruiting a larger and random sample would increase generalizability. Moreover, there was no verification that nurse participants who rated the critical clinical events in this study experienced these events previously. However, these events are very common in emergency departments, and the majority of events were discussed by nurses in the qualitative focus group interviews conducted in the previous study. In addition, social-desirability bias could impact the reliability of study results; collecting data through self-administered questionnaires increases the risk for this bias, as participants might provide responses that are socially acceptable rather than what they believe.

Implications for Emergency Nurses

Stressors in the workplace for emergency nurses can never be totally eliminated. Therefore, strategies should be adopted to alleviate the impact of these stressors on emergency nurses. Initially, before starting to work in an emergency department, nurses can perform self-assessments for pre-existing stressors, symptoms of anxiety and post-traumatic stress, and use of coping behaviors. In addition, all nurses can be given information for obtaining third-party psychological counseling based on the results from their self-assessment. Nurses' positive coping behaviors should be reinforced, and maladapted behaviors (eg, polysubstance abuse) should be discouraged.

At the primary prevention level, emergency nurses should be educated on work-related stress, its impact on their health, sentinel events and tipping points in relation to stress symptoms, and most importantly, effective strategies to promote resilience. Equally important, the education can include means to identify when an event becomes significant (critical) for them and manage personal stressors. Moreover, emergency nurse managers can conduct anonymous assessments to identify situations perceived as most stressful to their staff as well as the resilience strategies used by the nurses to deal with these stressors. Additional resources can be directed to the emergency department after these events to allow emergency nurses time to mentally recover before returning to their "normal" workflow. Emergency nurses can be coached on using proactive coping strategies to promote their resilience.

At the secondary prevention level, strategies should be adopted to mitigate the effects of highly stressful situations. An example of a world-wide used strategy that is relevant to emergency nurses' experience is The Pause.[34] The Pause is a brief intervention that was suggested by an emergency nurse in 2009. It is a small break for the health care team after the death of a patient to honor the life that ended and to acknowledge the efforts by the members of the health care team.[34] Evidence suggests that The Pause is an effective tool to reduce stress experienced by health care workers who provided care for critically ill patients.[34] Furthermore, emergency nurses who experienced a highly stressful critical clinical event should be offered an informal defusing or formal critical incident stress debriefing session by trained professionals. Debriefing sessions allow for facilitated discussions between emergency nurses to provide reflections on an experience and suggest strategies to promote future behaviors and responses.[35] Because evidence in the literature relative to the effectiveness of immediate debriefing is mixed,[36] participating in these sessions should be voluntary to prevent further psychological distress. In addition, social networking with colleagues away from the workplace is an opportunity to vent stress and provide mutual support through discussing stressful situations encountered at work.[37] However, work restrictions during the ongoing COVID-19 pandemic may limit this activity. Emergency nurses can still socialize with family members or others within their network who are willing to listen empathetically to their experiences.

At the tertiary prevention level, emergency nurse managers can monitor their staff for signs of acute stress or post-

traumatic stress. Appropriate referral to Employee Assistance Programs or other counseling services should be arranged as needed. Such counseling services should be available for emergency nurses at no cost and be optional depending on the impact of the employee's ability to provide safe care.

Future research can investigate other events potentially considered stressful by emergency nurses as well as work-related factors that influence emergency nurse resilience (eg, care of patients during a major infection outbreak, working with insufficient staff and resources). In addition, intervention studies need to be conducted to test the effectiveness of strategies to mitigate the effect of occupational stress on emergency nurses.

Conclusion

Emergency nurses in the present study reported similarities in their leading critical clinical events. Those events that significantly differed by patient population served tended to reflect volume of exposure. The greater volume and commonality of the event were reflected as less critical. While resilience was strong in the study sample, targeted strategies to bolster and protect resilience can be considered for critical clinical events based on patient population served.

Author Disclosures

Conflicts of interest: none to report.

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Characteristic	All respondents		Patient population served											
General			Adult			Pediatric			F statistic	P value*	Mean	N	%	Mean
N	%	Mean	N	%	Mean	N	%	Age (y)	39.6			37.2		
47.1			34.5			8.93	<.001	Years as registered nurse	12.7			9.7		

20.3			8.2			9.08	<.001	Years as emergency nurse	8.8			7.2		
13.4			5.8			7.83	.001	Hours worked per week	37.9			39.3		
37.4			37.1			0.28	.76	Educational attainment						
							.62	Diploma		7	14.6		1	6.3

	2	12.5		4	25.0			Associate degree		18	37.5	6	37.5
	7	43.8		5	31.3			Bachelor's degree		19	39.6	7	43.8
	5	31.3		7	43.8			Master's degree		4	8.3	2	12.5
	2	12.5		0	0			Shift worked					
							< .001	Day shift		32	66.7	16	100
	7	43.8		9	56.3			Evening shift		6	12.5	0	0
	1	6.3		5	31.3			Night shift		10	20.8	0	0

	8	50.0		2	12.5			Received training to cope with stressful situations		31	64.6		11	68.8

Clinical event (stressor)		All respondents		Patient population served						
G		A		P		F statistic*	P value	Mean	SD	Mean
SD	Mean	SD	Mean	SD	Sexual abuse of a child	3.50	0.68	3.56	0.63	3.56

0.63	3.38	0.81	0.058	.944	Death of a coworker	3.48	0.88	3.75	0.45	3.06
1.18	3.62	0.72	0.971	.387	Lack of responsiveness by health care professional during a serious situation	3.19	0.73	3.31	0.60	3.00

0.82	3.25	0.78	0.048	.953	Providing care to a coworker's family member who is dying or in a serious condition	3.13	0.89	3.13	0.96	2.69
0.87	3.56	0.63	3.317	.046†	Death of a child	3.12	0.84	3.06	0.93	3.19

0.83	3.13	0.81	0.196	.823	Serious injury to emergency provider in the line of duty	3.02	0.86	3.31	0.70	2.63
1.03	3.13	0.72	0.756	.476	Unexpected patient death	2.98	0.84	2.69	0.79	2.69

0.87	3.56	0.51	5.344	.009‡	Suicide of patient who is or has been in your care	2.90	0.97	2.94	1.00	2.44
0.96	3.31	0.79	1.591	.216	Serious injury of a colleague	2.90	0.99	3.19	0.91	2.63
1.09	2.88	0.96	0.124	.884	Death of a baby from SIDS	2.81	0.98	2.88	0.96	2.75

1.18	2.81	0.83	0.118	.889	Caring for a severely burned patient	2.79	0.92	2.50	0.97	2.88

0.96	3.00	0.82	4.226	.021[§]	Violence, including verbal abuse, threats, and physical abuse by one member of staff toward another	2.56	0.94	2.44	0.73	2.19

1.11	3.06	0.77	6.533	.003†	Actual/potential contact with infectious body fluids (eg, Hepatitis B, HIV, tuberculosis)	2.52	1.11	2.56	0.89	1.94
1.00	3.06	1.18	2.217	.122	Moral distress	2.35	0.96	2.56	0.96	2.06

0.85	2.44	1.03	1.309	.281	Death of a patient after prolonged resuscitation	2.23	1.11	1.94	0.93	1.75
1.00	3.00	1.03	5.707	.007†	Multiple trauma with massive bleeding or dismemberment	2.19	1.05	2.00	0.97	1.69

0.87	2.88	0.96	5.370	.008†	Dealing with multiple events in a short period	2.19	1.09	2.19	1.11	2.00
1.03	2.37	1.15	0.007	.993	Dealing with hysterical family members	2.10	1.08	1.94	0.85	2.13

1.26	2.25	1.13	0.730	.488	Emergency situation (eg, cardiac arrest or respiratory arrest)	1.85	1.03	1.81	0.75	1.25

0.78	2.50	1.16	5.023	.011[†]	Unusual situations involving patients but with no deaths involved	1.54	0.85	1.63	0.72	1.50
0.89	1.50	0.97	0.561	.575	Incidents with excessive media coverage	1.48	1.07	1.50	1.21	1.50

Clinical event (stressor)	Trauma center population (I)	Trauma center population (J)	Mean difference (I-J)	95% confidence interval	P value

Violence, including verbal abuse, threats, and physical abuse by one member of staff toward another	Pediatric	Adult	0.88	0.12-1.63	.020
Death of a patient after prolonged resuscitation	Pediatric	Adult	1.25	0.40-2.10	.002
Pediatric	General	1.06	0.22-1.91	.011	Multiple trauma with massive bleeding or dismemberment
Pediatric	Adult	1.19	0.39-1.99	.002	Pediatric
General	0.88	0.08-1.67	.029	Unexpected patient death	Pediatric
Adult	0.88	0.24-1.51	.005	Pediatric	General
0.88	0.24-1.51	.005	Emergency situation (eg, cardiac or respiratory arrest)	Pediatric	Adult

1.25	0.47-2.03	< .001	Providing care to a coworker's family member who is dying or in a serious condition	Pediatric	Adult

DETAILS

Subject:	Occupational stress; Emergency medical care; Responsiveness; Averages; Trauma centers; Employment; Workplace violence; Child abuse &neglect; Critical events; Questionnaires; Job performance; Nurses; Emergency services; Likert scale; Abused children; Sex crimes; Sexual abuse; Pediatrics; Resilience; Patients; Psychological trauma; Trauma; Stress; Media coverage; Coping; Focus groups; Psychological well being; Nursing; Clinical nursing; Teaching hospitals; Employment interviews; Mental health
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Duty to Work During the COVID-19 Pandemic: A Cross-Sectional Study of Perceptions of Health Care Providers in Jordan: JEN

ABSTRACT (ENGLISH)

Introduction

This study aimed to assess perceptions of duty to work among health care providers during the coronavirus disease 2019 response and to identify factors that may influence their perceptions.

Methods

This was a cross-sectional study conducted from April 1, 2020, to April 20, 2020, using an online survey distributed to health care providers in Jordan. Descriptive statistics were used, as well as chi-square test for independence to assess relationships between variables.

Results

A total of 302 questionnaires were included. Commitment to serve the community was the primary reason for coming to work (36%), followed by commitment to faith (29.6%). The major perceived barriers for coming to work were lack of appropriate personal protective equipment and appropriate training (62.6% and 53.5%, respectively). Males perceived higher work obligations than females in all potential barriers (P <.05), except for the lack of appropriate training. Nurses perceived higher work obligations than other health care providers despite the lack of appropriate training ($\chi 2$ = 11.83, P = .005), lack of effective vaccine or treatment ($\chi 2$ = 21.76, P <.001), or reported infection among coworkers ($\chi 2$ = 10.18, P = .03).

Discussion

While the majority of health care providers perceive an obligation to work during the coronavirus disease 2019 pandemic, specific conditions, mainly lack of protective gear and training, may significantly alter their perception of work obligation. Providing training and proper personal protective equipment are among the vital measures that could improve the work environment and work obligation during pandemic conditions.

FULL TEXT

Introduction

Countries around the world struggled to respond to the surge of patients with COVID-19 caused by the SARS-CoV-2, which overwhelmed many well-developed health care systems. During disasters and public health emergencies, health care providers (HCPs) were on the front lines, risking their lives to provide care for patients in need. Here, we define HCPs as health professionals who provide direct or indirect care to patients in hospital or prehospital settings. It is expected that HCPs have a clear work obligation during pandemics and health disasters, which is based on the code of conduct that governs their practice.[1] While HCPs recognize an obligation to work, they also expect to maintain their own health and well-being in order to provide care for patients.[2]

During pandemic disasters, while the need for HCPs is exacerbated because of the dramatic increase in work volume, a significant proportion of HCPs become infected themselves and are unable to provide care, leading to a staff shortage.[3-8] This shortage in staff, along with increasing demand, puts HCPs at a higher risk of infection, making matters worse.[9] As a result, some HCPs may become unwilling to report to work because of the risk of infection to themselves or their families. This can dramatically overwhelm hospitals and stretch staff resources thin, rendering them unable to provide the services that are needed the most during such situations.

The willingness of HCPs to report to work is one of the most important factors in the face of surge capacity limitations in response to the COVID-19 pandemic. HCPs are less willing to report for duty during disease outbreaks.[10,11] There are 2 positions with respect to the ethical obligation to work during disasters.[1] On one hand, some argue that HCPs are obligated to maintain their health in order to be able to care for others and not to be victims. In addition, they believe that it is not reasonable that HCPs threaten their own lives and the lives of their families to care for others.[1] A study performed by Damery et al[1] found that about 30% of nurses, 25% of hospital doctors, and 18% of general practitioners believe that they do not have to report for duty if doing so would risk themselves and/or their families. In contrast, others believe that HCPs should have limited self-regard and should accept potential harm in performing their job.[12] For instance, a study performed by Koh et al[12] assessed the impact of SARS on HCPs in Singapore. While the majority (76%) of participants felt at great risk of exposure to SARS, more than two-thirds (69.5%) accepted the risk of potentially contracting the disease as part of their job.

The COVID-19 pandemic has reintroduced the issue of role conflict and role abandonment among HCPs. The risk of infection to oneself and family has led some workers to abstain from their work. For instance, in an elderly-care home in Australia, after cases of COVID-19 among residents were reported, most of the workers did not report to work as scheduled because they felt in danger of infecting their family members.[13] Another case of role abandonment occurred in a residential home in Spain that resulted in mortality for elderly people amid the COVID-19 response.[14] It is, therefore, of primary importance to understand the perceived duty to work among HCPs during pandemic disasters. This is crucial to maintain staffing, maintain good quality patient care, and keep the health care system functional in such situations.

Disaster preparedness of health care facilities is paramount to ensure effective and efficient response to public health emergencies such as the COVID-19 pandemic. To achieve optimal disaster preparedness, the training of HCPs should adopt an all-hazards approach that utilizes generic basic principles for disaster scenarios.[15] The work of McCabe et al[16] provides a framework for evaluating the disaster preparedness of health care systems. The “ready, willing, and able” (RWA) framework can be applied to health care delivery systems at the individual, organizational, and governmental levels. Based on the RWA framework, the maximum overlap between the 3 domains, 'ready,'ness 'willing,' and 'able,' provides the maximum quality preparedness and response to public health

emergencies. In this context, “ability” refers to the “actual operational power of an individual to perform a task”; “willingness” refers to the “state of being favorably predisposed in mind toward specific responses”; and “readiness” to respond means that an individual is “available for prompt reaction, service, or duty.”[16] Therefore, the perceived duty to work can be explored within the context of the RWA framework.

In Jordan, the government has implemented 1 of the strictest lockdown policies in the world.[17] This resulted in keeping the number of cases of COVID-19 under control and within the managing capacity of the Jordanian health care system. However, early in June 2020, Jordan, along with many other countries, started to relax the strict measures of social distancing to support its struggling economy. This resulted in a spike of cases of COVID-19, which put HCPs at high risk of contracting the disease and spreading it to their families. During the period from January 2021 until the end of March 2021, the spread of the pandemic was among the highest in the world, stressing the already limited health care resources.[18] In this climate of uncertainty, the following questions are highlighted: (1) Are HCPs obligated to work in conditions that put them and their families at higher risk than day-to-day conditions? (2) Are there conditions where HCPs become no longer obligated to provide care for the sick? This study, therefore, aimed to assess the perceptions of duty to work among HCPs during the COVID-19 response and to explore factors that may influence their perceptions.

Methods Design

This was a cross-sectional descriptive study using an online questionnaire using a convenience sampling method with HCPs in Jordan.

Measures

The questionnaire was developed by an expert panel of HCPs and researchers (4 PhD holders in the fields of nursing and paramedicine) (Supplementary Appendix). The questionnaire items were also based on previous pandemic-related research,[1,19,20] as no standardized tool was found to assess the perception of duty to work during a pandemic. The questionnaire included 14 items addressing 3 domains: demographics (7 items), 1 major reason for coming to work, and potential barriers for coming to work (6 items). The potential barrier statements take into consideration the RWA framework.[16]

The first section included information about sex, age, marital status, presence of children, education, job, and work experience. In the second section, participants were asked about the main reason for reporting to work during the COVID-19 response. Options that participants could select included: commitment to the community being served, commitment to faith, commitment to workplace and job, avoidance of penalties, and choice not to work in such situations. These options assumed that the participant was able to work. The third section included questions using a 6-point Likert-type scale to determine their barriers to work during COVID-19. Participants were asked to choose from 1 (not at all obligated) to 6 (strongly obligated). The questionnaire was pilot tested for readability and understanding of all terminologies by 10 participants and then modified according to participants’ feedback. The final version of the questionnaire was then approved by the expert panel. The internal consistency using the Cronbach alpha coefficient was 0.84 for the barrier to work items, indicating good reliability. Google forms (Web application, Google) were used to develop the online questionnaire and the disseminated link.

Setting

The survey took place in the country of Jordan. The majority of the health care workforce in Jordanian hospitals are nurses (44%) and physicians (25%).[21] The majority of nurses are females whereas the majority of physicians are males.[22] In the prehospital setting, emergency medical service (EMS) providers number approximately 2000, with males being the majority.[23] During the time of data collection, the number of cases of COVID-19 increased incrementally, as patients were in hospital isolation, and exposed people were quarantined. On the last day of data collection, there was a cumulative total of 425 cases and 7 deaths,[18] and the health care system in the country was not overwhelmed with patients with COVID-19 (Figure 1). However, there were reported cases of infection among HCPs working at the 3 hospitals in Jordan that were designated as primary inpatient centers for patients with COVID-19. These hospitals were excluded from sampling. The Raosoft online software (Raosoft, Inc., 2004) was used to estimate the required sample size with a confidence level of 95% and 5% margin of error. This requires 323

participants to carry out this study, given that the targeted HCPs are about 2000.[24]

Participants

HCPs in Jordan were invited to voluntarily participant in the study. Potential participants included physicians, nurses, and allied health professionals (ie, laboratory and radiology technicians). EMS providers encompassing emergency medical technicians, intermediates, and paramedics from the prehospital setting were also invited to be part of the study.

Data Collection Process

The online questionnaire link was shared with potential participants over social media, mainly through closed WhatsApp groups of HCPs. Responses were collected from April 1, 2020, to April 20, 2020. On April 10, 2020, the questionnaire link was reshared with the groups as a reminder for potential participants. No internet protocol (IP) addresses were collected.

Data Analysis

The online data were exported into the Statistical Package for the Social Sciences (SPSS), version 25, (Chicago, IL) for analysis. Continuous variables were reported as means and SDs, whereas categorical variables were reported as frequencies and percentages. Missing data were excluded, and valid percentages were used. The 6-point Likert-type questions were dichotomized for simplicity and ease of interpretation.[25] To score the responses, the first 3 choices were merged and labeled as “not obligated,” whereas the last 3 choices were labeled as “obligated.” A chi-square test for independence was used to assess relationships between demographics and potential barriers for duty to work with a *P* value P value. An adjusted standardized residuals test was performed to identify between-group differences with 1.96 as a cut point for significance.

Ethical Approval

This study was approved by the Institutional Review Board at Jordan University of Science and Technology (204/2020).

Results Demographics

Of the 306 questionnaires received online, 302 (98.6%) were complete and eligible for further analyses. Table 1 shows that the majority of participants are males (55.0%), married (69.8%), have children (65.3%), have a bachelor’s degree or higher (74.8%), and work as nurses (51.9%). Participants have a mean age of 34.3 (SD = 8.1) years and a mean experience of 11.1 (SD = 7.9) years.

Main Reasons for Reporting to Work

Participants were asked about the main reasons they reported to work during the COVID-19 pandemic. Table 2 demonstrates that 'commitment to the community being served' was the main factor for reporting to work (36.0%), whereas 'commitment to faith' was the second, and 'commitment to the workplace and job' was the third (29.7% and 26.7%, respectively). The least important reason for reporting to work was 'avoiding a disciplinary penalty,' which was represented by only 4.0% of participants. Only 3.7% of participants indicated that they 'would not report to work under such conditions.' The Table also demonstrates that commitment to the served community was selected most frequently for all types of jobs, whereas avoiding penalty and not reporting to work were selected most frequently by the other allied health group (9.5% and 11.1%, respectively, $\chi^2 = 28.68$, $P = .004$)

Work Obligation Barriers

Participants were asked about their perceived work obligation during the COVID-19 crisis under certain conditions as potential barriers for reporting to work. Table 3 demonstrates the dichotomized responses to perceived work obligation under such conditions. The lack of availability of appropriate personal protective equipment (PPE) is the greatest barrier for the obligation to report to work (62.6%), followed by the lack of appropriate training (53.5%). While the lack of vaccine or treatment for the COVID-19 infection was the weakest barrier for the obligation to work, it was selected by more than one-third (39.6%) of participants. In a situation where coworkers become infected with COVID-19, just under half of the study sample (47.2%) perceived an obligation to report to work. Similarly, if the participant mistrusted information supplied by the employer, just under half of the participants (47.3%) perceived a work obligation. However, if there was a need to take care of a sick family member, over half of the participants

(52.3%) still perceived an obligation to report to work.

Table 3 also shows the comparisons between participants' perceived work obligation based on their sex differences. As shown in the Table, except for the lack of appropriate COVID-19 training, male participants showed significantly higher perceived work obligation than female participants in all potential barriers including lack of appropriate PPE (males 47.6% and females 24.6%, $\chi^2 = 16.59$, $P\,2 = 6.67$, $P = .02$); mistrust of information from employer (males 54.3% and females 40.2%, $\chi^2 = 5.83$, $P = .03$); lack of vaccine or effective treatment (males 67.3% and females 52.3%, $\chi^2 = 6.86$, $P = .02$); and a need to take care of a sick family member (males 59.5% and females 43.5%, $\chi^2 = 7.45$, $P = .01$).

Table 4 shows the relationships between participants' perceived work obligation and their profession. Chi-square test with an adjusted standardized residuals test was performed to identify between-group differences. If some coworkers become infected, nurses are more likely to perceive an obligation to work, whereas other allied HCPs are less likely to perceive an obligation to work (physician 51.9%, nurses 54.5%, EMS providers 39.2%, and others 32.8%, $\chi^2 = 10.18$, $P = .03$). In addition, if there is a lack of an effective vaccine or treatment for COVID-19, nurses are more likely to perceive an obligation to work, whereas other allied HCPs are less likely to perceive an obligation to work (physician 57.1%, nurses 71.7%, EMS providers 56.0%, and others 38.1%, $\chi^2 = 21.76$, $P\,2 = 11.83$, $P = .005$). There was no significant relationship between job type and other potential barriers, including lack of appropriate PPE, mistrusting information from the employer, and the need to take care of a sick family member. We found no significant relationship between perceived work obligation and marital status or between perceived work obligation and having children.

Discussion

Our study findings show that commitment to the served community was the main reason for reporting to work in the early phase of the COVID-19 pandemic in Jordan. The study also indicated that the lack of availability of appropriate PPE and the lack of appropriate training were the greatest barriers to the perceived obligation to report to work, whereas lack of vaccine or treatment for COVID-19 was found to be the weakest barrier. Males perceived higher work obligation than females, and nurses perceived a higher work obligation than other HCPs.

We found that commitment to the served community was the major stimulus for all types of HCPs to report to work despite the increased risk. To explain this, there is a need to put the findings in context. During the data collection period, the media was very active in highlighting the crucial role of the frontline HCPs in serving the community and saving lives in the pandemic. This was clear when the country was on strict lockdown and under curfew except for those HCPs who could move freely through checkpoints with high respect. These situations may have helped make the commitment to serve the community the optimal reason for coming to work. In addition, the finding that those who were not willing to report to work or would report only to avoid penalties were mainly among the other allied health group of professionals, is in congruence with the previous studies indicating that physicians and nurses have a higher willingness to work than others.[26,27] It should be noted here that HCPs in Jordanian hospitals are full-time workers. Those who do not report to work as scheduled are subject to some form of penalty. In the prehospital setting, EMS providers work in a quasi-military system (under the umbrella of the Civil Defense) and may therefore be subject to more severe forms of penalty in cases of work absenteeism.

The findings of our study also showed a high willingness of HCPs to work during the COVID-19 pandemic, which is in congruence with the recent studies in this field.[26,28,29] Willingness of HCPs to work during influenza pandemics was examined in previous studies, and results were varied. A systematic review found that willingness to work during influenza pandemics ranged from 23.1% to 95.8%, depending on the context and scenario of the study.[27] The review also found that being male, a physician, or a nurse was associated with willingness to work. Recent studies on the COVID-19 pandemic found varied results as well. For instance, a recent study in Jordan found that while 96.4% of participants (physicians, nurses, and EMS providers) were willing to report to work during the pandemic, fewer than two-thirds (64.7%) were willing to provide direct care to patients with COVID-19.[28] Other studies found that the willingness of HCPs was 77.1% in China,[30] 69% in Bangladesh,[29] and 75% in Palestine.[26] Being male, working in the emergency department, having received appropriate training, and having low work-related stress levels and long

experience were associated with willingness to work,[26,28,29] whereas concern for family and lack of safety measures were the major barriers to willingness to work.[28,29]

Barriers Toward Perceived Work Obligation

The findings of our study highlight the importance of exploring and managing the main barriers that may influence the decision of HCPs to report for duty during pandemics. In this study, while the overwhelming majority of participants indicated a willingness to work during COVID-19, only about half of them perceived an obligation to report to work in the presence of any of the aforementioned barriers. Previous studies indicated that emergency responders face difficulties in balancing their safety and duty to work during disasters and public health emergencies, which could result in a significant shortage of HCPs.[10,31] Previous studies also indicated that the perception of duty to work has a major influence on reporting for duty.[1,32]

PPE are of prime importance to keep HCPs safe from contracting infections. During disease outbreaks, there might be a need for additional PPE and training to protect workers. In the United Kingdom, during the heat of the COVID-19 response in March 2020, HCPs threatened to quit their work if they were not provided with appropriate PPE, as they felt that working without enough PPE would have exposed them to unacceptable risks.[20] In addition, for the COVID-19 response, McConnell[9] indicated that in the case of a PPE shortage, the risk of infection increases, and the chance of fatal infection reaches approximately 1/200. In such a case, the author believes that HCPs are not obligated to work.[9] Our findings are in congruence with these previous studies. That is, lack of proper PPE was found to be the major barrier to perceived work obligation, as about two-thirds of participants indicated that they did not feel obligated to report to work during the COVID-19 pandemic if there was a lack of PPE.

Our study indicated that in the case of inappropriate training, more than half of the participants perceived no obligation to work, making it the second major barrier to working during the COVID-19 response. Our findings were in congruence with previous studies, as knowledge and training on infectious diseases and infection control practices are among the most important contributing factors to motivating HCPs and enhancing their intention to work during public health emergencies.[24,32-35] A study by Weingarten et al[36] found that HCPs and families of infected patients were at the highest risk of infection with COVID-19. In the middle of the COVID-19 response, a study in China found that 64.6% of participants received specific COVID-19 training at hospitals.[30] The study also showed that 77.1% of participants were willing to provide care for patients with COVID-19 infection.

Although vaccine availability is important in protecting responders, prompt availability of vaccination in the early stages of disease outbreaks is unlikely because of the long process of its development and distribution. However, research studies have indicated that vaccine availability might influence the decision on reporting to work.[23,37] For instance, a study found that lack of effective PPE, along with the absence of self and family vaccination, were reported to dramatically decrease willingness to report for duty from 91% to 4%.[37] In our study, however, the availability of effective vaccines and treatments was least indicated by participants as a barrier for duty to treat. Their response can be explained by the observation that HCPs, in general, acknowledge that the development of a vaccine may require many months before it becomes available to responders, and that with proper PPE, they can be safe. In addition, the COVID-19 cases were under control during the period of data collection, which could have made HCPs less concerned about not being vaccinated.

Sex Differences

Our study indicates that male participants perceive higher work obligation than female participants in the presence of all potential barriers. This might be due to the stereotypes concerning the role expectations of males and females in the society of Jordan. In Jordan, females are generally assumed to be the primary caretakers of dependents in the households.[38] This unequally socially imposed role indicates that the exposure of female HCPs to the COVID-19 infection in the workplace could put their dependent family members at higher risk, which might be the main factor for their lower perception of work obligation compared with the males. In addition, a recent report on discrimination in Jordan found that women are still being viewed as mothers and wives, which may undermine their social status, economic status, and profession.[38] Our study findings are also in congruence with previous studies indicating that the male sex is a factor associated with willingness to work.[27,32,39,40]

Occupational Differences

There are occupational differences in perceptions of working during pandemics. According Malm et al[41] and McConnell,[9] the benefits one gains from their job, including social prestige, determine the level of duty to work. That is, HCPs such as physicians and nurses experience a stronger sense of duty to treat patients than social care workers owing to the greater benefits they acquire from the job.[9] Although all HCPs are needed to keep health agencies functioning during normal times, some jobs are needed more than others during public health emergencies. For instance, nurses are most essential during pandemics, and they are at the highest risk of contracting infection due to frequent and long duration of contact with patients.[41] While historical social and power dynamics have granted nurses fewer benefits and social prestige compared with physicians, our study found that nurses perceive higher work obligation than other HCPs, including physicians, in situations where they lack appropriate training, lack effective vaccine or treatment, or there is a reported infection among coworkers. Previous studies showed that physicians and nurses have a higher willingness to work than others,[26,27] with physicians being the most likely to be willing to work.[27] Furthermore, after the Fukushima nuclear disaster in Japan in 2011, a study found that only 47% of HCPs reported to work in their hospitals (within the impacted zone).[42] Second to the clerks (38% reported to work), only 48% of nurses reported to work. This fact was explained by suggesting that clerks and nurses were mostly women who had evacuated from the impacted area due to the concern of radiation exposure to their children. In our study, lower concerns about the impact to children from COVID-19 infection may explain the higher perceived work obligation among nurses than others.

Effect of Having Children

The current study found no significant effect of having children on the perceived work obligation, which contradicts the findings of previous studies.[42,43] The reason for the difference in our findings from other studies is unclear. A possible explanation is that early in the COVID-19 outbreak, children were the least affected group from COVID-19 infection. However, our study indicated that almost half of the participants perceived no obligation to report to work if they needed to take care of a sick family member (not necessarily children). This supports the findings of a previous study indicating that 28% of HCPs agree that it is professionally acceptable to abstain from work to protect the family during pandemics.[44] With regard to the COVID-19 response, McConnell[9] indicated that it is morally permissible for HCPs to abstain from work when the risk and burden to self and family outweigh the duty to treat. This is the case in COVID-19, as the elderly are at a much higher risk of death from COVID-19 infection than the young.[9] During pandemics, first responders are more concerned that they could transfer the contagious disease to their family members.[43] During the SARS outbreak, for instance, many HCPs contracted the disease from their work, and some of them transmitted the infection to their family members.[2] It was found that 21% of victims of the SARS outbreak were HCPs.[45] The feeling of uncertainty and the concern for family safety are reported to be the main sources of role conflict during disasters.[46] Another potential reason for the conflicting findings from our study, compared with previous studies, was that we did not measure whether the participant was the primary caretaker for their children; we only measured whether they had children.

RWA Framework

This study assessed the perceived duty to work within the context of the RWA framework. In assessing the readiness domain, the readiness should be assessed at the individual, agency, and system levels. That is, at the agency or system levels, readiness includes “staff, structure, and stuff.” This means that the presence of barriers (in staff, structure, or stuff) for reporting for duty may influence the readiness domain of the framework.[16] In our study, the lack of appropriate PPE (stuff) was the greatest barrier to the perceived obligation to report to work. For the willingness domain, the willingness of an individual to respond appropriately is influenced by many factors. For instance, training experiences can provide confidence in the ability to respond, which in turn affects willingness to respond. Other factors may also influence the willingness to respond such as risk perception, trust relationships, and political imperatives.[16] Our study found that the lack of appropriate training and mistrust with the employer were among the major barriers for perceived work obligation. For the ability domain, which is the actual ability of an individual to perform a task, included are knowledge, competencies, and proficiencies that come from education,

training, and preparatory experiences.[16] Our study found that lack of appropriate training influences the perceived duty to work, indicating that proper training can improve both the ability and willingness to respond. In addition, previous studies found that HCPs trained on disaster situations are more likely to perform better during actual disasters.[15] Therefore, it is plausible that applying RWA constructs would improve the likelihood of coordinated, comprehensive, and competent responses to public health emergencies. Future study is needed to test this framework.

Limitations

The inherent nature of cross-sectional designs and the type of questions may have influenced the way participants answered the questions. Participants were enrolled mainly through closed WhatsApp groups of health care professionals, the most widely used social media tool in Jordan. Owing to the nature of the online survey, those who were not using these social media tools or were unavailable during the data collection period may not have had the chance to participate, which could limit the representativeness of the sample. We also could not exclude the possibility of response bias as the sample did not reflect the exact population demographics, given that more EMS providers and less physicians were represented in the study sample. In addition, the period of data collection occurred in an early phase of the pandemic, during lockdown, and with a relatively low number of COVID-19 cases in Jordan. Had the study been conducted in a later phase of the pandemic with more population deaths among coworkers and their families, the study may have produced different results. Finally, limits to generalizability include nonsystematic sampling and relatively small sample size. Health care specialty was not measured, nor were the age(s) of children and primary caretaker status of the participant.

Implications for Emergency Nurses

Individual clinicians and health care agencies in Jordan should be proactive in their disaster preparedness for infectious disease surges. Each organization and trained professional must assess factors to ensure they are ready, able, and willing to provide care for patients in pandemic surge conditions. These preparedness activities may include, but are not limited to, providing training, proper PPE, vaccinations, incentives, physiological and psychological support for staff and their families, and keeping them informed about the pandemic progress.

This study assessed the perceived work obligation of HCPs within the context of the RWA framework. Although the perceived work obligation can be influenced by the 'ready,' 'willing', and 'able' domains, this study focused mainly on the 'willing' domain at the individual level. Future studies may use the RWA constructs as a framework to assess the preparedness of the health care system of Jordan for quality response to future disasters taking into consideration the 'ready', 'willing', and 'able' domains at system and organizational levels.

There is a plethora of resources that can be used for disaster preparedness at individual and organizational levels.[47-49] For instance, the World Health Organization developed a strategic framework for emergency preparedness identifying the principles and elements applied in developing effective emergency preparedness at all levels.[47] In addition, the US Department of Health and Human Services developed the Kaiser Permanente Hazard Vulnerability Analysis as a tool that can be used by health care facilities to analyze hazards using a systematic approach.[50] At the individual and household levels, the Society for Academic Emergency Medicine and Ready.gov provide disaster preparedness plans and toolkits.[48,49] At the local level, the health care system in Jordan is ill-prepared for disaster response and lacks the necessary resources to support professional and organizational readiness.[51] However, health officials and decision-makers can adapt such resources within the context of Jordan to enhance the response preparedness of the country at the household, professional, and organizational levels.

Conclusions

During the COVID-19 pandemic, it was clear that the need for HCPs was never greater. This study assessed the perceived work obligation of HCPs within the context of the RWA framework. While the majority of HCPs were willing to report to work during pandemics in our study, many barriers can significantly influence the perceived obligation to report to work. The lack of PPE, along with the lack of appropriate training, were the major perceived barriers. Males and nurses perceived more obligation to work than females and other HCPs, respectively. There is an urgent need to provide training, proper PPE, vaccinations, incentives, and physiological and psychological

support for staff and their families to motivate HCPs to report to work during pandemics. Relying on the HCPs' sense of commitment to work may not be the best strategy to maintain staffing; other practical state, organizational, and individual preparedness interventions are recommended.

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Author Disclosures

Conflicts of interest: none to report.

Supplementary Appendix

Questionnaire

Dear health care providers,

We are hoping for your valued participation in our research by completing this survey entitled: **Duty to Work during the COVID-19 Pandemic: Perceptions of Healthcare Providers in Jordan**. Your feedback is important. This survey designed to assess the perceived work obligation of the healthcare providers in Jordan during the COVID-19 pandemic, and the factors that may influence their perception. The survey should take less than 5 minutes to complete.

Your participation is strictly voluntary, and responses will be kept anonymous. You may withdraw your participation at any time. All information collected from this survey will be used for research purposes only and will be kept confidential.

If you have any questions about the research, please contact the principal investigator, Dr. XXXXXXXXX via email at XXXXXXXXXXXX, or by phone at XXXXXXXXX.

Demographic information

•Sex

•Male

•Female

•Age

•_____

•Marital status

•Single

•Married

•Others

•Have children

•Yes

•No

•Education

•High school

•Diploma

•Bachelors or Higher

•Job Title

•Physician

•Nurse

•EMS providers

•Other Allied (not specified)

•Work Experience _____year.

Reason for coming to work

The main reason for coming to work during the COVID-19 response

•○Commitment to the community being served

•○Commitment to faith

•○Commitment to workplace and job

•○Avoiding penalties

•○Will not come to work in such situations.

Obligation to come to work

Based on the previous scenario, please rate your obligation to come to work from 1 to 5, with 1=Not obligated and 5=Obligated:

1. There is a lack of the availability of the appropriate PPE.

2. 1234

2.

I mistrust the information coming from my employer regarding the progress of the disease outbreak.

•1234

3.

I did not receive appropriate training specific to COVID-19.

•1234

4.

There is no vaccine or effective treatment for COVID-19.

•1234

5.

I need to take care of a sick family member.

•1234

6.

Some co-workers got infected with COVID-19.

•1234

Thank you for participating. You may now return the completed survey to the research assistant.

Supplementary Data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.jen.2022.04.004.

Variable	n*	%
Sex		
Male	164	55.0
Female	134	45.0
Age		
Mean (SD)	34.3	8.1
Median	33	
25% and 75% quartile	28-40	
Marital status		
Single	78	26.2
Married	208	69.8
Others (not specified)	12	4.0
Have children		
Yes	194	65.3
No	103	34.7
Education		

High school	7	2.3
Diploma	68	22.8
Bachelors or higher	223	74.8
Job title		
Physician	28	9.4
Nurse	154	51.9
EMS providers	51	17.2
Other allied (not specified)	64	21.5
Work experience		
Mean (SD)	11.1	7.9
Median	10	
25% and 75% quartile	4-17	

Participant response	All groups		Physician		Nurse		EMS provider		Other allied	
n	%*	n	%	n	%	n	%	n	%	Commitment to served community
106	36.0	14	50.0	56	36.4	16	31.4	21	33.3	Commitment to faith

89	29.7	7	25.0	54	35.1	15	29.4	12	19.0	Commitment to workplace and job
80	26.7	6	21.4	40	26.0	16	31.4	17	27.0	Avoid penalty
12	4.0	1	3.6	3	1.9	2	3.9	6	9.5	Will not report to work in such situations

Potential barrier	Total		Male		Female		Chi-square	df	Adjusted P value†
n	%*	n	%	n	%	Lack of appropriate PPE			
						Not obligated	189	62.6	86
52.4	101	75.4	16.59	1	< .001	Obligated	113	37.4	78

47.6	33	24.6	Some coworkers became infected with COVID-19						
			Not obligated	159	52.8	74	45.4	81	60.4
6.67	1	.02	Obligated	142	47.2	89	54.6	53	39.6
Mistrust information coming from the employer									
Not obligated	158	52.7	75	45.7	79	59.8	5.83	1	.03
Obligated	142	47.3	89	54.3	53	40.2	Did not receive appropriate training for COVID-19		
							Not obligated	160	53.5
77	47.2	79	59.8	4.65	1	.06	Obligated	139	46.5

86	52.8	53	40.2	No vaccine or effective treatment for COVID-19					
				Not obligated	118	39.6	53	32.7	63
47.7	6.86	1	.02	Obligated	180	60.4	109	67.3	69
52.3	Need to take care of a sick family member								
	Not obligated	142	47.7	66	40.5	74	56.5	7.45	1

Potential barrier	Physician	Nurse	EMS provider	Other allied	Chi-square	df	Adjusted P value[†]

n	%*	n	%	n	%	n	%	Lack of appropriate PPE			
								Not obligated	18	64.3	91
59.1	36	70.6	41	64.1	2.29	3	.76	Obligated	10	35.7	63
40.9	15	29.4	23	35.9	Some coworkers became infected with COVID-19						
					Not obligated	13	48.1	70	45.5	31	60.8
43	67.2	10.18	3	.03	Obligated	14	51.9	84	54.5	20	39.2

21	32.8	Mistrust information coming from employer									
		Not obligated	14	50.0	70	45.8	32	62.7	39	61.9	7.24
3	.06	Obligated	14	50.0	83	54.2	19	37.3	24	38.1	Did not receive appropriate training for COVID-19
											Not obligated
16	57.1	68	44.4	35	70.0	38	60.3	11.83	3	.005	Obligated

12	42.9	85	55.6	15	30.0	25	39.7	No vaccine or effective tretatment for COVID-19			
								Not obligated	12	42.9	43
28.3	22	44.0	39	61.9	21.76	3	< .001	Obligated	16	57.1	109
71.7	28	56.0	24	38.1	Need to take care of a sick family member						
					Not obligated	14	50.0	67	44.1	23	46.0
35	55.6	2.46	3	.57	Obligated	14	50.0	85	55.9	27	54.0

DETAILS

Subject:	Men; Health care; Chi-Square Test; Appropriateness; Emergency preparedness; Perceptions; Professional training; Work environment; COVID-19; Pandemics; Equipment; Obligations; Nurses; Medical personnel; Medical ethics; Emergency medical care

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ABSTRACT (ENGLISH)

Cardiopulmonary resuscitation is in progress and the patient has an implantable cardioverter defibrillator (ICD) per family's history. Narcotics may be used to treat pain caused by decreased blood flow or vasospasms (D).2 Correct answer: C If a patient remains in ventricular fibrillation with an ICD and the defibrillator does not function, the rescuer should proceed with standard defibrillation and cardiopulmonary resuscitation (C). A bar (or clinical ring) magnet that is placed directly over the ICD device will temporarily deactivate the defibrillator function (the magnet may be taped in place) (D).3 Correct answer: A The dreaded ear irrigation is not a favorite procedure for the emergency nurse.

FULL TEXT

These review questions are based on the Emergency Nursing Core Curriculum and other pertinent resources to emergency nursing practice. They offer emergency nurses an opportunity to test their knowledge about their practice.

Questions

1. A patient is being seen in the emergency department for general malaise. Which of the following laboratory values would cause you the most concern?

2. **A.**Sodium level of 144 mmol/L

3. **B.**Calcium level of 8.8 mg/dL

4. **C.**Aspartate aminotransferase (AST) level of 96 U/L

5. **D.**Serum troponin I level of 0.03 ng/mL

2.

An elderly patient is diagnosed as having peripheral vascular disease upon discharge from the emergency department. Which of the following would further enhance the disease and cause the patient further complications?

•**A.**Smoking

•**B.**Alcohol

•**C.**Calcium channel blockers

•**D.**Narcotics

3.

A cardiac arrest patient is noted to be in ventricular fibrillation. Cardiopulmonary resuscitation is in progress and the patient has an implantable cardioverter defibrillator (ICD) per family's history. You should:

•**A.**await the defibrillator to function when it recognizes the fibrillation.

•**B.**perform synchronized cardioversion as soon as possible.

•**C.**defibrillate immediately with standard equipment.

•**D.**await a magnet to turn off the implantable defibrillator.

4.

In performing an ear irrigation on an adult patient with a visualized cerumen impaction, you should:

•**A.**pull ear superiorly and posteriorly.

•**B.**pull ear posteriorly and down.

•**C.**irrigate using warm soapy water.

•**D.**use cool saline with a drip method.

5.

A cardiac monitor displays the following rhythm for a patient complaining of dizziness and shortness of breath. The patient does not describe any history of cardiac disease. How would you document this rhythm?

•**A.**Sinus rhythm with second degree Mobitz I block

•**B.**Sinus dysrhythmia

•**C.**Sinus rhythm with P mitrale

•**D.**Sinus rhythm with P pulmonale

Answers

1. Correct answer: C

The AST is markedly elevated (C). This test evaluates liver function. AST is an enzyme found mostly in the liver, and the level rises as the liver is inflamed or injured. AST is also called serum glutamic-oxaloacetic transaminase. A sodium level of 144 mmol/L is within normal range (134-143mmol/L) (A). The calcium level is within normal limits (8.6-10.3 mg/dL) (B). A normal troponin I level is 0.0 to 0.4 mg/mL. The listed value is within normal range (D).[1]

1. Correct answer: A

Smoking has been proven to enhance peripheral vascular disease owing to the vasoconstrictive effect of nicotine. If a patient continues to smoke, the peripheral vascular disease may worsen (A). Although alcohol use may cause confusion and increased tendencies for falling, it has not been associated with peripheral vascular disease (B). Calcium channel blockers may be used as a therapy for peripheral vascular disease to decrease vasospasms (C). Narcotics may be used to treat pain caused by decreased blood flow or vasospasms (D).[2]

1. Correct answer: C

If a patient remains in ventricular fibrillation with an ICD and the defibrillator does not function, the rescuer should proceed with standard defibrillation and cardiopulmonary resuscitation (C). ICDs can malfunction and may reach the full complement or therapy. A standard defibrillation should be used immediately (A). Synchronized cardioversion should be used for terminating an unstable organized rhythm, sending the shock on a defined R wave in the cardiac cycle (B). Although a magnet can be utilized to turn off an ICD, there is no need for a delay with treatment of the

patient. All ICDs have a magnet sensitive switch that responds to a bar (or clinical ring) magnet. A bar (or clinical ring) magnet that is placed directly over the ICD device will temporarily deactivate the defibrillator function (the magnet may be taped in place) (D).[3]

1. Correct answer: A

The dreaded ear irrigation is not a favorite procedure for the emergency nurse. Visualization of the canal should occur before the irrigation. The ear should be pulled superiorly, upward and posteriorly, back for an adult ear irrigation to facilitate the irrigation solution to enter the canal (A). Pulling the ear posteriorly and downward would occlude the canal (B). Saline or water would be an appropriate solution for irrigation, not containing soap, given that the bubbling of the soap would be difficult to remove from the ear canal (C). The irrigation should be room temperature or slightly warm. Cold substances should not be used for the purpose of irrigation, and the solution should be flushed gently in the canal as opposed to dripped (D).[4]

1. Correct answer: C

P mitrale is an atrial abnormality of the cardiac cycle, displaying a biphasic or bifid P wave. A characteristic M pattern is seen. A first degree heart block frequently accompanies a P mitrale pattern owing to the widening of the P wave. This is seen with left atrial enlargement or left atrial abnormality (C). A sinus rhythm with second degree Mobitz I block would display a progressive widening of the PR segment (A). A sinus dysrhythmia would display an irregular R-R interval (B). P pulmonale or right atrial abnormality would display a tall or peaked P wave. (D).[5]

DETAILS

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Coronavirus Disease 2019 in the Emergency Department: Establishing an Interprofessional Incident Command System: JEN

ABSTRACT (ENGLISH)

Coronavirus disease 2019 was declared a national emergency in the United States on March 13, 2020, at which time the Children's National Hospital Emergency Department in Washington, DC, mobilized to develop and implement a unit-based Incident Command System. Anticipating that the unique and challenging nature of this pandemic might require a large interprofessional team, emergency nurses, emergency physicians, and emergency physician assistants were placed in traditional Incident Command System roles to provide an organizational framework for the ED response. This framework served multiple purposes but most importantly it helped to efficiently streamline and coordinate communications within the emergency department, with hospital leadership and with other hospital departments. The focus on intentionally taking an interprofessional approach to assigning Incident Command System roles was key to optimize staff safety, patient care, and clinical efficiency. This paper highlights a unique concept of applying the Incident Command System model to a single hospital department in a disaster scenario, using existing ED staff to function in various roles not typically held during regular operations. Given that policies and procedures can be ever-changing during a pandemic, emergency departments can implement an interprofessional incident command structure to provide a framework for communications and operational planning

that allows for agility based on evolving priorities. The Children's National Hospital ED Incident Command System model established during the coronavirus disease 2019 pandemic can serve as a guide for other emergency departments during a disaster response.

FULL TEXT

Introduction

Coronavirus disease 2019 (COVID-19), the disease caused by the novel coronavirus, was declared a public health emergency by the World Health Organization on January 30, 2020.[1] Subsequently, the District of Columbia reported its first case on March 7, 2020,[2] and COVID-19 was deemed a US national emergency on March 13, 2020.[3] In response to the declared national emergency, the pediatric emergency department at Children's National Hospital (CNH) in Washington, DC, implemented an interprofessional unit-based ED Incident Command System (ED ICS) that went into effect on March 14, 2020.

Background

CNH is a 319-bed, freestanding, tertiary hospital serving pediatric patients in District of Columbia, Maryland and Virginia, with an annual ED visit volume of approximately 124,000 with 15,000 admissions. Although initial reports indicated the elderly were primarily affected by COVID-19,[4] preparations were also made for a potential surge of pediatric ED patients. Within the first 2 months, CNH treated more than 400 patients diagnosed as having COVID-19 in the emergency department, with 25% requiring hospitalization and, of those, 25% requiring critical care.[5] Given the highly transmissible nature of severe acute respiratory syndrome coronavirus 2, staff safety, the acquisition of personal protective equipment (PPE), and education of safety protocols were prioritized. Staying up to date on infection control measures and clearly communicating to staff became paramount and a major impetus for the rapid stand-up of a comprehensive incident command structure.

The National Incident Management System was created by the Department of Homeland Security to provide a standardized framework for responding to large-scale incidents.[6] The ICS ([Figure 1]) represents a standardized organizational structure often used in emergency management that can be adapted to a variety of situations to reduce redundancy in tasks and allow for a streamlined reporting structure.[6–8,16] This structure enables effective and efficient incident management by integrating a combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational framework.[7] The ICS has 5 major management functions: command, operations, logistics, planning, and finance.[8,9]

Methods Incident Command in the Emergency Department

The COVID-19 Incident Command in this pediatric emergency department ([Figure 2]) included an interprofessional team of emergency nurses, emergency physicians, and emergency physician assistants. Multiple groups from the ED ICS worked closely with hospital leadership, infection control, language services, registration, and other hospital departments and stakeholders to develop and lead implementation of policies and plans in the emergency department.

Command Section

The ED incident commander (IC) reported directly to the hospital COVID-19 ICS. The ED leadership decided to establish an ICS independently, given the frontline status of the emergency department and the need to make rapid decisions as the situation evolved. The finance function of the ED ICS was led by the ED IC. Relevant finance duties/management included tracking staff hours toward COVID-19-specific duties and any supply expenditures. This information was shared with the finance section of the hospital COVID-19 ICS. The ED IC also attended the hospital COVID-19 ICS meetings and was the ED spokesperson to represent at essential city and state forums that were involved in the community-wide response. Two assistant incident commander (AIC) roles were created to focus on the emergency department–specific issues, one an emergency physician leader and one an emergency nurse leader, who worked in tandem throughout the response.

An emergency physician assistant was assigned the *information officer* role. In this role, they managed a designated COVID-19 email account and helped streamline communications to the department. The IC team also worked

closely with a designated *safety officer*, who was an emergency nurse with extensive ICS training. The *safety officer's* primary role was to oversee PPE-related concerns. The fundamental ICS concept that every individual has only one designated supervisor, known as "unity of command," was strictly adhered to, improving the flow of information, helping with the coordination of operational efforts, and enhancing operational safety.[10]

Operations Section

The *operations section* was responsible for all day-to-day activities related to COVID-19 in the emergency department. The *surge unit* focused on creating a surge plan to increase the capacity for ED patient assessments and management should a large influx of patients overwhelm current capacity.

The *psych unit* worked with psychiatric services to manage mental health patients by helping to develop testing protocols and guidance for psychiatry admission protocols.

The *code room/intubation unit* worked in conjunction with the *PPE branch*, infection control, and the critical care department to develop policies and procedures to keep staff protected during high-risk procedures such as intubations, critical care resuscitations, and aerosolizing procedures.

The *patient follow-up unit* developed and maintained a system to address the large number of COVID-19 test results that required follow-up in a timely manner. Although test follow-up is an already established process in the emergency department (eg, culture results), the sheer number of COVID tests requiring follow-up necessitated a team to develop a new process to manage the increased workload.[11] The *education unit* prepared COVID-19-specific discharge instructions for families using guidelines from the Centers for Disease Control and Prevention, led staff educational updates, and maintained revisions on informational signage throughout the unit.

The *emergency medical services/transport unit* worked with prehospital partners and the interfacility transport team to ensure consistency of practice and standardization of protocols for transferring patients from the field or an outside facility. This required extensive coordination among the regional EMS systems, various regional EMS providers, and the interhospital transport team.

Planning Section

The *planning section* addressed internal and external planning, rapidly creating new teams as the need arose. For example, a *telehealth unit* was established to improve ED telehealth capabilities focused on virtual patient follow-ups and enhanced caregiver communication via virtual platforms. The *community/primary care unit* worked with the local referring provider community to inform them of ED policies, facilitate referrals, and communicate follow-up processes.

Logistics Section

The *logistics section* had 2 primary roles: PPE and staffing. In this pandemic, the rapid standup of the *PPE branch* was imperative and was overseen by the *safety officer.* The *PPE branch* ensured adequate supply of PPE and worked closely with infection control to develop PPE protocols for emergency department–specific, high-risk clinical situations such as caring for patients undergoing an aerosol generating procedure.

The *staff branch* worked closely with the hospital occupational health department to manage reports of exposures and persons requiring quarantine, oversee changes to the clinical schedules, and address the unique stressors posed by the pandemic. This included connecting staff with mental health resources and facilitating staff connections for childcare. The *staff branch* also organized regular wellness activities, including virtual happy hours, and managed the distribution of donated food to staff on shift.

Communication Model

Effective communication in any disaster is paramount.[12] The COVID-19 pandemic provided a unique challenge, given the vast number of unknowns about the disease, the evolving nature of the level of outbreak, and shifting priorities and recommendations from public health and government officials. Correcting misinformation and being transparent about what was unknown, especially early on, were key features of our communications strategy.

For decades, the American Heart Association and American Academy of Pediatrics have provided guidance on interprofessional communication during a crisis, via certification courses such as Pediatric Advanced Life Support (PALS). Although PALS scenarios are often exercised during smallscale resuscitation events, the same key team

dynamic principles were used daily to navigate the COVID-19 pandemic in the emergency department. Closed-loop communication, clear messaging, clear roles, knowing one's limitations, knowledge sharing, constructive intervention, reevaluation and summarizing, and mutual respect were all familiar practices for ED staff to rely upon and apply during this COVID-19 response.[13] Role confusion is another phenomenon identified as uniquely prevalent during crises that is proven alleviated by checklist or job aid amidst an emergency event.[14] The clear hierarchy inherent to ICS application not only establishes a who's-who contact list but also minimizes redundancy by delineating responsibilities at the command, group, and individual levels. Concise definition of roles should be shared with all staff for accountability with top priorities for each role reassessed frequently among ICS team members.

Communication within the ED ICS was shared via a single email distribution list for all members of the ED ICS and a text group for urgent issues. Initially, the ED ICS met daily on video-conference calls run by the AICs. The frequency of these meetings decreased as groups became more self-sustaining, global needs reduced, and the influx of new information to guide policies and practice became more consistent.

It was important that communication to the ED staff was frequent, concise, easily digestible, and readily available. To accomplish this, an email titled "5@5" was used daily to reach the ED staff. At 5 pm each day, the AICs summarized 5 key points regarding the COVID-19 response. This email became a popular and widely used source of information well beyond the ED recipients and at its height included nearly 600 people from multiple departments and executives throughout the hospital. Topics ranged from urgent notifications to inspirational messaging, important process changes, lessons learned, latest science, ED trends in data, free resources available to health care workers, and light-hearted quotes.

To provide a forum for questions, a separate dedicated email account through which staff could send COVID-19-related queries was developed and managed by the information officer. Multiple department-wide virtual town halls were also conducted, which allowed staff to ask the ED ICS team leaders questions directly, engage in real-time discussions, and unwind and socialize with their peers.

Implications for Emergency Nurses

Establishing an interprofessional ICS structure for a disaster such as the COVID-19 pandemic is an efficient and effective way to organize a department-level response, particularly in lieu of the restrictions placed on being able to meet in person and the switch to prioritizing virtual forms of communication during the pandemic. This article describes a unit-based ICS framework implemented during COVID-19 to efficiently streamline and coordinate interdisciplinary communications within the emergency department and with other hospital departments. The ICS was established quickly, with major elements functional within 28 days (Figure 3). The disruption of routine staff meeting schedules and urgency for nimble operational changes to keep up with the evolving hospital and public health guidelines for managing the pandemic culminated in a need for the emergency department to have a leadership framework similar to the hospital and public health department framework. Goals were to optimize staff safety, patient care, and clinical efficiency. Although not formally measured, success with this unit-based framework was determined by positive feedback from staff, low workplace infection rates, reduced redundancy of tasks at the leadership level, and a notable decrease in individual questions and queries from staff as regular communications increased. This unit-based framework for crisis communications and operational planning using established ICS roles can serve as a guide for other emergency departments during a disaster response.

Key take-home points are as follows:

- Create an interprofessional approach to ICS leadership (emergency nurses, emergency physicians, emergency physician assistants) that allows for buy-in and perspectives that represent the needs of various disciplines in the emergency department.

- Regularly engage key relevant hospital departments and hospital leadership (eg, infection control, intensive care units, laboratory, medicine).

••Identify liaisons to hospital committees and departments to facilitate bidirectional and streamlined communication.

••Implement relevant ICS units as key issues emerge and retire groups as their goals are met.

••Establish regular meetings with all ICS members and modify the frequency of meetings as the situation evolves.

••Encourage a formal team-dynamics framework, such as that given by the American Heart Association PALS programming, for a template of established, interprofessional communication tools.

••Streamline department-wide communications to convey important, timely, and accurate messaging to aid in information management and mitigate misinformation.

••Create a streamlined system for bidirectional communication between staff and ICS leadership.

Conclusion

COVID-19 has affected every facet of life, both professionally and personally. Establishing an emergency department–focused ICS leadership structure with emergency nurses, emergency physicians, and emergency physician assistants in the early stages of the pandemic was key to success. Although there are other examples of ICS structures during COVID-19,[15] this is the first we are aware of in the published literature to specifically highlight the use of an interprofessional unit-level team and not one composed entirely of physicians.[13] Although this experience is based on a pediatric emergency department, this framework has broad applicability to any ED setting. As the COVID-19 pandemic continues to evolve across the US, success in this emergency department's response was attributed to implementing leadership strategies rooted in an emergency preparedness framework. This experience demonstrates that the ICS structure can serve as a model for leadership in an ED disaster response and the importance of including all disciplines of the clinical team.

Author Disclosures

Conflicts of interest: none to report.

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New Light on the Person With the Lamp: Tales from Shanghai, China: JEN

FULL TEXT

It was a cold winter night when a hospital in Shanghai had to be urgently shut down because of the epidemic. Our hospital was called upon to receive patients referred from the closing hospital and to perform nucleic acid testing on the personnel involved. All of our emergency nurses canceled their vacations and arrived at the hospital overnight to work overtime. Our hospital has again adopted the mobile hospital we used in Shanghai and Wuhan during the early stages of the outbreak.[1]

The picture shows a nurse standing outside the mobile hospital holding the mobile equipment waiting for the patients who will be transferred from the closed hospital. The faint light is so bright in the cold winter night that it makes people feel hopeful and warm. Such a picture cannot help but remind me of the legendary person with the lamp, the pioneer of nursing—Florence Nightingale. Déjà vu. Generation after generation of nurses are just like this. They take the lamp from their predecessors and pass it on from generation to generation.

For countless days and nights since the outbreak of the epidemic, emergency nurses have always stood on the front line. In this battlefield without fire, they are the person with the lamp of today. While continuing the practice tradition from the time of Nightingale's Pledge, they also write their own pledge now: "Learn for dispelling disease, Moralize for promoting benevolence, Unite for overcoming difficulties, Love in the world. We are not only the person with the lamp, we ourselves are the brightest source of light - burning ourselves and illuminating others."

We dedicate this to the nurses who have been fighting on the front line and thank them for their effort and dedication. We believe that the epidemic will eventually pass and we will triumph together.

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A Cross-sectional Study of Self-Perceived Educational Needs of Emergency Nurses in Two Tertiary Hospitals in Nairobi, Kenya: JEN

ProQuest document link

ABSTRACT (ENGLISH)

Background

Many low- and middle-income countries lack resources for well-functioning emergency care systems. Emergency nurses interact with injured and critically ill patients as the first contact in many health care settings. However, insufficient training limits nurses from providing ideal emergency care. The purpose of this research was to highlight educational needs specific to nurses working in 2 emergency departments in Nairobi, Kenya.

Methods

A descriptive cross-sectional study involving emergency units of 2 of the largest referral and teaching hospitals (Aga Khan University Hospital, Nairobi, and Kenyatta National Hospital) in Nairobi, Kenya, was conducted. Data were

collected by using an adapted structured, self-administered questionnaire. The data were analyzed using descriptive statistics. The skills and competencies of the participants were assessed. In addition, the educational gaps and needs of the participants around emergency care such as trauma, cardiovascular diseases, and respiratory and neurological illnesses were described. Results were presented in frequencies and percentages.

Results

The questionnaire response rate was 63.6% (n = 84). Most of the respondents held associate degrees in nursing (72.6%), whereas 19% had a bachelor's degree in nursing. Most respondents (84.5%) perceived themselves as being highly competent in basic skills such as performing cardiopulmonary resuscitation and assessment of body systems. Less than half of the respondents (48.8%) perceived themselves as being highly competent in intermediate skills such as assisting with endotracheal intubation. In advanced competencies, such as analyzing electrocardiograms and administering thrombolytic medications, only 16.7% perceived themselves as highly competent.

Conclusion

The results of this study suggest there is a knowledge gap and educational needs among emergency nurses in Nairobi, Kenya. It identified injuries/trauma; cardiovascular, respiratory, and neurological disease; and other emergencies as topics of focus areas with a high need. To address these knowledge and skills needs, a future specialty training in emergency nursing is recommended and this could be achieved through continuing professional development and short courses or postgraduate-level training.

FULL TEXT

Background

Emergency care remains one of the least developed aspects of health care in low- and middle-income countries (LMICs) because many of these countries lack coordinated systems and have limited resources.[1] If efficiency and organization of emergency care were improved in LMICs, more lives could undoubtedly be saved, despite emergency care's limitations in LMICs compared with high-income countries.[2.] Even though communicable and maternal causes of death have decreased sharply globally as a proportion of total deaths in global disease burden, they still remain common causes in LMICs[3] with approximately 90% of the injury burden occurring in LMICs.[4]

The need for emergency care improvements is particularly relevant in LMIC sub-Saharan Africa. In Kenya, the leading causes of mortality related to disease processes are communicable with HIV/AIDS, lower respiratory tract infections, and diarrheal diseases.[3] Kenya, like other developing countries, has seen a rise in fatalities from injury throughout the past 40 years, which can be partially credited to the lack of a comprehensive emergency trauma care system.[5] More specifically, Nairobi (the capital city) has seen a dramatic increase in building collapses in the recent past, adding to the overall burden of injuries.

Nurses make up the largest group of health care workers and form the backbone of health care delivery in Africa and are often the first health care professionals to manage a severely injured or critically ill patient.[1] Emergency nurses need an advanced skill set and in-depth clinical knowledge for effective management of their patients.[6] The capability of emergency nurses to promptly identify signs and symptoms in patients who are acutely sick is critical to provide safe patient care. Globally there are no uniform guidelines that direct the level of education that is required to work in nursing roles in emergency departments.

Australia, Canada, New Zealand, the United Kingdom, and the United States have well-established emergency nursing competency standards and advanced practice roles, including emergency nurse practitioners who require graduate education for qualification, certification, or registration.[7] Emergency nursing in Africa is progressing, but is confined by limited resources.[8] Previous studies demonstrate inadequate basic emergency skills, course knowledge, and exposure to emergency departments in nursing undergraduate training programs in Africa.[9] Formalized specialist emergency care is developing in many African countries such as Kenya, but many of these countries have not yet established emergency nursing as a nursing specialty.

Addressing these educational deficits through an African emergency nursing curriculum has been a challenge owing to a lack of resources, communications challenges and disruptions, low educational uptake, and a lack of monitoring

and evaluation initiatives.[8] Patients with various clinical presentations to the emergency department are evaluated by health care providers of different medical specialties but all of these patients will still interact with emergency nurses during their care. Therefore, emergency nurses need a higher-level skill set and in-depth knowledge to manage these patients' care effectively.

According to a study conducted in Dar es Salaam, Tanzania, nurses lacked knowledge and skills pertaining to patient's triage assessments in emergency departments.[2] This knowledge and skill gap is concerning because triage in emergency departments is key for patient prioritization and may influence patient outcomes. A different study in South Africa found that only 2 of their sampled nurses (n = 128) working in the emergency department had formal training in emergency nursing. Almost half of these respondents (48%) had low self-perceived competency levels.[6] Emergency nurses need advanced expertise and vast clinical knowledge to enable them to manage and provide effective patient care, which demonstrates a need for continuing educational advancement and ongoing professional development among Kenyan emergency nurses. This study aimed to describe self-perceived educational needs of nurses working in emergency departments in Nairobi, Kenya. Specific objectives entail (1) describing levels of perceived competencies among emergency nurses, (2) identifying the educational needs of nurses working in emergency units in Nairobi, Kenya, and (3) determining potential means of addressing these gaps.

Methods Design

This was a descriptive, cross-sectional study describing the self-perceived educational needs and competency levels among nurses working in emergency departments in Nairobi, Kenya. Data were collected in December of 2019.

Setting

The setting of the study included the emergency units of 2 of the largest referral and teaching hospitals in Kenya. Of the 2 hospitals in Nairobi chosen to be part of this study, Aga Khan University Hospital, was privately funded, and Kenyatta National Hospital was state owned and funded. These 2 hospitals were selected because they have busy 24-hour emergency units with 200 to 250 daily patient visits and serve as major trauma and referral centers for Nairobi and Kenya as a country.

Study Population

The target population were nurses working in the emergency departments of the 2 hospitals working in both adult and pediatric emergency departments. At the time of data collection, Aga Khan University Hospital employed 60 registered nurses and Kenyatta National Hospital employed 95 registered nurses in their emergency departments. All nurses are licensed by the Nursing Council of Kenya (NCK) by means of a state board examination after nursing education training.

The inclusion criterion for the study was registered and enrolled nurses (enrolled nurses are nurses providing nursing care under the direction and supervision of a registered nurse and are licensed by the NCK; their roles are similar to licensed practical nurses in the US or nursing associates in the United Kingdom) in the emergency department of the 2 study sites who were directly involved in patient care. Those excluded were nurse managers, nurses not involved in direct patient care, and student nurses in the emergency departments.

Sampling

Convenience sampling was used to include all nurses who were available, directly involved in patients care and willing to participate.

Data Collection

The data collection tool was an adapted structured, self-administered questionnaire developed by Dulandas and Brysiewics[6] who also approved its use and adaptation. The validity of the tool has been assessed by specialists in emergency care in Ghana and the US.[6]

Variables

Knowledge and skill competencies of emergency nurses can be defined in 3 stages: basic, intermediate, and advanced.[10] Basic skills are the fundamental knowledge an emergency nurse should have, such as performing cardiopulmonary resuscitation (CPR) and assessment of body systems. Intermediate skills are gained with

experience and higher levels of knowledge, such as assisting with endotracheal intubation. Advanced skills such as analyzing electrocardiograms and administering thrombolytic medications involve knowledge application and critical reasoning gained through experience and specialty level training.[6] Competency levels were self-rated as least competent (1 score), competent (2 scores), and highly competent (3 scores). A higher score indicated higher self-perceived competence. The skills were categorized as basic, intermediate, and advanced skills.

Educational needs were rated in relation to 5 areas, namely trauma, cardiovascular, neurological, respiratory, and other emergency topics. The respondents were asked whether they agreed they had an educational need. Agreed scored 3 points, neither agree nor disagree scored 2 points, and disagree scored 1 point. Hence, the higher the score, the higher the educational needs.

Procedures

Appointments were made with the nursing managers of the respective units to contact their nurses and observe all due institutional protocols. Data were collected by research assistants by directly distributing paper questionaries to the nurses. All filled questionnaires were returned to the research assistant who then handed them over to the principal investigator and stored in a lockable cabinet. The questionnaires were stored in the lockable cabinet held by the principal investigator until they were entered into a password-protected and encrypted database.

Ethical Consideration

Permission and ethical approval to conduct the study were sought and granted by the Aga Khan University Ethics Committee, the research Committee of Kenyatta National Hospital/University of Nairobi, and National Commission for Science, Technology and Innovation. A written informed consent was obtained from each respondent prior to data collection.

Data Handling and Analysis

Data were analyzed using the SPSS, version 20 (IBM SPSS Statistics). Descriptive statistical techniques were used to analyze the data, and the results were presented using frequencies and percentages. There were questions with incomplete responses that were missing at random. Missing data were caused by nonresponse from the study participants and were excluded list-wise.

Results Demographic Characteristics

At the time of data collection, study site 1 had 47 emergency nurses of whom 37 agreed to complete the questionnaires and study site 2 had 85 nurses of whom 47 participated in the study. The response rate was 63.6% (n = 84) as illustrated in Table 1.

Most respondents held associate degrees in nursing 72.6% (n = 61), whereas 19% (n = 16) had a bachelor's degree in nursing and 4.8% (n = 4) had a higher degree or specialized training in emergency nursing (a postregistration-level training). Only 2 of the respondents had a certificate in nursing, and 1 respondent had a master's degree in nursing.

Competency Levels

As noted in the methods, competency levels were self-rated as least competent, competent, and highly competent, and the skills were categorized as basic, intermediate, and advanced skills. These data are illustrated in Table 2.

In basic competencies, most respondents (84.5% [n = 71]) perceived themselves as being highly competent (see Table 3 below). In intermediate skills, less than half of the respondents (48.8% [n = 41]) perceived themselves as being highly competent whereas 47.6% (n = 40) perceived themselves as competent. In terms of advanced competencies, only 16.7% (n = 14) perceived themselves as being highly competent (see Table 3).

Educational Needs

Regarding trauma topics, the highest educational need included intra-abdominal injuries at 83.3% (n = 70) and spinal cord and head injuries with both listed at 81% (n = 68). The cardiovascular topic thought by respondents to be of highest educational need was cardiogenic shock at 85.5% (n = 71) followed by acute myocardial infarctions and defibrillation/cardioversion with 81% (n = 68) and 79.8% (n = 67), respectively.

A high need for additional education on neurological topics was for stroke, intracranial bleeding, and convulsive disorders with 78.6% (n = 66), 78.6% (n = 66), and 71.4% (n = 60), respectively. High educational needs in the area

of respiratory emergencies included blood gas analysis at 78.6% (n = 66) and mechanical ventilation at 77.4% (n = 65) and chronic obstructive pulmonary disease at 75% (n = 63).

Other areas of emergency nursing with a high need for education were triage at 89.3% (n = 75), disaster preparedness at 88.1% (n = 74), and advanced cardiac life support at 88.1% (n = 74). It is worth noting that in all of the above areas no topic scored less than 55% indicating a very high educational need ([Table 4]).

We also asked respondents about barriers to their emergency educational development. We asked the respondents whether they agreed or disagreed that funding, support from hospital management, access to educational institutions, staffing issues, and time were a barrier to their educational development. The majority (70% [n = 59]) highlighted that funding was the major barrier to their development. Staffing issues (61.9% [n = 52]), time (56.0% [n = 47]), support from management (41.7% [n = 35]), and access to educational institutions (36.9% [n = 31]) were other barriers to nurses' educational development.

Discussion

We studied nurses working in 2 emergency departments, sought to identify current gaps in emergency nursing as a specialty in Kenya, and examined the educational needs specific to nurses working in emergency departments in Nairobi, Kenya.

Demographics

Most nurses working in the emergency departments had an associate degree and did not have any formal training in emergency/trauma nursing. These findings are similar to other studies conducted in Africa that have drawn attention to the educational needs of nurses in our emergency departments.[2,6] Although all nurses in the study were registered by the NCK and are thus qualified to be practicing as nurses, basic nursing education does not provide sufficient emergency nursing competence for high-quality and safe care in the emergency setting.

Basic Skills

Limited basic emergency knowledge and skills are included in undergraduate nurse training programs, and not all nursing programs include rotations through emergency departments. Consequently, there is a need for supplementary structured emergency nursing education.[9]

Nurses are key members of any health care system, and their clinical competency is crucially important, particularly in the emergency department. There is an association between nurses' clinical competency and quality of care.[11] Most nurses (84.5%) perceived themselves as being highly competent in basic skills, implying that the nurses are knowledgeable and skilled in providing quality and safe care in terms of basic skills. The lowest scored basic skill was CPR with only 73.8% perceiving themselves as highly competent in this area. This finding echoes Dulandas and Brysiewicz[6] in South Africa who studied nurses in tertiary hospitals and also found that CPR was the basic skill in which most nurses felt less competent. CPR is a critical element of basic life support and is the first-line response to cardiac/respiratory arrest before defibrillation and advanced life support are available. It is expected that nurses, especially those working in emergency departments, should be highly competent in CPR. Although it is commendable that 73.8% of nurses studied perceived themselves to be highly competent, there were also 26.2% who felt less competent in CPR. Bearing in mind that these study centers were referral and trauma centers in which direct care is provided to high acuity patients, this could have direct implications for patient care.

Intermediate Skills

In terms of intermediate skills, less than half of the emergency nurses (48.8%) in our study perceived themselves as being highly competent. In specific skills, ability to prepare and administer drugs in cardiac arrest and ability to manage shock were the areas where respondents were least competent with 53.6% and 56%, respectively. This is an area of concern because emergency nurses often encounter unexpected cardiac arrest with little information about the patients.[12] There is an expectation for nurses to have pharmacological knowledge of indications and adverse effects of the drugs used in cardiac arrest and correct doses, routes, and frequency. The fact that almost half the nurses do not perceive themselves as highly competent could be a plausible reason for poor outcomes in cardiac arrest in Kenya.

Only 56% of nurses studied felt they were highly competent in managing patients in shock. Could this affect the fact

that hypovolemic shock associated with diarrheal diseases is the third leading cause of mortality in Kenya?[3] The emergency nurse's ability to assess and manage shock is vital.

Advanced Skills

In advanced skills, only 16.7% perceived themselves as highly competent. This is in keeping with other African studies.[6,13] One plausible reason is the lack of emergency specialty specific education and training. In high-income countries such as the United States and the United Kingdom where advanced nursing practice is well defined and advanced practice nurses have more complex roles, pathways to obtaining skills and competencies are also well defined and include graduate-level degrees. Even though advanced practice nurses' roles are different from those of staff nurses and cannot be directly compared, staff nurses in these countries do pursue additional education in the form of classes such as advanced cardiac life support, trauma nursing core course, and emergency nursing pediatric course placing them in a better position to manage their patients. Educational programs contain the same core components of coursework. The coursework equips the nurses with theoretical knowledge whereas the clinical mentorship training helps develop assessment, diagnostic skills, procedures, and competencies to practice at an advanced level.[14]

Formal pathways to the advanced practice nursing role may provide another important avenue to elevate clinical competency. In Australia, the introduction of advanced emergency nurse services has been instrumental in reducing waiting times for low-acuity patients and positively affecting ED service delivery. Evidence supports the value emergency advanced nursing practice roles.[15] If the same were to be implemented in Kenya, it may prove to be beneficial given the high disease burden in the country.

Our study demonstrated a high educational need for emergency nurses similar to other studies from Africa.[6] The role of the emergency nurse is still developing in Africa, and in efforts to formalize this role, the development of professional bodies such as the Emergency Nurses Society of South Africa, which is open to nurses from all African countries, has been instituted. Formalization of the emergency nursing role would be further supported and strengthened if a professional body such as the Emergency Nurses Society of South Africa were to be formed in Kenya. It would then be specific to emergency nurses in Kenya. In Kenya, the Emergency Medicine Kenya Foundation is one such organization, although it targets all emergency service personnel including physicians and prehospital emergency medical services personnel, all of whom have different scopes of practice. Currently, the Emergency Medicine Kenya Foundation does provide education for emergency nurses through provision of short courses and training.

Short courses such as basic life support, advanced cardiac life support, pediatric advanced life support, and triage have been pivotal in helping emergency nurses remain current with evidence-based practice that is best achieved through continuing professional development and follow-up. However, short courses alone may not be sufficient to meet all educational needs. In Kenya, a number of nursing colleges offer a postbasic specialized associate degree in emergency nursing. Postgraduate-/master's level training is yet to be established.

Implications for Emergency Nurses

Comprehensive patient care needs in the emergency care setting require a more complex understanding of emergency nursing care principles. The results of our study identified focus areas for future specialty training and education in emergency nursing.

Furthermore, the concepts of autonomy and advanced practice are fairly new in nursing education in Kenya; therefore, these skills and concepts will have to be developed through educational advancement and input from all the concerned stakeholders including NCK, Kenyan government, universities, and hospital bodies.

Limitations

The study was limited to 2 tertiary teaching and referral hospitals in Nairobi, Kenya. This restricts generalization in regard to the skills, competencies, and educational needs of emergency nurses in other areas. This was a report of a self-perceived assessment, and no actual measurement of competencies or knowledge was performed. Thus, this study offers useful insights/findings that employers, educators, or regulators may use to improve emergency nursing in Kenya. In addition, the difficulty in recruiting emergency nurses affected the sample size. At the time of

recruitment, both centers reported to be suboptimally staffed and may have contributed to the small sample size of the study.

Conclusion

An understanding of the perceived skills and competencies levels, educational needs, and barriers to education among emergency nurses at the Aga Khan University Hospital, Nairobi, and Kenyatta National Hospital was obtained from this study. With low perceived competency levels, skills, and knowledge among most emergency nurses, there is a clear need for educational development to improve basic, intermediate, and advanced skills of emergency nurses.

Variable	Frequency (n = 84)	%
Site		
Study site 1	37	44
Study site 2	47	56
Years of experience		
0-11 mo	20	23.8
1-2 y	15	17.9
2-5 y	21	25.0
> 5 y	28	33.3

Basic skill	Highly competent	Competent	Least competent

n	%	n	%	n	%	Able to administer oxygen: cannula, mask, bag valve mask
77	91.7	7	8.3	0	0	Able to assess circulation: pulses, skin color, capillary refill, blood pressure, signs of bleeding

73	86.9	10	11.9	1	1.2	Able to assess breathing: rate, effort, cyanosis
68	81	16	19	0	0	Able to assess mental status: monitor Glasgow coma scale
66	78.6	17	20.2	1	1.2	Able to perform cardiopulmonary resuscitation

Competencies	Frequency (n = 84)	%
Basic competencies		
Least competent	1	1.2
Competent	12	14.3
Highly competent	71	84.5
Intermediate competencies		
Least competent	3	3.6
Competent	40	47.6
Highly competent	41	48.8
Advanced competencies		
Least competent	16	19
Competent	54	64.3
Highly competent	14	16.7

Trauma	Agree (%)	Neither agree nor disagree (%)	Disagree (%)
Abdominal and trunk trauma	83.3	8.3	6.0
Spinal cord injuries	81.0	13.0	6.0
Head injuries	81.0	9.5	8.3
Burns injuries	78.6	15.5	6.0
Pediatric trauma	77.4	14.3	8.3
Orthopedic trauma	75.0	16.7	7.1
Obstetrics/gynecology/pregnancy trauma	67.9	23.6	7.1

Ophthalmic (eye) injuries	67.9	26.2	6.0
Geriatric trauma	65.5	21.4	11.9

DETAILS

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Should Emergency Physicians and Nurses Direct Their Patients to YouTube for Heparin Self-Injection Training? A Systematic Review of Social Media Videos: JEN

ABSTRACT (ENGLISH)

Background

The aim of this study was to examine the content, reliability, popularity, and quality of YouTube videos for patients learning how to self-administer subcutaneous low molecular weight heparin injections.

Methods

A systematic review of YouTube videos was conducted on August 20, 2021, using the keywords of “Low-molecular-weight heparin injection,” “Enoxaparin injection,” “Heparin injection,” “Dalteparin injection,” and “Tinzaparin injection.” Two independent emergency physicians evaluated included videos separately with 5 different score systems (1-Journal of American Medical Association Score, 2-The Video Power Index, 3- Global Quality Scale, 4- Modified 5 Point DISCERN, 5- Total Comprehensiveness Score).

Results

Of 458 videos, a total of 161 unique videos were included. Of these, 94 (58.4%) were classified as useful and 67 (41.6%) as containing misleading information. The total number of views was 6,245,284 in useful information videos. DISCERN score (median 4, *P* <.001), Global Quality Score (median 4, *P* < .001), Journal of American Medical Association Score (median 4, *P* <.001), and Total Comprehensiveness Score (median 6, *P* <.001) were higher in the Useful Information Group.

Conclusions

Nurse and physician prescreening and prescoring the accuracy and quality of specific low molecular weight heparin injection self-administration videos before recommending YouTube to patients is warranted. Policies to limit the spread of health misinformation through credibility scoring and evaluation are needed on social media sites such as YouTube.

FULL TEXT

DETAILS

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Cross-Sectional Analysis of Burnout, Secondary Traumatic Stress, and Compassion Satisfaction Among Emergency Nurses in Southern California Working Through the COVID-19 Pandemic: JEN

ABSTRACT (ENGLISH)

Objective

The purpose of this study was to assess burnout, secondary traumatic stress, and compassion satisfaction scores in emergency nurses after working through the COVID-19 pandemic using the Professional Quality of Life Scale version 5 and compare those scores with similar studies conducted before the pandemic.

Methods

A cross-sectional analysis of a descriptive survey including the Professional Quality of Life Scale version 5 questionnaire was sent to nurses working in the emergency department before 2021 from urban, adult, and pediatric receiving hospitals in Southern California. Results were analyzed to provide insight into the effect of the COVID-19 pandemic on the levels of burnout, secondary traumatic stress, and compassion satisfaction compared with prepandemic studies found in the literature using the same Professional Quality of Life Scale version 5 instrument.

Results

Mean subcategory scores were in the moderate range for burnout (25.6), secondary traumatic stress (24.5), and compassion satisfaction (38.7). Burnout scores for midshift nurses were found to be significantly higher than day shift nurses (mean difference 5, $P = .02$) as were secondary traumatic stress scores (mean difference 4.6, $P = .007$). In addition, compassion satisfaction subcategory scores in nurses with 1 child living at home were significantly higher than those with 2 (mean difference 6.7, $P = .02$).

Discussion
The unnormalized mean findings were similar to prepandemic studies conducted using the same Professional Quality of Life Scale version 5 instrument indicating nurses are at risk of compassion fatigue. In addition, the scores from midshift nurses reflect increased burnout and secondary traumatic stress whereas nurses with 2 children had lower compassion satisfaction. This implies the need for leadership to proactively seek interventions to support nurses on each shift.

FULL TEXT

Contribution to Emergency Nursing Practice

••Emergency nurses are at risk of burnout and compassion fatigue owing to the nature of the environment. The COVID-19 pandemic created uncertainty, changes in practice, and a lack of resources for health care providers.

••The findings of this paper are that current burnout and secondary traumatic stress scores for emergency nurses are moderately high whereas compassion satisfaction is moderately low. Nurses who work the midshift scored significantly higher for burnout and secondary traumatic stress than those working the day shift, whereas those with 2 children living at home scored significantly lower for compassion satisfaction than those with 1 child.

••Emergency nurses need continued support from those in leadership positions to decrease burnout and secondary traumatic stress while continually supporting compassion satisfaction. Department heads must support efforts to decrease negative components of nurses' professional quality of life with specific interventions.

Introduction

Professional quality of life, as represented by the constructs examined using the Professional Quality of Life Scale version 5 (ProQOL), is made up of both positive and negative emotions that an individual feels while engaged in their position.[1] Emergency nurses experience unique daily stressors, including a multitude of patient presentations, traumatic events, chaotic environments, and a wide range of emotional encounters.[2] Nursing is emotionally, spiritually, and physically demanding; these demands and stressful encounters can lead to compassion fatigue, burnout, secondary traumatic stress, vicarious trauma, and a decrease in compassion satisfaction.[2-6] The ProQOL is a validated tool that measures 2 negative (burnout and secondary traumatic stress) affects and 1 positive (compassion satisfaction) affect, or feelings/emotions, that are part of a worker’s overall professional quality of life.[7] The ProQOL defines burnout as one of the multiple elements in compassion fatigue.[7] Compassion fatigue and burnout have similar symptoms; however, they differ in cause. Compassion fatigue occurs because of the element of caring for people in a helping profession, whereas burnout is caused by workplace environments and is associated with the organization rather than the patients.[8] If a caregiver’s stressors are caused by work conditions, scheduling conflicts, poor work environment, and leadership, this would classify as burnout.[8,9] Compassion fatigue occurs subtly and is progressive in nature. The signs may go unnoticed until the caregiver experiences a sudden onset of physical, emotional, and spiritual exhaustion.[9,10] The consequence of compassion fatigue is that the nurse’s ability to show and feel compassion is decreased or absent. Nurses who are experiencing compassion fatigue may negatively affect patient outcomes and patient satisfaction owing to their emotional distress, inability to care, and low levels of efficiency. Compassion fatigue can be devastating to the nurse both personally and professionally, and early recognition and prevention are important.[8,11]

Secondary traumatic stress is a consequence of caring for people who have experienced trauma even though the nurse has not experienced the trauma personally.[8,11] Secondary traumatic stress describes various symptoms similar to those of posttraumatic stress disorder acquired through secondary exposure to trauma rather than a direct

event.[12] Nurses with secondary traumatic stress experience similar symptoms of posttraumatic stress disorder, which include behavioral components such as irritability, anger, lack of sleep, and substance abuse problems.[8] Although secondary traumatic stress and vicarious trauma are often used interchangeably, they were independently developed by different research groups. Although secondary traumatic stress is defined by symptoms, vicarious trauma tends to focus on the potentially harmful changes that can occur in professionals dealing with graphic and/or traumatic material through clients and/or patients.[13]

Finally, compassion satisfaction is what nurses look to achieve by working with people. Many nurses enter the field to help people and improve patients' quality of life. Compassion satisfaction is the knowledge that the caregiver's work is making a positive impact on the patient's experience and meaningful connections are made.[14]

Immediately after the World Health Organization declared the COVID-19 a global pandemic on March 11, 2020, followed shortly after by the United States issuing a national emergency proclamation on March 13, 2020, the professional demands of emergency nurses were affected.[1-17] COVID-19, caused by the severe acute respiratory syndrome coronavirus 2, has caused additional stress, uncertainty, and fear in the health professional community, particularly including emergency nursing staff.[18-20] When nurses are exposed to unpredictable changes and stressful situations on a regular basis, they can experience anxiety and exhaustion, which can lead to decreases in job satisfaction and the quality of care they are able to provide.[21]

The concepts of compassion fatigue, burnout, secondary traumatic stress, vicarious trauma, and compassion satisfaction have been studied extensively in an array of settings including nursing departments. The overall goal of this project was to record and assess levels of burnout, secondary traumatic stress, and compassion satisfaction using the ProQOL questionnaire in emergency nurses employed in Southern California during the COVID-19 pandemic. The specific aims of this study were to:

- **1)** Describe the sample population of emergency nurses
- **2)** Summarize the ProQOL scores by subcategories (burnout, secondary traumatic stress, and compassion satisfaction)
- **3)** Examine correlational relationships between the subcategory scores
- **4)** Evaluate ProQOL subcategory scores by demographic, socio-related, and work-related characteristic compassion satisfaction

Methods

This study was designed as a descriptive observational study for emergency nurses at 3 Southern California acute care hospitals located in Torrance, Laguna Beach, and Mission Viejo where the authors of this article are employed. The registered nurses at the selected locations who met the inclusion criteria were invited to participate. The inclusion criteria were any registered nurse who was actively working on the unit and hired before January 2021. Qualified individuals were sent an anonymous survey to be completed via the organization's Research Electronic Data Capture instance.[22,23] Before the initiation of procedures, the study was reviewed by the organization's regional institutional review board and the research department and local administrative staff. Owing to the anonymous responses and a lack of intervention and follow-up, the institutional review board deemed the project exempt because it did not qualify as human subjects research; however, all system policies and procedures and good research practices were followed. Owing to the cross-sectional, hypothesis generation nature of this project, no power or sample size calculation was completed.

Survey Tools

The data collection survey included multiple demographic, socio-related, and work-related items:

•**i.**Years of experience as a nurse

•**ii.**Full-time employment status

•**iii.**Current age range

•**iv.**Marital status

•**v.**Number of children living at home

•**vi.**Shift worked

Participant responses to these questions would serve as points of interest in further investigation of ProQOL scores. The ProQOL is an open access tool available to assess burnout, secondary traumatic stress, and compassion satisfaction that has been used in numerous populations, including health care professionals, since its release in 2012.[7] High scores of burnout and secondary traumatic stress with low levels of compassion satisfaction are indicative of compassion fatigue in health care workers.[7] Although areas of concern with the scale's validity and reliability in nurses have been recently reported, there is a documented lack of more adequate tools.[24,25] The scale is made up of 30 items which are "I"-statements regarding professional work that the user responds to via a 5-point Likert scale ranging from 1 = never to 5 = very often.[7] Scoring is completed by summing the values for all statements in each of the 3 subscales: compassion satisfaction (10 items), burnout (10 items), and secondary traumatic stress (10 items).[7] It is important to note that, when scoring the ProQOL, multiple burnout items are scored inversely.[7] Raw or unnormalized scores for each subcategory can be evaluated or transformed to a *t*-score where the sample mean is converted to 50 with the standard deviation set at 10.[7]

Procedure

The survey was distributed via email, which included an attached flyer with a scannable QR code; the recruitment flyer was also posted in participating locations' break rooms. In the distribution phase, the nurses were informed as to why this survey was being conducted. The aims of the study were explicitly described to the nurses as an assessment of the baseline levels of burnout, compassion fatigue, compassion satisfaction, and secondary traumatic stress not only to compare the scores with prepandemic levels in similar studies but also to have knowledge for future interventions designed to help the staff and prevent burnout and compassion fatigue. Given that the ProQOL is a psychological test, it was important to inform the nurses that they were not being evaluated for any bad behavior or feelings and the responses would be anonymous.[7] Guidance for reporting the results of the study was derived from the Strengthening the Reporting of Observational Studies in Epidemiology checklist for cross-sectional studies.[26]

Data Analysis

Data were exported from Research Electronic Data Capture to Microsoft Excel for Mac version 16.5 for cleaning and coding. The results were then imported to IBM SPSS Statistics version 27 for further analysis.

For description of the study's participant population, all responding nurses were pooled and demographic, socio-related, and work-related items for the entire study population were described via frequency reporting. For analysis of each of the 3 ProQOL subcategories (burnout, secondary traumatic stress, and compassion satisfaction), mean scores and standard deviations were calculated via results from all responding nurses; the mean scores were evaluated directly by the guidelines in the ProQOL manual.[7] All statistical analysis conducted had an alpha set

Setting and Context

According to publicly available data from the Centers for Disease Control and Prevention, although the survey was open, the daily average of newly reported COVID-19 cases in the United States was 20,338 (SD = 7374.4, range 9094-35,655) whereas the state of California saw an average of 965.6 newly reported COVID-19 cases daily (SD 247.8, range 580-1440). COVID-19–related deaths were lower during the same time frame with the United States daily average being 445.8 (SD 132.6, range 228-662) and California at 19.7 (SD 5.6, range 12-35).[27]

Results

During a 26-day period, between May 13, 2021, and June 7, 2021, the survey was open, and 55 nurses responded with 50 completing the survey from 3 hospitals within the health care system. The response rate was calculated at 25% whereas 22.7% completed the survey (total nurses 220, Torrance 90, Mission Viejo 90, Mission Laguna 40). The survey was sent out to 3 hospitals with the concentration of responses coming from Mission Viejo and Torrance. Responders varied in age, experience, and shifts, with age (82% were 30 years or older) and experienced (82% had at least 3 years of experience), and full-time workers (88%). The reported shifts being worked were split, with day shifters being the most common responders (46%) followed by night shift (34%) and midshift (20%). The majority of the study population were married (60%) and had at least 1 child (60%). Full demographic characteristics of the responders are further detailed in Table 1.

The mean raw (unnormalized) ProQOL scores for all 3 subcategories were found to be in the “moderate” range: burnout = 25.6 (SD = 5.6); secondary traumatic stress = 24.5 (5.4); and compassion satisfaction = 38.7 (SD = 5.4). Before additional analyses, normality of all 3 subcategory results was evaluated and found to be acceptable (Table 2). Correlations among the 3 ProQOL subcategories were assessed, and responders’ burnout scores were found to be associated with both the secondary traumatic stress and compassion satisfaction scores (Supplementary Table 1). Burnout and secondary traumatic stress had a significant positive correlation indicating that as the score for one increased, the score for the other also increased (PCC 0.54, *P* P

After grouping responders by the demographic characteristics described in Table 1 (location, age range, experience, employment status, shift, marital status, and number of children), ProQOL subcategory scores were examined by one-way ANOVA (Table 3). Based on the ANOVA results, ProQOL subcategory scores for 3 demographic characteristics warranted further examination:

- **1)** Burnout and compassion satisfaction subcategory scores for years of experience as a nurse: examination of the post hoc Tukey test results for years of experience as a nurse revealed no significant between-group differences in the burnout or compassion satisfaction subcategory scores for any comparison.

- **2)** Burnout and secondary traumatic stress subcategory scores for the shift being worked: as suggested by Tukey test results, burnout subcategory scores for day-shift nurses (n = 23) were compared with those working the midshift (n = 10). Nurses working the midshift had significantly higher burnout subcategory scores (mean 29.1, SD 4.9) than those working the day shift (mean 24.1, SD 5.8, mean difference 5, t(31) 2.376, *P* = .02). The same groups’ scores for secondary traumatic stress were also examined, and midshift nurses again had significantly higher mean scores (mean 27.3, SD 3.7) then those working the day shift (mean 22.7, SD 4.4, mean difference 4.6, t(31) 2.915, *P* = .007). Results also summarized in Table 4.

- **3)** Burnout and compassion satisfaction subcategories for the number of children: based on the results of the post hoc Tukey test, compassion satisfaction subcategory scores for nurses with 1 child (n = 9) were compared with those with 2 children (n = 13). Nurses with 1 child had a significantly higher compassion satisfaction subcategory score (mean 41.9, SD 8.2) than those with 2 children (mean 35.2, SD 4.6, mean difference 6.7, t(20) = 2.432, *P*

= .02).

Discussion

This study was designed to assess the burnout, secondary traumatic stress, and compassion satisfaction levels in emergency nurses working through the COVID-19 pandemic to determine whether the nurses are currently experiencing compassion fatigue. The authors then took the current scores and compared those scores with similar studies conducted before the pandemic found in the literature. The results of this research determine that the emergency nurses are experiencing compassion fatigue as indicated by the moderate levels of burnout, secondary traumatic stress, and compassion satisfaction during the COVID-19 pandemic. The mean ProQOL subcategory scores fall in the moderate level for burnout, secondary traumatic stress, and compassion satisfaction.

Comparisons of the present study's results with those conducted before the presence of the COVID-19 pandemic suggest that moderate levels of burnout and secondary traumatic stress are consistently present along with a moderate level of compassion satisfaction. The scores were not significantly different after working through the COVID-19 surge experienced in Southern California, along with short staffing, changes in practice, critically ill patients, and overcrowded departments. Figure and Supplementary Table 2 illustrate the current study's results along with those that have been previously published with an unnormalized measure of central tendency (point estimate) and variability (SD).

Although a full systematic review or meta-analysis was not conducted, a targeted literature review focusing on examining the potential impact of the COVID-19 pandemic on results was conducted using a Preferred Reporting Items for Systematic Reviews and Meta-Analyses–like process.[28] After completion of a literature review, 3 manuscripts met all requirements and were included:

1. "The effectiveness of an educational program on preventing and treating compassion fatigue in emergency nurses,"[29]
2. "Factors that influence the development of compassion fatigue, burnout, and compassion satisfaction in emergency nurses,"[30]
3. "Differences in Compassion Satisfaction, Compassion Fatigue, and Work Environment Factors by Hospital Registered Nurse Type."[31]

Some areas of consideration for this lack of major change from prepandemic times may be that emergency nurses have always adapted to rapid changes in patient acuity and high levels of stress; thus, they are more resilient to the environment created by the pandemic. Another possibility is the increased support from the leadership, the organization, and the public during the pandemic. Nurses were recognized as heroes during the early pandemic, which may have created a sense of support that prevented severe rises in burnout and secondary traumatic stress scores. In addition, the study took place during a period when COVID-19 cases were relatively low (after public distribution of COVID-19 vaccines began and before the major wave of cases caused by the delta variant began). As of July 27, 2021, the 7-day case average was more than 60,000 per day compared to the 20,338 case per day average seen during the study period.[32]

Although the mean scores were not different from earlier studies, certain demographic characteristics seem to have an impact on subcategory scores. When day shift was compared to midshift, the midshift nurses have significantly higher levels of burnout and secondary traumatic stress. This finding provides insight for the need to support the midshift nurses and further investigate what contributes to this result. Midshift nurses start the shift during busier times and end the shift during busier times. They often miss in-services scheduled for the morning and night shifts.

Their break times do not fall at usual break times, which may prevent participation in the hospital's scheduled nursing events. Working the midshift may lead to missing department gatherings, supportive interventions, and preshift informational meetings and huddles. Plus, when the midshift nurses arrive, they are often sent straight out to the unit to take over an assignment, give lunch breaks, or relieve an overwhelmed coworker.

The number of children living at home was associated with the compassion satisfaction subcategory score. Nurses with 1 child living at home had significantly higher compassion satisfaction scores than those with 2. Currently: the average compassion satisfaction score for those with 1 child nearly improved from the "moderate" range to the "high" range. Although emergency nursing leaders do not have a direct impact on the number of children an individual has, additional support, such as flexible scheduling and nonpunitive available time off to care for family, can be provided to lessen the impact of childcare stressors on their professional quality of life.

The implications of the results in this current study compared with previous studies indicate that nurses are constantly at risk of the development of compassion fatigue, and early recognition and continuous interventions are needed. When nurses experience burnout and secondary traumatic stress combined with low levels of compassion satisfaction, they will slowly and quietly develop compassion fatigue. Once the nurse is experiencing compassion fatigue, a sudden onset of physical and emotional exhaustion may occur, and the ability to recover becomes difficult.[14] Patient outcomes suffer, turnover rates increase, unit moral decreases, and the nurse's mental health declines. The consequences are devastating to the nurse, the patients, and the organization.[14]

Limitations

The study had several limitations. First, the survey was sent out in May 2021, which was a time when the COVID-19 surge in January had decreased and work life had returned to a more normal state. Second, the study's sample (N = 50) was limited to a single hospital system in Southern California. In addition, the significant findings by demographic characteristics (shift worked and number of children) were analyzed with small sample sizes indicating the need for further research. Third, the survey was sent out in an email and posted in the break room. This was a voluntary survey, which may have captured only nurses who were engaged enough to complete the survey. Nurses who were experiencing extreme burnout and compassion fatigue may have chosen not to participate. Finally, the demographics did not include sex or education level. The ProQOL manual explains that sex does not significantly impact scores; however, looking at the results obtained, these demographics may provide additional insight.[7] For example, were the nurses with 2 children who scored low on compassion satisfaction male or female? In addition, do the nurses working midshift voluntarily work those hours or are they waiting for a day-shift spot to open? Nurses with children may work midshift for childcare reasons, yet the hours make sleeping and self-care difficult. These factors may contribute to high burnout and low compassion satisfaction and not because of the organization. Further investigation into variations of the ProQOL score based on education level (ADN, BSN, MSN), certification, such as certified emergency nurse, and any education on self-care and/or emotional intelligence could be explored for its potential effect on the nurses' scores.

As with all observational studies, the risk of bias is present. The small sample size and limited locations of participants and the fact that generally motivated individuals complete optional studies all play into the risk of selection bias.[33] Owing to the potential risk, generalization of the results of this study applying to all emergency nurses throughout the United States or beyond without the application of further analysis would not be advisable.

Implications for Emergency Nurses

An important point in this study is that although the ProQOL scores of the emergency nurses are not significantly higher in burnout and secondary traumatic stress or significantly lower in compassion satisfaction from the prepandemic scores found in similar studies,[29-31] they are still in the moderate range, with the point estimate for

compassion satisfaction being lower than previous findings and burnout and secondary traumatic stress point estimates being higher. Continuous work to improve these scores and the emergency nurses' quality of life is needed. Those in leadership positions need to be aware of the increased burnout and secondary traumatic stress levels in the midshift nurses and should include the midshift nurses in all supportive interventions.

Interventions to support higher compassion satisfaction levels and decrease burnout and secondary traumatic stress levels may cultivate a better work environment for our nursing professionals, increase patient satisfaction, and decrease turnover. Interventions that focus on nurse recognition have shown to be effective in reducing burnout and turnover.[34] Cost-effective interventions can be implemented as part of a unit-based improvement project. Items such as a gratitude board in the break room where staff can write a thank you message openly to one another, anonymous suggestion boxes that are addressed in unit meetings, leadership rounding where leaders show support and interest in staff, and a time and place for staff to meet, debrief, and provide feedback are shown to be effective.[34]

Compassion fatigue prevention in nurses can be targeted by interventions based on self-care and self-awareness. Activities such as meditation, mindfulness exercises, journaling, adequate sleep, healthy diet, and exercise are self-care activities that support well-being. Some hospitals have a dedicated self-renewal room where nurses can relax in times of stress. Other hospitals have used mobile carts with refreshments, journals, aroma therapy, stress reduction balls, and portable chair massagers.[35] Leadership can support nurses by implementing proactive programs targeted at improving nurses' well-being.[14] Leaders can also provide education on the concepts of burnout and compassion fatigue and the importance of self-awareness and early recognition to prevent compassion fatigue.[14] Nurses may not be aware of what compassion fatigue is and how it starts. Simple education on the concept to promote awareness is important for prevention. It is also important to not a component of compassion fatigue is burnout, which is now understood as being substantially influenced by organizational components such as unhealthy work environments, pressure from organizational policies, insufficient resources/staffing and patient care-related stress. Interventions focused on the individual nurse alone will not be sufficient; system-level solutions are needed to effectively address this occupational phenomenon.[8] Organizational and individual efforts to prevent and combat compassion fatigue promise to benefit the nurse, the patient, and the organization.

Conclusion

The results of this study show that emergency nurses had moderate levels of burnout and secondary traumatic stress with moderate levels of compassion satisfaction indicating probable compassion fatigue while working through the COVID-19 pandemic. The present study's results were not significantly different from the prepandemic levels reported in other nursing studies. Emergency nurses are accustomed to unexpected events on a daily basis. They work in chaotic environments and adapt to changes throughout the shift based on incoming patients.

Potential areas of future research include surveying other nursing units in the hospital with the ProQOL to assess the scores by department. Comparing other units' scores with those reported in emergency nurses may provide insight on the resiliency of emergency nurses working through situations such as the COVID-19 pandemic. In addition, future research into the development of a targeted questionnaire specifically for nurses to assess the components of the ProQOL has been suggested.[25] Further assessment into what positive interventions leadership and hospital systems provided to nurses during the pandemic should be explored. The added support that nurses receive during the pandemic may have had a positive effect on preventiing burnout and improving compassion satisfaction.

The finding that midshift nurses have higher levels of burnout and secondary traumatic stress subcategory scores indicates a need for further research as does the impact of children on compassion satisfaction. Assessment of the

factors that contribute to the difference in scores between day shift and midshift and tailoring specific interventions to support the midshift nurses are needed.

Finally, the prevention of compassion fatigue in nurses should be as high a priority as any other quality improvement project in the hospital setting. When the nurses experience high burnout, secondary traumatic stress, and low compassion satisfaction, the entire organization suffers.

Acknowledgments

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Author Disclosures

Conflicts of interest: none to report.

Supplementary Data

Search methods for identifying previously published raw, unnormalized, ProQOL subcategory scores (and standard deviations) for US-based nurses:

••Searches included Ovid (Evidence-based Medicine Reviews, Embase, and MEDLINE), PubMed, and Google Scholar using key search terms in various combinations:

•**a.**Key search terms:

•**i.**"Nurse(s)","

•**ii.**"Professional Quality of Life," or "ProQOL,"

•**iii.**With and without "Scale,"

•**iv.**With and without "version 5," "V", or "v5."

•

Articles were restricted to peer-reviewed journals, published in English, conducted using version 5 of the ProQOL (released in 2012) and conducted in the US.

•

Only subcategory scores for nurses were included, rather than those pooled with other health care providers.

•

Also, ProQOL subcategory means/medians and SDs must include the raw, or unnormalized because transformation to a t-score makes comparisons difficult because of the mean (or median) being set at 50 with a SD of 10.

•

An additional approach to article selection included reviewing reference lists for pertinent citations.

•

Studies using a pre/post-intervention were included with the pre-intervention scores being used.

Supplementary Data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.jen.2022.03.008.

Characteristics	n	%

Hospital location		
Torrance	30	60
Mission Viejo	19	38
Laguna	1	2
Age range		
20-29 y	9	18
30-39 y	17	34
40-49 y	14	28
≥ 50 y	10	20
Years of experience, y		
≤ 2	9	18
3-5	10	20
6-10	13	26
> 10	18	36
FTE status		
Full time	44	88
Part time	4	4
Per diem	2	4
Shift worked		
Day shift	23	46
Mid-shift	10	20
Night shift	17	34
Marital status		

Single	16	32
Married	30	60
Divorced	3	6
Separated	1	2
No of children living in the home		
0	20	40
1	9	18
2	13	26
≥ 3	8	16

Summary measure	Burnout		Secondary traumatic stress		Compassion satisfaction	
Mean	SD	Mean	SD	Mean	SD	Raw score
25.6	5.6	24.5	5.4	38.7	5.4	Skewness
−0.08		0.39		−0.3		Kurtosis
−0.95		−0.51		−0.3		Raw score reference range[7]
22 or less = low						23 to 41 = moderate

Demographic characteristic	Burnout		Secondary traumatic stress		Compassion satisfaction	
F value	P value	F value	P value	F value	P value	Hospital location
0.42	.66	0.66	.52	0.52	.6	Age range
0.72	.55	1.56	.21	1.18	.33	Years of experience
2.66	.06*	1.35	.27	2.54	.07*	FTE status
0.06	.94	1.36	.27	0.86	.43	Shift worked
2.97	.06*	3.12	.05*	1.6	.21	Marital status
1.65	.19	0.68	.57	1.77	.17	No. of children living in the home

Shift worked	Burnout*	Secondary traumatic stress†

Mean	SD	Mean	SD	Day shift (n = 23)
24.1	5.8	22.7	4.4	Midshift (n = 10)

	Secondary traumatic stress		Compassion satisfaction	
PCC	P value	PCC	P value	Burnout

Publication	Burnout		Secondary traumatic stress		Compassion satisfaction	
PE	SD	PE	SD	PE	SD	Present study (N = 50)
25.6	5.6	24.5	5.4	38.7	5.4	Lisle et al[31] (N = 208)
21.3	3.5	22	5.3	40.7	6.2	Hunsaker et al[30] (N = 284)
23.7	5.9	21.6	5.4	39.8	6.3	Flarity et al[29] (N = 73)

DETAILS

Subject:	Emergency medical care; Hospitals; Independent living; Fatigue; Quality of life; COVID-19; Burnout; Vicarious trauma; Traumatic stress; Nurses; Nurse led services; Pandemics; Emergency services; Sympathy; Coronaviruses; Leadership; Occupational stress; Mental health; Pediatrics
Business indexing term:	Subject: Occupational stress
Location:	United States--US; Southern California
Identifier / keyword:	Compassion fatigue; Burnout; Secondary traumatic stress; Emergency nurses; Resilience; Professional Quality of Life Scale
Publication title:	Journal of Emergency Nursing:; JEN; Philadelphia
Volume:	48
Issue:	4
Pages:	366-375.e2
Publication year:	2022
Publication date:	Jul 2022
Section:	Clinical
Publisher:	Elsevier Limited
Place of publication:	Philadelphia
Country of publication:	United Kingdom, Philadelphia
Publication subject:	Medical Sciences--Nurses And Nursing
ISSN:	00991767
e-ISSN:	15272966
Source type:	Scholarly Journal
Language of publication:	English
Document type:	Journal Article
DOI:	https://doi.org/10.1016/j.jen.2022.03.008
ProQuest document ID:	2683119064
Document URL:	https://www.proquest.com/scholarly-journals/cross-sectional-analysis-burnout-secondary/docview/2683119064/se-2?accountid=211160

Evaluation of Peripheral Administration of 10% Calcium Chloride in a Retrospective, Single-Center Electronic Health Record Cohort: JEN

ABSTRACT (ENGLISH)

Background

Calcium chloride is commonly used in emergency departments in the treatment of a variety of emergencies. Historically, administration via central venous catheters has been preferred owing to its high osmolarity and vesicant properties. Although preferred, central access may not always be available in time-sensitive, emergent situations leading to many instances of peripheral administration. The objective of this analysis was to evaluate the charted safety of peripheral venous administration of 10% calcium chloride.

Methods

A single-center retrospective chart review was performed in patients who received 10% calcium chloride in the adult emergency department evaluating for the incidence of infusion-related adverse events. Patients were excluded if they were less than 18 years of age or had a lack of catheter documentation during 10% calcium chloride administration or if the 10% calcium chloride was documented as given through a central venous catheter.

Results

A total of 72 administrations were evaluated. Patients were predominantly male (67%), with a median age of 55 years and body mass index of 29.2. The primary outcome demonstrated that 4 infusion-related adverse events occurred (6%) with grade 1 (n = 1) and grade 0 (n = 3) documented incidence of infusion-related adverse events. None of the documented incidence of infusion-related adverse events resulted in permanent tissue injury, and all patients had conservative management.

Discussion

This study demonstrated that administration of 10% calcium chloride via peripheral venous catheters may be feasible and seemed to carry a low incidence of documented complications. Further prospective studies are needed to confirm study observations.

FULL TEXT

Contribution to Emergency Nursing Practice

••Peripheral administration of 10% calcium chloride is routinely accepted and occurs without significant observed complications. However, some reports have indicated that calcium extravasation can result in erythema, papule formation, necrosis, and possible skin sloughing.

••Our study found that 4 documented infusion-related adverse events occurred in 3 patients of the total 72 administrations analyzed, all with low-grade symptoms. None of the documented extravasations resulted in permanent tissue injuries. All were administered through a large bore peripheral line in a proximal vein. Our study demonstrates that administration of 10% calcium chloride via peripheral line administration was feasible, carried a low charted incidence of complications, and may offer an alternative to central line administration in emergent settings. However, more studies are needed to confirm these results.

••At a single institution, calcium chloride seemed to be safe when administered via peripheral intravenous catheters. Other institutions should review their own internal data to evaluate the safety of peripheral administration of calcium chloride.

Introduction

Calcium chloride is commonly indicated for the treatment of severe hypocalcemia, used for deleterious effects of hyperkalemia, and suggested for the treatment of calcium channel or beta blocker overdose.[1,2] Historically, 10% calcium chloride administration has been preferentially administered via a central venous catheter (CVC) due to concerns with its high osmolarity and vesicant properties. However, owing to limited time availability of providers in the demanding environment of emergency departments and preferred line placement confirmation, CVCs are not always available. This is further compounded by weighing the potential CVC placement complications such as arterial puncture, pneumothorax, or subcutaneous hematoma.[3–5] Other formulations of intravenous calcium include calcium gluconate, which is readily available in most emergency departments. However, calcium chloride is manufactured in a ready-to-use Carpuject, minimizing preparation time required in the emergent setting. In addition, drug shortages and recalls with calcium gluconate may necessitate the utilization of calcium chloride.[6]

The main reason that peripheral administration of calcium chloride has been historically avoided is related to the risk of extravasation and local tissue injury. Calcium extravasation can result in erythema, papule formation, necrosis, and skin sloughing within a few hours to days after the infiltration.[7–13] Early symptoms of calcium extravasation include burning, tenderness, induration, and edema. In contrast, extended damage including iatrogenic calcinosis cutis occurs when deposition of calcium in the dermis leads to local tissue injury and inflammation. This results in intracellular calcium release and further adds to local insoluble calcium deposits in the form of calcium hydroxyapatite.[8,14] These calcinosis cutis lesions develop within 2 weeks and resolve with local wound care after 2 to 6 months.[8]

Another attribute routinely cited against the administration of 10% calcium chloride through peripheral venous catheters (PVCs) is its relatively high osmolarity of 2040 mOsm/L. However, emergency nurses commonly administer other hyperosmolar solutions such as 3% sodium chloride (1027 mOsm/L), 8.4% sodium bicarbonate (2000 mOsm/L), and 50% dextrose (2500 mOsm/L) via PVCs in emergent situations without issue.[15] Although hyperosmolar solutions theoretically elevate the risk of extravasation and local tissue injury, few studies have characterized the incidence and severity of 10% calcium chloride infusion-related adverse events (IRAEs) via peripheral line administration.[6]

In one of the largest studies to date, Lin et al reviewed 371 patients who underwent parathyroidectomy of whom 96 patients received 5% calcium chloride peripheral administration and found a 3% incidence of skin necrosis.[10] However, calcium was administered via small peripheral veins in the hands and legs, given as larger doses with variable concentrations, not given as an intravenous push, and not administered in clinical emergencies. Most of other publications involve case reports or small case series evaluating the safety of various concentrations of intravenous calcium chloride or calcium gluconate through various points of access but similarly do not evaluate the

clinical scenario commonly encountered in the emergency department.[7–12,16]

Clinically, peripheral administration of 10% calcium chloride is often used and occurs frequently without any significant observed complications. However, considerable ambiguity remains regarding the safety of this practice. At our institution, administration of 10% calcium chloride through a PVC is permitted in emergent situations at the provider's discretion where delay of administration could result in clinical deterioration and during periods of calcium gluconate shortage.[6] Therefore, the purpose of this study was to quantify the charted incidence of 10% calcium chloride extravasation during peripheral administration in the emergency setting.

Materials and Methods Intervention

A retrospective, single-center, institutional review board–approved cohort study was conducted at an adult emergency department in a quaternary care academic teaching hospital seeing approximately 70 000 emergency room visits per year. All adult patients admitted to the emergency department who received 10% calcium chloride between January 1, 2018, and December 31, 2020, were screened for inclusion with data obtained from an information technology inquiry. The start date of January 1, 2018, was used because this was the date the institution introduced a new electronic health record system. Patients were included if they were ≥ 18 years of age or had documented receipt of at least one dose of 10% calcium chloride through a PVC or if they only had PVCs at time of 10% calcium chloride administration when site of administration was not documented. Patients were excluded if they were less than 18 years of age or had a lack of catheter assessment documentation after 10% calcium chloride administration or if the 10% calcium chloride was documented as given through a CVC.

Measures

Data collection included patient demographics, characteristics of the PVC (placement date and time, location, gauge [G], and insertion attempts), and presence of risk factors for extravasation at the time of admission. Patient-specific risk factors for IRAEs include comorbidities consisting of age, obesity, disseminated skin diseases, diabetes mellitus, peripheral vascular disease, coronary artery disease, peripheral neuropathy, lymphedema, Raynaud's disease, or receiving chemotherapy, anticoagulation, or antiplatelet as a home medication or administered at the institution before administration of 10% calcium chloride.[7,15,16] Owing to the severity of previously reported IRAEs requiring skin grafts,[7,10] overreporting was favored in cases where the specific PVC used during administration was not documented. For example, if a patient had 3 PVCs present and no CVC when 10% calcium chloride was administered and the administering provider did not indicate which PVC the 10% calcium chloride was administered through, we evaluated all 3 PVCs for extravasation and considered any incidence to be related to 10% calcium chloride administration. In addition, if the patient did not have the specific PVC indicated in the administration of 10% calcium chloride and the patient obtained a CVC at the same time or before administration of 10% calcium chloride, data collection for the particular patient was terminated. Finally, if a patient had no documentation of PVC line assessment after administration of 10% calcium chloride, the data were reported as missing and data collection was terminated.

The primary outcome of this study was to report and characterize the incidence of charted IRAEs with the administration of 10% calcium chloride through a PVC. Incidence of charted IRAEs was evaluated for the entire duration of hospitalization. IRAEs were classified according to the Infusion Nurses Society Infiltration Scale incorporating the degree of pain, extent of swelling, presence of blanching, and extent of circulatory impairment on the skin (Table 1)[3] where grade 0 consisted of no symptoms and grade 4 consisted of the most severe symptoms. Infusion-related injury descriptions and grade of injury according to the Infusion Nurses Society Infiltration Scale were noted by nurse documentations in the electronic health record. In addition, internal quality improvement reports were evaluated to assess documented incidences of 10% calcium chloride IRAEs. Secondary outcomes include

time to IRAE, hospital and ICU length of stay, and mortality during admission.

Analysis

Demographic and clinical data were abstracted from the electronic health record and entered into a Research Electronic Data Capture database. The Research Electronic Data Capture is a secure, web-based software platform designed to support data capture for research studies, providing (1) an intuitive interface for validated data capture, (2) audit trails for tracking data manipulation and export procedures, (3) automated export procedures for seamless data downloads to common statistical packages, and (4) procedures for data integration and interoperability with external sources.[17,18] Descriptive statistics for continuous variables were presented as mean values with standard deviation if the values were normally distributed and median with interquartile range (IQR) if not normally distributed. Categorical variables were presented using numbers and percentages. Interobserver reliability was calculated using Cohen's kappa coefficient in a randomly selected 25% sample in an effort to reduce individual observer bias during data collection.[19] All analyses were conducted using the Statistical Package for Social Science, version 1.0.0.1406.

Results

There was a total of 143 10% calcium chloride medication prescriptions for nursing administration in the adult emergency department from January 1, 2018, to December 31, 2020. Notably, 71 administrations were excluded because of missing line assessment documentation (n = 44, 30.77%), CVC in place during 10% calcium chloride administration (n = 20, 13.99%), and no administration recorded (n = 7, 4.90%). That left 43 patients with a total of 72 administrations of 10% calcium chloride via PVCs who were evaluated for the charted incidence of adverse events.

Baseline characteristics are listed in [Table 2]. Patients were predominantly male (67%), with a median age of 55 years. Most common risk factors for IRAEs during time of 10% calcium chloride administration include hypertension (44%), diabetes mellitus (30%), and coronary artery disease (23%). The vast majority of the PVCs used were placed in the cephalic vein (51%) as illustrated in [Table 3]. In addition, 40% of PVCs were 18 G or larger in bore size.

Our primary outcome demonstrates that 4 documented IRAEs occurred of 72 total administrations (6%) in 3 of 43 patients (7%), all with low-grade symptoms (grade 1 [n = 1] and grade 0 [n = 3]). Two patients had 1 IRAE each, and 1 patient had 2 IRAEs. The patient with 2 IRAEs had 2 separate calcium chloride injections administered through the same peripheral line. All documented IRAEs resulted in no permanent tissue injuries charted given that all patients had conservative management of the IRAEs ([Table 4]). In addition, Cohen's kappa was run to determine whether there was agreement between the 2 evaluators' judgment on presence of IRAE. The result was perfect agreement between the judgments (k = 1.00).[19,20] Our secondary outcomes demonstrate that the median time to IRAE was 71 hours (IQR 56-72). Median hospital length of stay was 4 days (IQR 1-9), median ED length of stay was 3 hours (IQR 2-4), and mortality during admission resulted in 25 of 43 patients (58%). A detailed review of patients with documented IRAEs is presented in [Table 5]. These patients ranged from 44 to 68 years of age with majority being male (67%). All patients had a cephalic PVC with either an 18 G or 22 G. No patients with documented IRAEs received medications to treat or prevent skin injury, such as hyaluronidase, nor were seen by a plastics consultation team for debridement.

Discussion

10% calcium chloride is often used for the treatment of emergent disease states and administration only via a CVC has been the historical precedent.[1,2] It is common for emergency nurses and providers to encounter patients who need emergency calcium products but do not have a CVC. In these emergent situations where delay of administration could result in clinical deterioration and during periods of calcium gluconate shortage, data evaluating outcomes of 10% calcium chloride via PVC administration are limited. Lin et al[10] evaluated 371 patients who

underwent a parathyroidectomy of whom 96 patients received peripheral administration of calcium chloride for postoperative hypocalcemia. A total of 3 patients (3%) had skin necrosis after administration of various concentrations and dosages of calcium chloride (n = 1, 20 mL of 5% calcium chloride; n = 2, 10% calcium chloride in 100 mL infusion). Notably, the varying concentrations were all administered in small peripheral veins (n = 1, dorsum of hand; n = 1, distal lower extremity; n = 1, greater saphenous vein without dilution). Anger et al[21] evaluated the safety of compounded calcium chloride admixtures (10% calcium chloride in 5% dextrose as 600 mg/250 mL and 300 mg/100 mL) in adult inpatients during a national shortage of calcium gluconate. Of the 333 doses administered via peripheral lines, 4 patients (1.8%) experienced a moderate to severe infusion site reaction. Of the 4 patients, 3 experienced phlebitis, and 1 experienced an infiltration. Notably, calcium chloride was diluted to a lesser elemental calcium concentration than 10% calcium gluconate, and this study evaluated nonemergent administration. In addition, Miguez et al[13] published a review of 37 articles evaluating 60 total cases of peripheral calcium extravasations in children and adults with most patients being neonates with an average age of 8 days. The most common area of injury was in the dorsum of the hand and wrist; 70% of extravasation were from calcium gluconate with 17% coming from calcium chloride. Overall, extravasation resulted in erythema (65%), swelling/edema (48%), skin necrosis (47%), indurated skin (33%), and yellow-white plaques or papules (33%).

The overall incidence of observed IRAEs related to peripheral administration of 10% calcium chloride ranges from 1% to 17% in reports in the published literature.[10,13] Theoretically, calcium gluconate contains less elemental concentration of calcium per milliliter and may lead to less adverse effects compared with calcium chloride when similar volumes are administered. However, given that equipotent doses are typically prescribed, the relative safety of the 2 salts is unknown and further comparator studies are needed.[1,8] All calcium doses included in our study involved 10% calcium chloride push doses of 10 mL, except for 1 patient with 3 administrations of 10% calcium chloride diluted in 100 mL normal saline. Despite differences in concentrations and site of administration, we found an incidence of charted extravasation events that were comparable with other studies evaluating calcium chloride and calcium gluconate.[13,22]

In our study including 72 total administrations of 10% calcium chloride through PVCs, a total of 4 IRAEs were observed (6%). Most patients who had 10% calcium chloride administered peripherally had a large bore catheter, which we defined as 18 G or larger, placed in the cephalic vein.[23] All 3 patients who experienced extravasations had 10% calcium chloride injections infused via a cephalic vein in an 18 G or 22 G PVC. The low incidence and severity of charted IRAEs documented in our study may be caused by the high percentage of large veins used and utility of large catheter bores, allowing for greater blood flow to distribute the calcium chloride and minimized contact with the vascular epithelium leading to a decreased risk of tissue damage.[21] Prominent risk factors for extravasation also related to the patients include comorbidities that impair blood flow, weaken blood vessels, or impair the ability to report an extravasation event.[15] All 3 patients had at least one comorbidity with potential to impair blood flow, with 2 patients having multiple risk factors for extravasation including altered mental status at time of administration, diabetes mellitus, hypertension, coronary artery disease, and previous stroke/cerebrovascular accident. In addition, institution-related factors included skilled nurses and physicians inserting PVCs that could contribute to minimizing the risk of extravasation.[24] This is highlighted in the statistics that all our patients had only one PVC insertion attempt documented.

Given that limited data are published regarding the safety of peripheral administration of 10% calcium chloride in the emergency setting, future studies should seek to better describe the severity of IRAE and identify patients that are at an increased risk of having severe extravasation.[8–12,25] These studies should additionally evaluate the perceived increased safety of calcium gluconate compared with calcium chloride. The most serious adverse event reported in

our study included skin blanching. None of these cases required a surgical consult.

Limitations

Our study does have several methodological limitations. First, our study is a single-center, retrospective chart review with more than 30% of the outcome data missing in the health records. This subjects our study to reporting and documentation bias from the electronic health record. Second, our sample size is small with a low IRAE event rate documented partly owing to our restriction to the adult emergency department. However, we restricted our patients to the emergency department not only because this is the most likely department to require emergent administration of 10% calcium chloride but also because it is the least likely to have CVCs in place before calcium administration. Owing to our small sample size and underrepresentation of the population, overreporting of IRAEs may have also been favored. A larger sample size may be required to identify incidents of tissue necrosis from extravasation. However, we did evaluate internal quality improvement reports, which is one of the primary avenues of IRAE reporting at the institution. We found no other extravasations other than the ones reported. Third, lacking a control group, we cannot conclude that 10% calcium chloride administration via PVC is safer than via a CVC or safer than administration of calcium gluconate. Future prospective multicenter studies should not only compare peripheral with central administration of calcium chloride but additionally explore the relative safety of calcium chloride versus calcium gluconate when administered peripherally. Fourth, we cannot comment on patient outcomes because our primary outcome only assessed the charted incidence of IRAEs. Fifth, the median age of our patients was 55 years, so we are unsure how calcium chloride administration would affect veins of elderly patients. Sixth, the incidence of acute calcium extravasation can take hours to days after the infiltration to develop, and given the high incidence of early mortality observed, it is possible that the patients could have died before discovery of an IRAE. Finally, given that we were only able to evaluate for IRAEs during the hospital stay, there is a potential that they may have presented themselves after hospital discharge. Nevertheless, our study is one of the largest to date evaluating the peripheral administration of calcium chloride and justifies further prospective studies that challenge the relative safety of 10% calcium chloride.

Implications for Emergency Clinical Practice

The information presented has multiple implications for emergency clinical practice. First, this study expands on the limited published data evaluating peripheral administration of 10% calcium chloride in the emergency setting. Second, although our study had a low incidence of documented IRAEs, this study provides useful guidance for clinicians seeking to conduct their own review at their institution to determine the relative safety of administering 10% calcium chloride via peripheral catheters in emergent situations at the provider’s discretion where delay of administration could result in clinical deterioration and during periods of calcium gluconate shortage. Third, this study provides additional data challenging the dogma surrounding the perceived increased safety of calcium gluconate compared with calcium chloride. Finally, our study emphasizes the importance of emergency nurses in the interdisciplinary specialty. The low incidence of charted IRAEs found in our results highlights the knowledge and skill surrounding the discretion and decision making around peripheral administration by emergency nurses. Furthermore, our findings underscore the importance of accurate documentation of all line insertions, medication administrations, and line assessments to provide valuable information in attributing extravasations to certain medications for internal safety evaluation.

Conclusion

Peripheral administration of 10% calcium chloride seemed to be associated with a low incidence of documented IRAEs. Although prospective studies confirming external validity are warranted, providers wishing to administer 10% calcium chloride peripherally should preferentially choose the largest bore PVC in the most proximal vein. Our study

demonstrated that administration of 10% calcium chloride via PVC may be feasible, seemed to carry a low incidence of charted complications, and may offer an alternative to CVC access in emergent at the provider's discretion where delay of administration could result in clinical deterioration and during periods of calcium gluconate shortage. However, broad adaption of this method of administration is cautioned until larger prospective studies are conducted to confirm our observations.

Author Disclosures

Conflicts of interest: none to report.

Grade	Clinical criteria
0	No symptoms
1	Skin blanched
	Edema <1 inch in any direction
	Cool to touch
	With or without pain
2	Skin blanched
	Edema 1-6 inches in any direction
	Cool to touch
	With or without pain
3	Skin blanched, translucent
	Gross edema >6 inches in any direction
	Cool to touch
	Mild to moderate pain
	Possible numbness
4	Skin blanched, translucent
	Skin tight, leaking

	Skin discolored, bruised, swollen gross edema >6 inches in any direction
	Deep pitting tissue edema
	Circulatory impairment
	Moderate-severe pain
	Infiltration of any amount of blood product, irritant, or vesicant

Baseline characteristics	Median or n	IQR or (%)
Female, sex (%)	14	(33)
Median age, years, IQR	55	39-66
Median BMI, IQR	29.2	23.9-33.8
Risk factors for IRAE		
Hypertension (%)	19	(44)
Diabetes mellitus (%)	13	(30)
Coronary artery disease (%)	10	(23)
Presence of altered mental status (%)	8	(19)
Stroke/cerebrovascular accident (%)	3	(7)
Peripheral vascular disease (%)	3	(7)
Anticoagulation therapy present		
Venous thromboembolism prophylaxis (%)	35	(81)
Therapeutic (%)	7	(16)
Antiplatelet therapy present (%)	19	(44)

Characteristics of PVCs used	n	%
Location		
Cephalic	37	51
Intraosseous	7	10
Jugular	3	4
Basilic	2	3
Brachial	2	3
Unknown	21	29
Gauge		
14	1	1
16	2	3
18	26	36
20	24	33
22	1	1
Unknown	18	25

Primary outcome	All administrations (n = 72) median or n	IQR or (%)
IRAEs (%)	4	(6)
Grade 1 (%)	1	(1)
Skin blanching		
Grade 0 (%)	3	(4)

Age/sex	Comorbidities	PVC and gauge	Description of IRAE	Time to IRAE (h)	PVC removed?
68/F	AMS, DM, HTN, CAD, CVA	Cephalic/18 G	Grade 1; infiltrated, skin blanched	69	Yes
44/M	HTN	Cephalic/22 G	Grade 0; no voiced complaints	17	Yes
45/M	AMS, DM, HTN, CAD, CVA	Cephalic/18 G	Grade 0; no voiced complaints	72	Yes

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ABSTRACT (ENGLISH)

Immediate bystander intervention is critical to controlling bleeding, minimizing blood loss, and saving lives.3,6 In recent years, active shooter and terrorist attacks using knives and explosive devices have highlighted the need for strategies to deal with uncontrolled external hemorrhage at the incident scene.2,7,8 Delays in clinical intervention are due to the emergency service response time and personnel restrictions related to safety concerns at the scene.3,9 As a result, multiple strategies have been devised to enable bystanders to control the bleeding until emergency medical services (EMS) arrive and transfer the patient to a definitive care facility.4,10 Nurses may take on numerous roles within these scenarios, including applying hemorrhage control techniques within their scope of practice, being involved in community injury prevention programs, and researching and evaluating hemorrhage control interventions.5 Ultimately, the involvement of all nurses, not just emergency nurses, in hemorrhage control is an opportunity to save lives. Background Severe penetrating injuries can result in life-threatening blood loss within 5 minutes.9,13 Uncontrolled bleeding remains the primary cause of death in 35% of trauma patients,2,3,13 and evidence suggests that 57% of traumatic hemorrhagic deaths could be prevented through bystander intervention using basic bleeding control methods.4,10 In 2013, as a result of an increase in mass casualty incidents, particularly the Sandy Hook Elementary School shooting, the American College of Surgeons convened a multidisciplinary meeting to develop a strategy to reduce death and injury from penetrating trauma in an out-of-hospital environment.14 The expert group published a document titled The Hartford Consensus directing all responders, both health care and civilian, to undertake additional education and increase their access to the necessary equipment to control severe bleeding at the incident scene.14 The consensus documents aimed to increase survival from these penetrating trauma injuries by making military bleeding control materials available within a civilian setting. The

increasing incidence of international mass casualty events (New Zealand–2019, Manchester–2017, Paris–2015, Sri Lanka–2019) and active shooter incidents (Las Vegas–2017, Orlando–2016, Pittsburgh–2019, Stoneman Douglas High–2018) demonstrate the need for community focused initiatives to address the risk of hemorrhage.20-23 There have been at least 558 gunshot incidents within school grounds nationally, with an average of 19 mass shootings a year since 2013.24 In 2019, there were 39,707 fire-arm related deaths in the United States.25 Emergency planning, incorporation of prevention, and development of risk assessment and response plans should occur in all areas where large volumes of general public congregate such as schools, places of employment, sporting events, concerts, and shopping malls.26-28 Retrospective incident reviews highlight the critical period of community response time between the incident and the EMS intervention.3,29,30 This time period is when traditional responder roles are adopted and the community responder role is activated. In October 2017 in Las Vegas, during an active shooter incident in which 58 people died, over 30 minutes elapsed before health care providers were able to assess and treat patients.6 The independent review of the Manchester terrorist attack in the United Kingdom notes that training the general public in first aid, including hemorrhage control, provides the emergency services with a large pool of potential volunteers who can offer direct assistance to the injured.30 In 2019, at least 12 states introduced or passed legislation to inform, educate, and empower their citizens to become immediate responders who can save a life in the event of a bleeding emergency.31 The role of laypeople in responding to community health emergencies is increasingly acknowledged and is recognized as a key component in the chain of survival.

FULL TEXT

Description

Uncontrolled external hemorrhage is a common cause of preventable death and is increasingly recognized as a serious public health concern.[1-5] Bleeding can be a life-threatening emergency, causing death within minutes. Immediate bystander intervention is critical to controlling bleeding, minimizing blood loss, and saving lives.[3,6] In recent years, active shooter and terrorist attacks using knives and explosive devices have highlighted the need for strategies to deal with uncontrolled external hemorrhage at the incident scene.[2,7,8] Delays in clinical intervention are due to the emergency service response time and personnel restrictions related to safety concerns at the scene.[3,9] As a result, multiple strategies have been devised to enable bystanders to control the bleeding until emergency medical services (EMS) arrive and transfer the patient to a definitive care facility.[4,10] Nurses may take on numerous roles within these scenarios, including applying hemorrhage control techniques within their scope of practice, being involved in community injury prevention programs, and researching and evaluating hemorrhage control interventions.[5] Ultimately, the involvement of all nurses, not just emergency nurses, in hemorrhage control is an opportunity to save lives.

Emergency nurses have a critical public health and educator role within any hemorrhage control strategy.[11,12] Key areas of responsibility include professional education and community collaboration based on evidence and research into the effectiveness of hemorrhage control interventions. The literature provides examples of nurses working within a public health and injury prevention role by educating and empowering their local community in Stop the Bleed techniques and promoting the accessibility of hemorrhage control kits. These actions may improve clinical outcomes.

ENA Position

It is the position of the Emergency Nurses Association that:

1. Hemorrhage control techniques such as direct pressure, the application of topical hemostatic agents, and tourniquet application are part of all nurses' scope of practice.

2. Emergency nurses promote and participate in public awareness campaigns and advocate for hemorrhage control education and training for health care workers and laypeople.

3. Emergency nurses collaborate with other disciplines and specialties, including EMS and other first responders to develop, implement, and evaluate hemorrhage control strategies.

4. Injury prevention community education, particularly in schools and other places where large volumes of people congregate (ie, athletic facilities, concert venues, universities), includes emergency nurses.

5. Emergency nurses advocate for the deployment of bleeding control kits in readily accessible public areas such as airports, schools, and stadiums.

6. Emergency nurses are involved in the development of evidence-based hemorrhage control guidelines, policies, and procedures and contribute to hemorrhage control research.

Background

Severe penetrating injuries can result in life-threatening blood loss within 5 minutes.[9,13] Uncontrolled bleeding remains the primary cause of death in 35% of trauma patients,[2,3,13] and evidence suggests that 57% of traumatic hemorrhagic deaths could be prevented through bystander intervention using basic bleeding control methods.[4,10]

In 2013, as a result of an increase in mass casualty incidents, particularly the Sandy Hook Elementary School shooting, the American College of Surgeons convened a multidisciplinary meeting to develop a strategy to reduce death and injury from penetrating trauma in an out-of-hospital environment.[14] The expert group published a document titled The Hartford Consensus directing all responders, both health care and civilian, to undertake additional education and increase their access to the necessary equipment to control severe bleeding at the incident scene.[14] The consensus documents aimed to increase survival from these penetrating trauma injuries by making military bleeding control materials available within a civilian setting. The Hartford Consensus recommendations include the application of tourniquets and wound packing, materials and skills previously considered unsuitable for a civilian setting. The transfer of these skills empowers community bystanders to take an active role as first responders.[8,14,15]

In 2015, the United States government launched its aforementioned Stop the Bleed campaign[16] based on the findings of the Hartford Consensus.[14] The Stop the Bleed initiative is an essential component of a multidimensional approach to controlling hemorrhage and reducing death at the scene. A key aspect of this initiative is the empowerment of the community to undertake an injury prevention role, particularly in schools and other places where large volumes of people congregate.[3,8,14] Civilian bystanders act as first responders, implementing bleeding control interventions while awaiting the EMS. Key components of this strategy include education on the practical aspects of hemorrhage control, civilian access to appropriate equipment such as tourniquets and hemostatic dressings, bleeding kits, and the ability to coordinate transportation of the patients to a receiving trauma center in a timely manner.[4,17-19] To achieve this goal, training programs for control of hemorrhage need to be available to the public and offered by employers to schools and universities, religious groups, and other community facilities with a large footfall of people. The aim is to ensure that hemorrhage control education is widely available and as universally recognized as cardiopulmonary resuscitation (CPR) and automated external defibrillators (AED) training and forms an integral component within the chain of survival in penetrating traumatic injury. The skills to control hemorrhage are simple, evidence-based, and relatively easy to teach to a large number of people, and most importantly, to potentially save lives.

The increasing incidence of international mass casualty events (New Zealand–2019, Manchester–2017, Paris–2015, Sri Lanka–2019) and active shooter incidents (Las Vegas–2017, Orlando–2016, Pittsburgh–2019, Stoneman Douglas High–2018) demonstrate the need for community focused initiatives to address the risk of hemorrhage.[20-23] There have been at least 558 gunshot incidents within school grounds nationally, with an average of 19 mass shootings a year since 2013.[24] In 2019, there were 39,707 fire-arm related deaths in the United States.[25] Emergency

planning, incorporation of prevention, and development of risk assessment and response plans should occur in all areas where large volumes of general public congregate such as schools, places of employment, sporting events, concerts, and shopping malls.[26-28] Retrospective incident reviews highlight the critical period of community response time between the incident and the EMS intervention.[3,29,30] This time period is when traditional responder roles are adopted and the community responder role is activated. In October 2017 in Las Vegas, during an active shooter incident in which 58 people died, over 30 minutes elapsed before health care providers were able to assess and treat patients.[6] The independent review of the Manchester terrorist attack in the United Kingdom notes that training the general public in first aid, including hemorrhage control, provides the emergency services with a large pool of potential volunteers who can offer direct assistance to the injured.[30] In 2019, at least 12 states introduced or passed legislation to inform, educate, and empower their citizens to become immediate responders who can save a life in the event of a bleeding emergency.[31]

The role of laypeople in responding to community health emergencies is increasingly acknowledged and is recognized as a key component in the chain of survival. Many studies establish the effectiveness of training the general public in CPR and AED use to saves lives.[3,32,33] There are numerous similarities between public access defibrillators and the Stop the Bleed initiative.[2] These similarities include placing hemorrhage control kits in easily accessible areas where large numbers of people congregate, ensuring that bystander equipment is easy to understand in an emergency situation and for ongoing maintenance and audit requirements.[3,4,18,34] In response to this initiative, at least 8 states (California, Illinois, Indiana, Missouri, North Carolina, New York, Tennessee, and Texas) introduced legislative bills that mandate that hemorrhage control kits be readily available in public schools and other government facilities.[35] Collectively, evidence in the literature supports the use of Stop the Bleed kits. However, a real-world limitation is the lack of enforcement of the equipment's quantity, placement, and contents.[7] Jacobs[14] suggests that Stop the Bleed kits should minimally include an effective tourniquet, compressive dressing, rolled gauze, trauma shears, and nitrile gloves.[7,36] Emergency planning teams should equip public sites with bleeding control supplies for a minimum of 20 people, with larger venues planning for larger number of patients.[7] When preparing for distribution, important considerations are ongoing mandatory training and monitoring and maintenance of supplies and equipment.

Tourniquet application is a crucial component of hemorrhage control.[3,7,9] Historically, tourniquets were not applied outside of the military owing to the risk of prolonged ischemia due to incorrect or inappropriate placement.[2,37,38] Current evidence demonstrates that amputation is rarely necessary, and the benefits of reducing bleeding and saving lives from tourniquet application outweigh the potential risk.[10] Goolsby et al[7] acknowledged a greater than 4-fold increase in mortality from hemorrhagic shock for patients who had tourniquets placed after arrival at hospital compared with application at the incident scene. This finding has important clinical and practical implications for educating the general public and reviewing traditional role responses for health care workers. The American College of Surgeons Committee on Trauma and the Hartford Consensus directs that all professional responders have the education and necessary equipment to apply tourniquets and topical hemostatic agents in civilian settings.[14,16] Similar initiatives exist globally, including Citizen Aid in the United Kingdom.[39,40] Good Samaritan protection is extended to include bleeding control interventions by bystanders, to encourage a willingness to respond.[8,14] Evidence suggests that individuals require access to ongoing training to increase recall of this relatively rarely used skill to enable an increase in confidence and competence and willingness to respond and to reduce barriers to intervention.[2,9,17]

Hemorrhage control techniques, including the use of tourniquets and hemostatic agents, should be incorporated into undergraduate nurse education and ongoing nursing education as a component of their injury prevention role.[34,41,42]

Controlling hemorrhage in the community setting is a public health priority and is essential as a part of the patient's chain of survival. Evidence supports the application and use of tourniquets and hemostatic agents to be included in every licensed nurse's educational preparation and scope of practice[43] and should be considered a component of essential clinical skills such as CPR and AED use. Education and familiarization with bleeding control techniques and equipment can improve the individual's willingness to respond, increase user's confidence, and ultimately improve clinical outcomes.[44,45] Emergency nurses have an opportunity to lead the way in controlling emergency hemorrhage through empowering and educating community members and collaborating with community partners, businesses, and local EMS colleagues.

Resources

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Implementing the Total Worker Health Program in a Shared Governance Context: JEN

ABSTRACT (ENGLISH)

Healthy work environments are critical to the stability and well-being of the nursing workforce, in addition to promoting optimal patient safety and patient outcomes and ensuring the viability of health care organizations.1 The National Academy of Medicine's Future of Nursing 2020 to 2030 notes the importance of supporting the health and well-being of nurses, stating "…it is essential to address the systems, structures, and policies that create workplace hazards and stresses that lead to burnout, fatigue and poor physical and mental health among the nursing workforce." 2 For years, unrealistic workloads, risk of infection and workplace violence, insufficient resources, and moral distress/injury have contributed to turnover, burnout, and poor professional quality of life—threatening the viability of nurses in the health care workforce.2 In addition, the ongoing pandemic disaster has intensified nurse exposures to occupational hazards, resulting in increased negative physical/mental health outcomes and a continuing exodus from the profession.3 As emergency clinicians, we are focused on achieving optimal patient outcomes, but who is focused on monitoring and improving our work-related well-being and occupational health outcomes? 4 In 1970, the National Institute for Occupational Safety and Health (NIOSH) was established as part of the US Centers for Disease Control and Prevention to function as a research agency with a mission of generating new knowledge in the field of occupational safety and health and to translate that knowledge to practice. The Emergency Nurses Association's Healthy Work Environment in the Emergency Care Setting Position Statement recognizes the component of mutual responsibility between the leadership and health care workers in creating a healthy work environment.11 The National Academy of Medicine advocates for a systems approach to support professional well-being and address clinician burnout.13 Unit-based councils are composed of frontline staff, making this a setting where meaningful and impactful dialog can be exchanged to address unique strengths, barriers, and facilitators within a unit to optimize work environments and staff well-being.

FULL TEXT

Healthy work environments are critical to the stability and well-being of the nursing workforce, in addition to promoting optimal patient safety and patient outcomes and ensuring the viability of health care organizations.[1] The National Academy of Medicine's Future of Nursing 2020 to 2030 notes the importance of supporting the health and well-being of nurses, stating "…it is essential to address the systems, structures, and policies that create workplace hazards and stresses that lead to burnout, fatigue and poor physical and mental health among the nursing workforce."[2] For years, unrealistic workloads, risk of infection and workplace violence, insufficient resources, and moral distress/injury have contributed to turnover, burnout, and poor professional quality of life—threatening the viability of nurses in the health care workforce.[2] In addition, the ongoing pandemic disaster has intensified nurse exposures to occupational hazards, resulting in increased negative physical/mental health outcomes and a continuing exodus from the profession.[3] As emergency clinicians, we are focused on achieving optimal patient outcomes, but who is focused on monitoring and improving our work-related well-being and occupational health outcomes?

The World Health Organization recognizes occupational health as an area of public health that seeks "to promote and maintain highest degree of physical, mental and social well-being of workers in all occupations."[4] In 1970, the National Institute for Occupational Safety and Health (NIOSH) was established as part of the US Centers for Disease Control and Prevention to function as a research agency with a mission of generating new knowledge in the field of occupational safety and health and to translate that knowledge to practice. NIOSH seeks to advance worker well-being and empower workers and employers to create healthy, safe workplaces.[5] In the early 2000s, NIOSH launched an initiative to improve the health of the United States workforce that eventually became known as the Total Worker Health (TWH) Program. This model aims to protect the safety and enhance the health and productivity of the US workforce through policy, programs, and practices that advance worker well-being.[6] The purpose of this

editorial is to consider how the concept and resources of TWH can be used by shared governance/unit-based practice councils and nurse leaders to positively affect the occupational health of nurses and other health care workers.

Shared Governance/Unit-Based Practice Councils

Shared governance is a working model or management style of participatory decision making that promotes principles of nurse involvement, empowerment, ownership, accountability, team building, leadership, innovation, and autonomy to promote quality care.[7-9] Essentially, it is a complex organizational component that encompasses the ways professionals regulate, direct, and control goal-oriented efforts.[10] Originally introduced to improve the work environment of nurses, patient/staff satisfaction, and retention,[7] the principles of shared governance are promoted by the American Association of Critical Care Nurses,[11] American Nurses Credentialing Center, Magnet,[8] and Pathway to Excellence programs.[12] Notable variation exists in theoretical underpinnings, forms, and scopes of shared governance committees, which makes rigorous outcome evaluation challenging.[7] In a recent integrative review, Kanninen et al[12] noted the success of shared governance committees depends on organizational support, work culture, and resources, rather than its mere existence, to produce optimal outcomes. Unit-based councils are shared governance models tailored to individual nursing units.

Given the systems, structures, and policies that create workplace hazards that lead to burnout, fatigue, and poor health outcomes among nurses (contributing to subsequent, negative impacts on the quality of patient care/outcomes), the prioritization of nurse health within a unit-based council is intuitive and easily justifiable. The Emergency Nurses Association's Healthy Work Environment in the Emergency Care Setting Position Statement recognizes the component of mutual responsibility between the leadership and health care workers in creating a healthy work environment.[11] The National Academy of Medicine advocates for a systems approach to support professional well-being and address clinician burnout.[13] Unit-based councils are composed of frontline staff, making this a setting where meaningful and impactful dialog can be exchanged to address unique strengths, barriers, and facilitators within a unit to optimize work environments and staff well-being. Nurse leaders can promote the engagement and empowerment of staff within a shared governance context to advance the well-being of health care workers on their units by evaluating, revising, and implementing policies, programs, and practices that both reduce work-related hazards and promote injury prevention.[14] Maintaining a high-level focus with simultaneous support of ED leadership is key to success. The Hierarchy of Controls is a model of controlling exposures to occupational hazards and is considered a fundamental concept in worker protection. It emphasizes organizational-level interventions to protect the health, safety, and well-being of workers. As the Hierarchy of Controls applied to the NIOSH TWH model[15] depicts (Figure 1), encouraging personal change by focusing on individual determinants is only a small part of both worker health and health in general. In other words, burnout is an organizational issue that affects individuals, rather than an individual issue as it has been historically considered.[16] Even the most generous and consistent amounts of self-care will likely be insufficient to mitigate burnout in chronically depleting or under resourced work environments. Environmental conditions (ie, the work environment), health protective/enhancing policies, programs and practices, and education have the potential for the greatest impact and warrant our attention as frontline health care professionals, leaders, researchers, and equity advocates.[15]

Shared Governance and TWH

The TWH approach has 5 defining elements, listed in Figure 2, that are explained in detail in the Fundamentals of Total Worker Health Approaches workbook[14] (Table). Below, we review various ways these elements could be incorporated in an ED unit-based practice council—with the support of ED management and directors—to address issues relevant to advancing the health of nurses and other health care workers. Issues that NIOSH has identified as relevant to advancing worker well-being through TWH can be visualized in Figure 3.[14]

1. Demonstrate leadership commitment to worker safety and health at all levels of the organization.

Unit-based councils can discuss which initiatives currently exist and evaluate whether existing initiatives necessitate change. Conducting a preliminary needs assessment is a great place to start within this first element. Measurements

and surveys not only support needs assessments but aid in program/intervention evaluation and optimization. The NIOSH Worker Well-Being Questionnaire can be used for these purposes.[17] This 5-section, 63-item questionnaire is published in the public domain and is free to use ([Table]). Other instruments such as safety climate scales,[18] the National Database of Nursing Quality Indicators,[19] and various types of annual surveys used by health care organizations may also be used to measure various aspects of occupational health, safety climate/culture, satisfaction, turnover intent, resources, etc. Other workplace assessment instruments and resources can be found online in the National Academy of Medicine's Clinician Well-Being and Resilience Toolkit.[20] Annual assessments can be useful to unit councils in assessing needs and trends within their department. TWH emphasizes the importance of considering organizational readiness to change. Weiner[21] refers to this concept as a shared team property, a psychological state where members of an organization share a sense of commitment to implement an organizational change and are confident they can do so. This concept is critical to successful innovation and implementation. Commitment to worker health must be prioritized among top leaders and should hold the same value as quality patient care and outcomes. This could include incorporating safety/health related standards into performance evaluations, establishing a budget for acting on employee recommendations, or providing adequate resources (ie, staff, time). Caution should be exercised to prevent productivity targets from compromising resources in a way that interferes with the nurse's ability to deliver quality care. Midlevel managers can review Making the Business Case[22] ([Table]) to quantify and project the value that TWH initiatives can bring to the organization (such as reduced turnover, workforce sustainability, etc.). Just as midlevel management links ED staff and upper management, unit-based councils have the ability to connect ED staff with midlevel management. ED leaders can welcome and encourage employee feedback through and from unit-based practice councils on working conditions and willingly collaborate for change. Nurse leaders can reward staff for achieving reporting goals of safety concerns or incidents and celebrate benchmarks in employee health/safety. Increasing active participation, input, and involvement from frontline staff and/or unit councils is empowering and promotes respect, contributing to an environment where change is welcome and innovative programs can thrive.[14]

1. Design work to eliminate or reduce safety and health hazards and promote worker well-being.

The clinical work environment is a social determinant of health. NIOSH and TWH recognize that the most effective means of prevention is to eliminate or reduce recognized workplace hazards ([Figure 2]). The Hierarchy of Controls applied to NIOSH TWH visually emphasizes that organizational-level interventions are the most impactful when it comes to protecting the health, safety, and well-being of employees.[15] As frontline workers, unit council members can expertly identify job-related hazards in the work environment. During shared governance meetings, workers can brainstorm to identify hazards and potential ways to redesign or reorganize the work environment to eliminate or minimize risk, providing recommendations to ED leaders. An example provided in the TWH workbook[14] includes policy implementation that gives nurses greater control and flexibility over their work schedules as an intervention to reduce work-related stress. Stress-reducing or skill-building interventions and easy access to Employee Assistance Programs or other noninstitutionalized mental health services are other examples.[14]

1. Promote and support worker engagement throughout the program design and implementation.

The third element of TWH is embedded in the very design of shared governance—a participatory model that enhances staff engagement and empowerment. ED leadership should prioritize programs of most importance for frontline workers and involve unit-based council members in the program design, planning, implementation, and evaluation phases of projects. All interventions should be created with long-term considerations for sustainability. Unit-based councils may also choose to implement initiatives to promote and support worker engagement.

Interventions such as meaningful recognition, shared decision making, and increased leadership support and involvement have been implemented successfully and reported in published literature.[23] Organizational resources must be aligned to support the prioritized programs identified by frontline workers.[14]

1. Ensure confidentiality and privacy of workers.

Implementing and evaluating programs to promote the occupational health and well-being of nurses may involve employees sharing confidential information pertaining to their health. Nurse leaders should ensure confidentiality and data privacy regarding these matters, the fourth element of TWH. Unit-based councils also need to consider this when creating, implementing, monitoring, or evaluating initiatives. Frontline staff should be involved in program planning meetings and can work with leaders to develop surveys. Communication regarding how employee data will be used and protected should be transparent across all levels of the organization. At no time should data be collected in ways that could result in discrimination, stigmatization, or penalization of employees. Program evaluation data, risk assessments, self-reported survey data, and electronic health records are examples of personal health information that may be used in a TWH initiative. Precautions such as record deidentification, third-party involvement, aggregate data use/reporting, and destroying personally identifiable information are privacy practices that can help ensure confidentiality.[14]

1. Integrate relevant systems to advance worker well-being.

When considering the fifth element of TWH, unit-based councils and nurse leaders can collaborate regarding system integration of data sources. Coordination can reduce redundancies and maximize effectiveness and resources. An initial assessment of safety and health policies, programs, and practices can reveal areas of overlap and opportunities for future coordination. Unit-based councils can expertly assess how policies and programs may or may not affect practice and worker well-being. Team meetings that convene staff and leaders with similar responsibilities can be helpful to plan and set priorities. Obtaining a multilevel perspective can assist organizations in mapping the connections between different systems and the experience of workers to design the most effective and innovative approaches to different workplace challenges.[14]

TWH provides resources to obtain a baseline unit/organizational assessment or worker health; identify steps to begin improving worker health, safety, and well-being; and measure progress over time. Few studies among the existing literature assess the impact of the work environment on nurse occupational outcomes. In a systematic review, Wei et al[1] examined the state of the science of United States nurse work environments, finding only 2 of the 54 included studies contained nurse occupational health outcome measures. This author team noted that the existing literature pertaining to nurse work environments was mostly descriptive and also observed a dearth of research studies that investigate the contribution of nurses to building/maintaining healthy work environments.[1] Interventions need to be designed and tested to advance our understanding of improving work environments and promoting nurse occupational health. Work environment measures also need to be applied consistently (some scales have been modified over time) and longitudinally to better understand the scope of normal fluctuation from a range of data.[24] Regular and consistent measurements are especially vital in the context of infectious disease surges, which strain health care workers and resources.

The long-term implications of pandemic-related increases of workplace hazards and stresses in a disaster context are evolving and have yet to be fully realized. It is undeniable that great opportunities exist regarding the research of nurse work environments and to promote worker health. The TWH framework outlines an approach to assess, implement, and evaluate programs to positively affect the occupation health of nurses and health care workers. Unit-based councils can be empowered to initiate and regulate such efforts. It has never been more important for health

care organizations to prioritize the health of their workforce.[14] The TWH approach can provide ED leaders, unit-based practice councils, and frontline workers with the structure and resources to collaborate and positively affect the occupational health of nurses and other health care workers.

Author Disclosures

Conflicts of interest: none to report.

Total worker health resource	Description
Essential Elements of Effective Workplace Programs and Policies for Improving Worker Health and Wellbeing[25]	This document includes 20 guiding principles for organizations and nurse leaders seeking to pursue work-related safety/health.
Fundamentals of TWH Approaches[14]	Available as a free PDF, this workbook can assist nurse leaders in optimizing existing initiatives or developing new TWH initiatives. Videos, printable guides, and other relevant resources are also included in this workbook.
Assess where your organization is on the TWH continuum and develop an action plan to start implementing TWH approaches[14]	These free worksheets are available for organizational self-assessment and for developing action plans.
Making the business case[22]	Review examples of how the TWH approach can benefit the organization and its workers.

DETAILS

Subject:	Emergency medical care; Work environment; Workforce; Occupational health; Facilitators; Burnout; Questionnaires; Health status; Occupational safety; Leadership; Emergency services; Nursing; Shared governance; Nurses; Occupational hazards; Clinical outcomes; Innovations; Corporate culture; Workers; Patient safety; Fatigue; Well being; Viability; Workplace violence; Quality of life; Health care; Empowerment; Organizational change; Systems approach; Health education; Pandemics; Medical personnel; Mental health; Injuries; Psychological distress
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Outcomes From a Nursing-Driven Acute Stroke Care Protocol for Telehealth Encounters: JEN

ABSTRACT (ENGLISH)

Introduction

Nursing care is widely recognized to be a vital element in stroke care delivery. However, no publications examining clinical education and optimal workflow practices as predictors of acute ischemic stroke care metrics exist. This study aimed to explore the impact of a nurse-led workflow to improve patient care that included telestroke encounters in the emergency department.

Methods

A nonrandomized prospective pre- and postintervention unit-level feasibility study design was used to explore how implementing nurse-driven acute stroke care affects the efficiency and quality of telestroke encounters in the emergency department. Nurses and providers in the emergency department received education/training, and then the Nursing-Driven Acute Ischemic Stroke Care protocol was implemented.

Results

There were 180 acute ischemic stroke encounters (40.3%) in the control phase and 267 (59.7%) in the postintervention phase with similar demographic characteristics. Comparing the control with intervention times directly affected by the nurse-driven protocol, there was a significant reduction in median door-to-provider times (5 [interquartile range 12] vs 2 [interquartile range 9] minutes, P <.001) and in median door-to–computed tomography scan times (9 [interquartile range 18] vs 5 [interquartile range 11] minutes, P <.001); however, the metrics potentially affected by extraneous variables outside of the nurse-driven protocol demonstrated longer median door-to-ready times (21 [interquartile range 24] vs 25 [interquartile range 25] minutes, P <.001). Door-to-specialist and door-to-needle times were not significantly different.

Discussion

In this sample, implementation of the nurse-driven acute stroke care protocol is associated with improved nurse-sensitive stroke time metrics but did not translate to faster delivery of thrombolytic agents for acute ischemic stroke, emphasizing the importance of well-outlined workflows and standardized stroke code protocols at every point in acute ischemic stroke care.

FULL TEXT

Contribution to Emergency Nursing Practice

••What is already known on this topic? Telestroke systems can be useful and efficient for providing care in the emergency department.

••What does this paper add to the currently published literature? This study provides additional feasibility information about a nurse led telestroke protocol in the emergency department to reduce door to treatment times for stroke patients.

••What is the most important clinical implication for practice? Important clinical implications include that a nurse-driven acute care protocol was feasible to implement for improved nurse sentive door-to-provider and door-to-computed tomography time metrics when using telestroke in the emergency department. However, the feasibility evidence indicated door-to-ready, door-to-specialist, and door-to-needle times may not improve using this protocol.

Introduction

The past decade has seen a steady increase in the number of successful telestroke networks,[1] and the rate of adoption has rapidly increased during the 2020 coronavirus disease 2019 pandemic.[2] A telestroke system of care uses 2-way audio-video technology to bring stroke expertise to remote populations. Unfortunately, available

evidence supports that the responsiveness of telestroke systems falls short,[3] with door-to-telestroke notifications of more than 15 minutes being associated with an 8-fold increase in likelihood of door-to-needle (DTN) time exceeding 60 minutes.[4] Delayed responsiveness also negatively affects the target treatment time for mechanical thrombectomy in eligible patients with acute ischemic stroke (AIS).[5] To date, there are no large studies that fully examine how clinical education and optimal workflow practices affect AIS care delivery within a telestroke setting. Meanwhile, nursing care is widely recognized to be a vital element in AIS care delivery.[6,7]

Background

Treatment of stroke is time based, with alteplase being the only Food and Drug Administration–approved pharmaceutical treatment for AIS, and tenecteplase has only been recommended but is not yet Food and Drug Administration approved.[8-11] Both alteplase and tenecteplase been have shown to reduce patient mortality and morbidity if given within the time window of 3 hours since last known normal.[8,12] Although the benchmark DTN time was initially set at 60 minutes,[13] newer best practice recommendations have pushed the goals to 45 and 30 minutes.[14] Unfortunately, recent analysis has shown that less than one-half of patients treated with alteplase received the treatment in the recommended 60-minute DTN time window.[15] Time to treatment must be improved to allow more patients to receive the improved outcomes that AIS therapies can deliver.[16]

Stroke in Rural Populations

Rural health populations will benefit from receiving stroke care similar to the stroke care received in urban populations.[17] To address the need for timely treatment in rural populations, which have traditionally not had access to expert stroke specialty care, the use of telehealth for AIS has burgeoned in the last decade. Thus, telehealth has enabled many patients living in rural areas the opportunity to receive AIS care.[18,19] This resonates with early findings from the Telestroke for Comprehensive Stroke Care in Acute Stroke Ready Hospitals (TELECAST)[20] study that demonstrates clinical benefit to individuals treated with telehealth. Despite the successful institution of these telestroke networks, there are limited data examining clinical education and optimal workflow practices establishing target benchmarks. However, a study by Lees et al[21] showed that the responsiveness of telestroke systems falls short with a mean door-to-physician time of 76.3 minutes, which consequently affects the target treatment time.[15]

Nurse-Driven Acute Stroke Care

Interdisciplinary collaboration between nurses and physicians has increased dramatically over the past decade.[22] Nurse-driven protocols are one product of this collaboration and are becoming increasingly popular. Research has shown that nurse-driven care protocols are associated with a reduction in time-sensitive stroke quality metrics.[23,24] One study showed improvement in door-to–computed tomography (CT) scan (DTCT) time, door-to-physician time, and door-to-decision times with a nurse-driven stroke ED protocol.[25] Fowler et al[5] added to this knowledge by finding an association between faster door-to-decision times when nurse-driven protocols are coupled with telehealth. Others have shown that incorporating a stroke nurse into ED management of patient care improved DTN times and patient outcomes at 90-days.[7,26] These studies showed the insight and need for incorporating the nurse, as a leader, into the acute care phase for patients in the emergency department, but evidence is lacking in the regularization of these protocols.[27]

Specific Aim

Standardized protocols are supported by multiple national associations, yet there are slight discrepancies regarding how these protocols should be implemented. One solution takes inspiration from stock-car racing and postulates a “pit stop” model of care with a “nurse driver” pushing the process to completion.[25] *The AHA Target: Stroke Initiative*[10] has several recommended target treatment times for AIS therapies, yet they do not specifically address the special constraints and considerations of a telestroke clinical encounter. We developed the Nursing-Driven Acute Ischemic

Stroke Care (NAS-Care) protocol to optimize the performance of telestroke encounters by emphasizing the rapid and coordinated completion of the stroke workup by nursing personnel during a stroke code activation. This study explored the impact of a nurse-led workflow to improve patient care in a telestroke model in the emergency department.

Methods

his feasibility study of a unit-level protocol used a prospective pretest and post-test design, in which the pretest cohort served as the control group, and the intervention was implementing the NAS-Care protocol. The primary aim was to examine whether the nurse-driven protocol was associated with improved efficiency of the telestroke encounter. The primary outcome was the impact on telestroke-encounter efficiency measured as DTN times. The study was completed in 3 phases: (1) baseline data collection (baseline group), (2) education and implementation of the NAS-Care protocol, and (3) postimplementation data collection (intervention group). All patients presenting to a partner institution's emergency department with identified acute neurological deficits that began within the institution's stroke code activation timeframe (commonly 4.5 hours) were enrolled in this study. The study received institutional review board approval (UT Southwestern Medical Center #112014-039). The timeline for study procedures can be found in [Supplementary Material 1].

The baseline group consisted of patient data recorded before implementing the NAS-Care protocol. During the baseline phase, data were collected from each of the 5 enrolling sites for 3 months. The sites were selected based on previous and new telestroke relationships with the team that was providing the training and were not required to be a part of a single health system. Enrolling sites ranged from small quaternary hospitals to large urban primary stroke care centers. The baseline data were collected as soon as possible after the site agreed to participate in the project. No additional training was provided during the baseline data collection phase. To reduce the risk of pretrial novelty bias, a nonclinical data abstractor was appointed at each recruiting site. This data abstractor completed the data collection baseline form and the demographics form during the baseline phase. The data collection and demographics form was reviewed with the primary principal investigator and/or research manager of the trial.

Intervention

The intervention group consisted of time-stamped data recorded after implementing the NAS-Care protocol. During the intervention phase, education was provided to nurses and providers in the emergency department at each enrolling site. Education was based on 5 principles: identification of shared goals, organized urgency with the removal of gatekeepers, multipersonnel, nonsequential processes, focus on defined staged roles and tasks, and empowered engagement/empowered responsibility. There was an additional focus on delineation of nursing roles while seeing these patients. For example, a pit-stop model was used with the leader being the pit master (nurse in charge of the code). This nurse would lead other nurses in what to do during the stroke code in the emergency department. The pit master would record the timing of events that occurred on the NAS-Care run sheet ([Appendix 1]) so that data could be analyzed by the site stroke coordinator to identify lags in time with more aggregate data. This allowed for changes in the process to occur at each specific site while taking into consideration site-specific needs. The focus of this training was the change in workflow, specifically adding role delineation.

In addition, all staff were National Institutes of Health Stroke Scale (NIHSS) certified within the last 2 years. Two in-person lectures were provided to the recruiting site to ensure knowledge of research protocols, understanding of AHA guidelines, role/responsibilities during the stroke code under the study guidelines, order sets, and the study data collection form. The protocol was then implemented and the data collection, via the run sheet, commenced; this phase lasted 6 months. The postimplementation data collection phase involved the central site collecting all the data for analysis. All run sheets were completed by the pit master, during the stroke code. The data abstractor also

checked the data as a measure of data quality at each enrolling site. A closeout visit occurred with each site that involved sharing their data and information regarding outcomes of the nurse-driven telehealth protocol. All materials were provided to the site for optional future use. An exit survey was also collected. See Appendix 2 for a detailed logic model.

NAS-Care implementation was facilitated at participating centers by first providing a series of planned didactic educational activities for ED personnel. Education focused on teaching that the protocol was designed to empower bedside nurses to rapidly gather the data needed for a provider to make a decision regarding alteplase administration. This protocol is mediated via the “NAS-Care run sheet” (Appendix 1). The run sheet is a detailed, single-page printed reference that serves as a workflow template during actual patient encounters and helps to organize clinical data efficiently.

Measures

Each case in this study reflects a stroke code activation, and the primary outcome variables reflect time metrics related to stroke codes: door-to-provider (DTP), DTCT, door-to-ready (DTR), door-to-specialist (DTS), and DTN times. DTP is the time from patient arrival in the emergency department to when the patient is first assessed by a provider (physician or advanced practice provider). DTCT is the time from patient arrival in the emergency department to the start of the CT scan. DTR is a unique parameter to telestroke clinical encounters and reflects the earliest time point at which all of the necessary data for a telespecialist or ED provider to make a decision regarding thrombolytic (alteplase) treatment have been collected. DTS is the time point at which the telespecialist first logs on to the telestroke machine to assess the patient or a stroke specialist assesses the patient in person. DTN is the time from patient arrival in the emergency department to the start of alteplase administration. All stroke codes were assessed using the NAS-Care run sheet, regardless of stroke diagnosis. There were no time windows (eg, alteplase treatment window) imposed on data collection.

Statistical Analysis Plan

Sample size estimates are based on preliminary data.[25] Assuming β is set at 0.80 and a 2-sided α of 0.05, the effect size of 0.20 (conservative estimate from above) results in a sample size estimate of 375 subjects per group.[28] The primary outcome variables were DTP, DTCT, DTR, DTS, and DTN. Data analyses were completed using SAS v9.4 for Windows. Data are reported as mean (standard deviation) for interval and ratio data, as frequency (percent) for nominal data, and as median (interquartile range) for ordinal data. Wilcoxon rank sum test was used for comparison of median times. *P* Results

Data were available from 447 patient encounters including 180 (40.3%) in the baseline phase and 267 (59.7%) in the postintervention phase. Of 83 patients receiving alteplase, 34 (41.0%) were in the baseline group, and 49 (59.0%) in the intervention group. As noted in Table 1, there were no statistically significant differences in demographic data by group assignment. Figure provides an example of box plots constructed to examine the difference of variables by site (see Supplementary Data). As shown in Table 2, the DTP metric was significantly lower in the intervention group, with a median of 2.0 (9.0) minutes, than the baseline group 5.0 (12.0) minutes (*P* P P P = .33) nor DTN 56.0 (25.0) minutes to 55.5 (30.0) minutes (*P* = .66). See Supplementary Data for point estimates.

Discussion

The findings support that the primary mechanics of the stroke workup, the gathering of stroke patient data and driving of early AIS care can be delegated to and efficiently completed by nurses. The NAS-Care protocol was associated with reduced DTP and DTCT times but no corresponding reduction in times to ready, specialist, or needle was observed. Moreover, there was a broad standard deviation in DTS and DTN, which indicates a wide variance in actual times. This supports previous authors who have identified that increasing stroke care efficiency

requires multidisciplinary-care coordination.[7,22] Similar to highly efficient, functional groups, role designation allows stroke team members to provide unique and vital contributions to stroke care.[29] Each member of the stroke team should be assigned designated tasks (roles)[30] to ensure that all tasks are accounted for and also to avoid duplication of efforts (eg, avoid both the nurse and the physician each obtaining a blood sugar).[7]

In particular, the role of the nurse is to assess, plan, implement, and evaluate patients whereas physicians and advanced practice providers are tasked with the decision to prescribe a thrombolytic agent and initiate mechanical thrombectomy.[31] Efficient ED care requires that nurses and physicians/advanced practice providers respect each team member and trust that roles are fulfilled in an accurate and timely manner.[29] Thus, it is reasonable to assume that the stroke workup can be completed by a nurse without additional medical order or prescription through a parallel processing model.[25,32] Within the NAS-Care protocol used in this study, nurses were assigned roles using the pit-crew model, which supported a nurse-led pit master to run the process of the stroke code and ensure all aspects of the stroke code were completed in a timely fashion.

In contrast to sequential interdependence, teamwork that occurs under a parallel processing framework has benefits to AIS care.[25] In the sequential model, each task must be completed before starting the next. For example, the nurse must obtain intravenous access before the physician can begin an NIHSS assessment. In reality, most tasks can be completed in a parallel manner. The nurse can perform the NIHSS while the patient is being prepped for CT scan and the physician can review the CT scan while the pharmacist is preparing the thrombolytic dose. Consequently, as popularity for parallel processing continues to grow, greater attention is required. The NAS-Care protocol also supports parallel processing, and the pit master can assign and delegate several tasks at once.

The increase in DTR times is concerning and worthy of additional investigation. The NAS-Care program was associated with a reduction in DTP and DTCT, whereas the DTR times were increased by nearly 10 minutes. The NAS-Care program did adopt key interventions identified to improve overall DTN times such as Emergency Medical Services Prenotification, Stroke Clock, and Single Notification.[3,33] Identifying a stroke nurse (or other lead person) and using a designated run sheet have been associated with reduced DTN times.[34] Increasing familiarity (eg, using simulation of stroke code events) reduces barriers to interdisciplinary engagement.[35] Future iterations of NAS-Care style programs may benefit from simulation before deployment and thereby reduce DTR times.[36]

Although the existence of a single intervention to resolve all AIS care delays is improbable, previous work has consistently identified the necessity of cooperation to improve acute stroke ED care.[7] As noted previously, one element is to identify the role of individual team members while simultaneously coordinating care.[22,25,31,37] In our study, we used the term “nurse driver” to indicate that the stroke nurse is empowered to drive (run) an established protocol. As documented by others, the role and positive impact of the stroke coordinator are well defined.[38-40] However, this is not to say the nurse is superior, but rather that there is an advantage to having one person take charge.[41] Thus, it seems that NAS-Care is ready for adoption.

Limitations

Although each study site conducted a retrospective chart review to collect as much baseline data as possible, many variables were not documented as a standard of care, which resulted in some missing data. Patient adverse events were not included in this feasibility study and should be taken into consideration for future studies. In addition, DTR was a new variable that encompassed a particular subset of patients, ultimately inhibiting pre- and postcomparisons of study data given that the fidelity of time measurements for this variable has not been fully established.

Furthermore, the variances in hospitals that have administered alteplase in DTN times were fairly significant, which limits the generalizability of study results to hospitals with varying alteplase administration rates. Recent literature suggests the use of control charts for quality improvement data,[42] and these were not derived because of the small

sample size and differences in recruitment rates and times by site.

Implications for Future Studies

Our experience demonstrates the feasibility of introducing a complex new stroke research protocol to emergency departments in diverse settings, many of which had little experience as research sites. The pit-stop model and NAS-Care run sheet were well received by unit staff. This protocol included the provision of in-person training on stroke recognition and the pit-stop model. New research models may develop approaches to remote training, which may be even more effective if continued on a regular basis beyond the initial intervention period. Future studies of unit-based emergency stroke protocols, which require larger sample sizes, would be amenable to cluster-based randomized clinical trial designs.

Implications for Emergency Nurses

The study protocol provides evidence that nurses can lead the protocol and procedure of ushering the patient through care and treatment teams in an ED setting. Telestroke is still an evolving paradigm of care; this study may have significant implications regarding clinical standards of what may constitute “best practice” care.

Conclusion

The NAS-Care protocol, in which an ED stroke nurse is the driver for AIS care, is associated with improved nurse-sensitive stroke time metrics but does not translate to lower DTN times. Additional ED workflows, possibly including mock stroke codes in partnership with telestroke physicians, may be required to further optimize alteplase administration metrics. The success of this study will be followed by a study to explore nursing-driven methods to improve identification of large vessel stroke.

Author Disclosures

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Appendix

Appendix 1NAS-Care Data Collection Sheet. NAS-Care, Nursing-Driven Acute Ischemic Stroke Care.**Appendix 2** NASCare Logic Model.

Supplementary Data

Supplementary Appendix 1 Analysis Results

Supplementary Data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.jen.2022.01.013.

Variable	n	Control		Intervention		P value
Mean	SD or %	Mean	SD or %	Age in y	445	65.5

15.9	67.4	15.5	.22*	Sex (% Female)	444	99

Variable	n	Control		Intervention		P value*
Median	IQR	Median	IQR	NIHSS	409	5.0
8.5	5.0	8.0	.96	Door to ED provider	441	5.0
12.0	2.0	9.0	<.001	Door to CT scan	442	9.0
18.0	5.0	11.0	<.001	Door-to-ready	405	21.0
24.0	25.0	25.0	<.001	Door to specialist	347	34.0
32.5	30.0	30.0	.33	Door-to-needle	83	55.5

DETAILS

Subject:	Emergency medical care; Tomography; Collaboration; Telemedicine; Patients; Emergency services; Nursing; Acute; Nurses; COVID-19; Stroke; Feasibility; Professional training; FDA approval; Nursing care; Data collection; Nurse led services; Rural areas; Nurse led care; Clinical education; Nursing education; Demography; Feasibility studies
Business indexing term:	Subject: FDA approval Feasibility studies
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Hospital Access Block: A Scoping Review: JEN

ABSTRACT (ENGLISH)

Introduction

The overarching objective of this scoping review was to explore the breadth of health care literature in attempts to identify current strategies that hospitals adopt to improve patient bed flow, reduce access and exit block while optimizing patient care.

Methods

PubMed, CINAHL, Embase, Proquest, and Cochrane electronic library databases supported literature search in March 2021. Scholarly articles that met the 3 eligibility criteria—access block causes, effects, and solutions—were considered. Joanna Briggs Institute Guidelines supported first- and second-level literary screening processes.

Results

The synthesis included 43 references. Most initiatives addressed access (n = 15), followed by care (n = 16) and then community (n = 9), with a further 3 articles providing commentary across all 3 domains (n = 3). Evidence supported Lean principles in both emergency department and inpatient sector. Lean principles addressing access included physician-led ED triage models, point-of-care testing, overcapacity protocols, mental health team collocation models, and fast-track services. Inpatient care Lean concepts validated gains in multidisciplinary rounds, appropriate allocation of allied health services with a 7-days-a-week model, staggering of elective surgeries, journey boards usage, transit lounges, and lateral transfers. Most literature addressing the backend was narrative in nature, theorized, and advocating for solutions and policy reform.

Discussion

This study addressed aims and identified current strategies that hospitals adopt to tackle access block while guaranteeing patient care. Government-supported research to map out evidence-based models of care that address exit block and demonstrate efficiencies is required to optimize access to care in the community.

FULL TEXT

Contribution to Emergency Nursing Practice

••Some researchers have looked at inputs, throughputs, and outputs, and others at patient-centered, clinical, and hospital system factors.

••The main finding of this paper is to explore blockages within Access, Care, and Community.

••Recommendations for translating the findings of this paper into emergency clinical practice include addressing hospital capacities and issues regarding backend exit block.

Introduction

Access block, “the situation where patients are unable to gain access to appropriate hospital beds within a reasonable amount of time” as defined by the Australian College for Emergency Medicine, can lead to crowding with patients boarding in emergency departments.[1] Scholars have spent the past 30 years exploring the concept of access block in hospitals and defining the problem; they have identified multimodal interactions that contribute to improved access to critical services. To mitigate access block, hospitals rely on efficient inputs: triage and registration systems; throughputs with timely patient assessment and management; and outputs through judicious patient discharges, transfers, or hospital admissions.[2] Health services have done well to embrace Lean concepts and thus efficiencies; however, the reality is that at any given point in time one-third of all Australians continue to experience access block despite these improvements.[3] Demands on Australian emergency departments have increased by 5% to 10%, accounting for approximately 1500 deaths annually.[3-5] Mental health ED presentations have increased up to 38%.[5] Furthermore, our aged population growth rates have risen by 1.5% to 2%.[4] Yet, total hospital bed numbers have reduced by 15% to 30%—a universal contradictory conundrum.[2,4]

Logic would support lack of hospitals beds as the fundamental drawback; research would suggest otherwise. A historical national survey completed by the Royal College of Physicians London would suggest that access block is complicated, with 45% of patients in hospital without reason.[6] What are health services doing wrong, and what can they do to address access block? This scoping literature review explores the research question: What current strategies can health services adopt to improve patient bed flow, reduce access and exit block while optimizing patient care? While some researchers have looked at inputs, throughputs, and outputs, and others at patient-

centered, clinical, and hospital system factors, this review explores blockages within access, care, and community.[2,7] This study aims to lead one through the patient journey and explore scholarly solutions from a diverse body of literature and methodologies to address bottlenecks in access and care delivery. Finally, the role of community, the government, and accountability is discussed, identifying the need for further research and legislation to address access block influencers, which lie beyond the remit of health service regulation.

Methods

This review followed the Joanna Briggs Institute Guidelines to inform methodology.[8] The Preferred Reporting Items for Systematic Reviews and Meta-analysis Extensions for Scoping Reviews (PRISMA-ScR) provided a template to support format of final assessment.[9]

Inclusion Criteria

Eligibility criteria included papers written in English sourced between 2015 and 2021 either from the primary data or synthesis of secondary data. Literature identifying probable causes and effects of access block, with a solution focus to improve bed flow while ensuring quality of patient care, were investigated. Advanced search functionalities were then applied using key words and phrases within text, “improve bed flow, bed block, reduced length of stay (LOS), access block” and exact word “inpatient.” A manual research of reference lists of included papers was undertaken for extra papers missed in the initial searches. A search in Google and other web-based repositories was also conducted in addition to manual searching of reference lists of retrieved papers to identify additional relevant papers that were not captured in the selected electronic database searches.

Search Outcome

The initial advanced search identified a total of 365 papers including papers identified through hand and manual searching. These papers were then cross referenced with 310 articles sourced using the same search engines from CINAHL, Embase, Proquest, PubMed, and Cochrane libraries. There were 122 duplicates.

Applying level-1 screening of titles, abstracts, and discussions, a further 127 articles were eliminated as not directly related to eligibility criteria. In total, 61 full texts were then screened; 36 met eligibility criteria and identified core themes of access, care, and community. Once themes were charted, a further scanning of reference lists was completed to progress each theme. The outcome of the literature search identified a total of 43 key references to inform this scoping assessment (Figure 1).

Data Extraction

The extraction form was developed using Joanna Briggs Institute manual for each paper. The extraction form was divided into 3 sections. The first section was related to the citation of the study, which included the authors and date of publication. The second section included the objective and methodology of the study, including study design, study methods, study procedures, and study participants. The third documented the findings, relevant additional information, and recommendations. Data were extracted by the first author from the included studies using the data extraction form, which was confirmed by the second author.

Results

The data search supported 43 scholarly articles (Figure 1). Most articles were quantitative (n = 23),[5,10-31] several were mixed-methods studies (n = 5),[7,32-35] and other designs (narrative literature review, scoping review, discussion papers) (n = 14),[2-4,36-46] with a single qualitative paper (n = 1).[47] Publications were universal, with studies in Trinidad, Kuwait, Iran, Canada, United States, Australia, New Zealand, Europe, France, China, Sweden, and the United Kingdom. The majority of the quantitative studies explored effects of access block on key performance indicators such as ED and inpatient LOS, the 4-hour rule, and wait times. Mixed-methods studies attempted to qualify effects of access block and interventions on patients and staff. Most initiatives targeted the adult inpatient population,

although pediatric cohorts were explored. The term access block was standardized across studies; however, maintenance-type care, affecting backend exit block, was not well defined. The scoping review identified 3 key themes in support of addressing the research question: Access, Care, and Community (Table 1).

Characteristics of included studies and their initiatives contained in this review are captured in Table 2 and Figure 2

Access

This category explores themes related to front end ED access block including enhancing hospital infrastructures and applying Lean concepts.[1,3-5,10,11,13,36]

Infrastructure

Because of advancements in medical and surgical efficiencies eventuating in reduced hospital LOS, hospital bed numbers in Australia reduced by approximately 18% over a 10-year window.[3,4] Over the years, there has been a 5% to 10% increased demand on Australian emergency departments, with annual patient presentation growth rates between 1% and 7% globally.[4,5] Therefore, it may be logical to infer that increasing ED bed numbers reduces access block and boarding; however, this is not the case.

An Australian trial whereby 3 hospitals increased ED bed numbers from 81 to 122 beds demonstrated improvements in reduced inpatient mortality rates but no effect on ED access block or LOS.[1] Similarly, increasing ED beds in a level I trauma center from 28 to 53 did not affect time between ambulance diversions and access to care.[10] This sentiment is reiterated by other authors recognizing that "the addition of new beds does not guarantee improved access to care."[11] Likewise, the principles of "elasticity in demand,"[1] —if one makes more beds, more demand will come—support research findings that simply increasing ED bed numbers does not mitigate risk of access block but rather adds to overall congestion.[12,36]

Lean Principles

Emergency departments across the world have embraced Lean principles to improve efficiencies in attempts to mitigate access block. These philosophies include minimizing defects, mitigating overproduction, time and resource management, transport productivities, inventory monitoring, supporting efficient motion, reducing excess processing, and optimizing talent utilization.[13]

Lean initiatives such as fast track systems support patient access to emergency departments,[10,17,36,37] however, not necessarily hospital throughputs, with LOS times remaining unchanged.[10,12,15] Similarly, short stay units, normally used to improve access to acute care, can increase access block when used inappropriately on patients with higher acuity requiring further management.[14,37] Point-of-care testing reduces time wastage in support of Lean constructs.[12,15,37] Full capacity protocols, otherwise known as overcapacity protocols (OCP), support the flow of patients awaiting inpatient beds from the emergency department to the acute wards, corridors, lounges, or overflow rooms.[12,38] This frees up ED beds, reducing ED boarding by up to 50%, guaranteeing "no patient left behind" in support of hospital access and Lean principles.[38]

Similarly, applying Lean staffing models and triage systems reduces access block. Nurse-led triage in the emergency department to support primary and secondary filtering for fast-track, emergency department, primary health care, or discharge to community demonstrates efficiencies.[37] However, in times of high bed capacity, efficiencies are often somewhat reduced, with nurses admitting some patients, erring on the side of caution.[15] A top-heavy, physician-led model demonstrates better throughput efficacies and discharge rates from the emergency department.[12] Furthermore, physicians are 35% less likely to admit patients with acute abdominal pain in times of peak bed capacity.[4,16-18] Nevertheless, to ensure harmony, cater for fluctuations in ED presentations, and maximize cost efficiencies, a physician-nurse-led triage system appears to be most effective in times of access block.[37]

Research confirms success of these multimodal Lean principles in emergency departments, with recent global

realization of the 4-hour rule on National Emergency Access Target.[12,14,32]

Inpatient Care

This category relates to inpatient care processes; communication and coordination are key to considerate care. Applying Lean principles demonstrated in the emergency department that inpatient throughputs including OCP, strategies around fast-tracking radiology, electrocardiograms, and pathology testing improves admitted inpatient flow. When you increase hospital infrastructures, bed numbers, and financial inputs but let these Lean fundamentals slide, as in the case of San Fernando General Hospital in Trinidad, crowding rears its ugly head again, with average LOS increasing by 25%.[11] To address inpatient care coordination and lessen access block, interdisciplinary team care, a 7-days-a-week service model, accountability, discharge before noon (DBN) processes, flexible bed allocations, lateral transfers, and health information management systems prove effective.[7,13,22-29]

Elective Admissions

While ED flow is variable, there are patterns and trends in epidemiology, time, and season that can be mapped to support staff rostering. Staggered elective admissions and staff rostering supports hospital throughputs during the week.[7,36] The Boston Medical Center applied these smoothing of elective surgical principles in 2003 and was able to reduce LOS by 45 minutes, waiting room times by 20 minutes, and cancelled procedures by 99.55%, all while seeing more patients through the emergency department than the year before.[36]

Discharge Before Noon

Simulation models allow one to map out areas for further improvements to inpatient bed access. Through 1-hour improvements in inpatient bed turnover rate, hospitals can reduce ED wait times by 10 hours and number of patients waiting from 11 to 4.[21] The reverse triage process with a push for 50% improvements in discharge documentation orders before noon can lead to an overall mean reduction in ED boarding time of 2.1 hours and ED walk out rates by 32%.[7] By introducing DBN, one can create a 5-year sustainable improvement of 42% discharge rates with no overall increase in readmission rates.[36] DBN supports bed flow and access to inpatient beds.[7,13,21,36]

Discharge Lounges

Scholars advocate for the provision of patient lounges to support admission-discharge patient flow and lessen access block.[1,2,4,12,32] Recent research suggests formalizing lounges into hospitality centers whereby a nurse completes paperwork for discharge or, alternatively, admission.[20,34] Hospitality centers have demonstrated positive effects on reduced ED boarding times from a total of 458 hours a month to 368 hours a month, improving front end access and throughputs.[34,39]

Electronic Journey Boards

The introduction of pull systems such as the electronic journey board (JB) allows for more timely referral processes and a degree of transparency in communication. JBs visible to all wards allow unit coordinators to pull patients from the emergency department early, provide timely flags to allied health disciplines for complex presentation management, and offer clarity around expected discharge dates and a central point of tendency.[20] Correct utilization of JBs can reduce LOS by 4.1 days and save the health care sectors $2.6 million annually.[27] However, JBs, like many initiatives, can lose value when placed in inappropriate locations with lack of suitable customizations, interoperability, and a shared vision in their usage.[47]

Lateral Transfers and Flexible Bed Allocation

Inter-hospital transfers can support access to health care services. When hospitals are at capacity, supports from like-minded sites can improve ED access and throughputs with no ill effects to overall hospital LOS or patient outcomes.[28,29] However, transferring patients to concurring sites after 4 pm has been identified with a 1-day increased LOS, so it is important to identify suitable transfers, as per discharge processes, before noon.[28] Similarly,

for large scale systems experiencing access block, some flexible bed allocations can support efficiencies, although full flexibility is not recommended, as geographic clustering is optimum for timely patient management.[29,36]

Community Care

The final category explores exit block as it positively relates to front end access block. Historically, the National Audit Office estimated a wastage of approximately 2.2 million hospital bed days in the NHS due to discharge delays, at a cost of estimated £170 million a year.[41] In total, delayed discharges accounted for 6% of hospital beds, a universal phenomenon.[41] Most delays were not due to hospital processes but rather attributed to funding approvals for social services, securing a Residential Aged Care Facility (RACF) bed, family dispute matters, and sourcing of appropriate community service providers.[23,35,38,39,41] This phenomenon was supported by more recent research from Salonga-Reyes and Scott,[35] where 44% of bed block was attributed to RACF beds, 13% to guardianship applications, 4% to 5% to administrative processes, 7% to family refusal of care, and 1% to 3% to delays in Aged Care Assessment Team reporting.

The Growing Problem

At this point, it is important to note that the population is not only growing but aging too. In 2015, China had 144 million people aged ≥65 years, 10.5% of the total population, with an expectation that this number would double by 2050 to 115 million people aged over 80 years.[42] Similarly, the population aged ≥85 years in the United Kingdom increased from 4.2% to 21% over a 7-year period.[30] Likewise, the Australian population aged >85 years is expected to grow from 500,000 in 2020 to 1.8 million individuals by 2050.[43] To meet the forecasted 2025 growth in Australian aged care, an estimated further 83,100 low care and 87,400 high care RACF beds would be required.[43]

RACF and Infrastructure

Common sense would therefore implore a similar logic as with the ED sector: increase the RACF and disability sector infrastructure to support bed numbers, and the problem will be solved. Increasing availability of long-term care beds by 10% has demonstrated improvements in overall hospital access, reducing acute sector patient LOS by 6% to 9%.[31] However, despite a tripling of RACF bed numbers in China to accommodate for the aged care crisis and support hospitals with bed flow, exit block is not necessarily mitigated, with evidence noting a drop in RACF bed occupancies from 80% to 55% due to private sector prices, patients' lack of insurance, preference, facility location, and quality of care.[42]

Care Needs in the Community: Families and the Care Giver Role

Some may query the role of families in supporting exit block, taking loved ones home into their care. In the United States, there are 43.5 million family caregivers aged >50 years, 14.9 million who care for someone with dementia, and only 2.1 million paid formal carers.[44] Similarly, Romania, Czech, Austria, Bulgaria, and Ireland have approximately 10% of the population in informal carer roles, with up to 35% of the population in Greece caring for a loved one.[45] It would appear that government systems have already monopolized on the role of informal and formal carers, "demonstrating how capitalism reorganizes the labour process to make use of free service labour."[46] Tackling backend exit block in support of hospital access therefore appears complex, requiring a multimodal system approach and legislative reforms.

Discussion

This study explores and identifies contemporary approaches hospitals utilize to mitigate access block while ensuring timely patient-centered care. The findings highlight deficits in hospital access and bed flow due to backend exit block and call for government reforms to better optimize one's rights to appropriate care in the community. Most quantitative studies included in this review ranged between 6 months and 2 years, with 1 retrospective study over 5 years.[10-31] A simulation model did support predictive analysis for efficiencies in this scoping review, but unfortunately

failed to contextualize real world experiences in a complex adaptive system; and the researcher therefore questioned its value.[17] Many of the studies were unable to demonstrate independent successes owing to multimodal quality improvement initiatives running in tandem, making it difficult for the researcher to ascertain strengths in ingenuities.[5,7,10,13,16,20,27,32] Furthermore, most quantitative studies were at single sites and may not have been directly transferrable.[10-16,25-27,29] Future researchers should take these weaknesses into consideration when setting criteria for forthcoming scholarly works.

Despite several weaknesses in identified studies, the scoping review still managed to successfully address the research question and identified positive strategies that hospitals adopt to address access and exit block while optimizing patient care. Most quantitative studies pointed to Lean principles in improving overall hospital efficiencies and access block.[5,10-17] This review demonstrated that there have been significant proactive initiatives to address hospital sector ED efficiencies with the introduction of short stay units, the 4-hour rule, physician-led triage, point-of-care testing, fast-track systems, and OCPs.[1,3-5,10-19] The inpatient sector has demonstrated improved efficiencies on LOS through information sharing and communication with MDT meetings and journey boards, 7-days-a-week service, DBN processes, smoothing of elective admissions, reverse triage due to OCP, lateral transfers, and transit lounges.[12,20-29,36] All of these initiatives demonstrated evidence in support of access block mitigation.

The literature addressing backend exit block, however, was mostly narrative in nature, prone to bias, yet still managed to raise cause for concern.[41-48] The lack of scholarly quantitative references providing evidence-based solutions to address this bottleneck was evident. The author recognized this deficit and therefore attempted to offer possible solutions based on evidence through recommended initiatives (Table 3).[30,35,38,39,41,43] Despite this weakness, the scoping review still managed to clearly highlight aged care's role in 44% of backend bed block and the need for government supports, research, and reforms.[35]

Strength of Study

The strength of this study is in the identification and confirmations of proactive evidence-based initiatives that hospitals can and do adopt to reduce LOS and improve access block. The review, however, pointed to the need for further research and development in the backend. The study follows the PRISMA-ScR checklist, supporting strengths in literary findings.[9]

Limitations

As per Joanna Briggs Scoping Guidelines,[8] there are limitations to this study. The study did not extend to all relevant databases or non-English text owing to the expanse of literature and time constraints of the university trimester. Unlike the systematic reviews, the quality of the included studies was not apprised in this scoping review. The researchers attempted to mitigate any biases by referring to peer reviewed scholarly works throughout to define the problem of access block and remain solution focused.

Implications for Emergency Nurses

This review demonstrates the need to explore research in backend exit block. Through extrapolation of epidemiological data, researchers can define and map out maintenance care type inpatients, local hospital and nursing home/disability care bed capacities, community social service packages, and resources available. Once charted, global comparisons in support of identifying evidence-based efficient practices for future legislation and policy formulation can be synthesized.

Conclusion

There are many strategies that health services can and do adopt to improve patient access to critical services and progress patient bed flow and care while lessening exit block. Through the multimodal application of Lean processes across systems, health care services are demonstrating improved efficiencies in combating access block in the

emergency department and inpatient setting. However, there are some bottlenecks that sit beyond health services remit; access to care in the community seems to be health care's Achilles' heel. At this stage, there needs to be some acknowledgment from governments that exit block cannot be separated from access block. Health sectors require government support to address this backend block. Through accountability and evidence-based research, governments can successfully map out existing resources and identify models of care that support fiscal pressures while ensuring optimal patient care and flow at the backend. Backend exit block research and policy reform need to be at the forefront of health and the governments' agenda.

Author Disclosures

Conflicts of interest: none to report.

Category name	Description	Example
Access	Strategies adopted to address access block at the front end of hospital care	Infrastructure Lean principles applied in emergency department:○Triage○Staffing models○Point of care testing○Fast track○Co-location of mental health teams○Overcapacity protocols○Short stay units○After hours GP or nurse service
Care	Inpatient care strategies to improve throughputs	Interdisciplinary care and information sharing Discharge times 7 days per week service Elective admissions Discharge lounges Electric journey boards Lateral transfers and flexible beds
Community	Improve exit block by addressing community care	Epidemiology Infrastructure and residential aged care facilities Funding Families and care givers

Authors	Aim	Method	Participants	Major findings	Limitations
Theme - Access					

Cameron et al[4]	To explore possible solutions to hospital access block	NR	Relevant studies addressing access block between 1999 and 2009	NR discussing strategies to mitigate access block:•Reduce demand on care services by addressing patient goals of care, chronic conditions coordination in community, mental health care, expand hospital and rehabilitation in the home models, and social service supports.•Increase capacity by increasing inpatient beds, not ED beds. Increase hospital throughput processes.•Improve exit strategies by increasing discharge processes to 7-days-a-week process, introduce transit lounges, DBN concepts, and community services.Strategies that do not work according to research:•After-hours GP clinics•After-hours telephone triage•Ambulance bypass	NR, prone to bias

Mason et al[2]	To clarify the cause and effects of exit block and explore possible solutions	NR evidence sourced between 2008 and 2014	Relevant studies between 2003 and 2014	Exit block is more likely to occur in populated areas, less likely in pediatric populations. Bed occupancy correlates with exit block, and ED boarding is directly correlated with backend block. Patients prefer to wait for inpatient bed in ED cubicle rather than a corridor. Increasing no. of ED beds does not affect ED LOS. Solutions proposed, a whole of systems-wide approach	Gray literature not reviewed; only English language articles sourced. Single reviewer to screen articles

Bahall[11]	Explore whether improving throughputs in emergency department will reduce crowding	Quantitative descriptive, observational study	Patients presenting to single-site emergency department in Trinidad September 2010 to March 2011	Significant issues regarding throughputs in Trinidad including timeliness and access to pharmacy, laboratory, and electrocardiogram testing, physiotherapy, and social work services. Introducing multimodal throughputs for 6 months in 2011, improved efficiencies. Once throughput interventions were ceased again, ED crowding increased by 87%, despite increase in inpatient bed no. from 209 to 227 and reduced medical admissions from 58 to 52 peoples per d.	Single-center study. Secondary data. Possible observational bias

Chrusciel et al[10]	To evaluate the effects of fast-track services on ED LOS and quality of care	Quantitative adjusted before-after analysis	Patients presenting to emergency department between 2015 and 2017	In intervention hospital, ED mean intervention times reduced from 215 to 186 min; patients leaving without being seen reduced from 10.0% to 5.4%. There was an increase in 30-d readmission rates from 11.4% to 12.3%; however, improved access to critical services with decrease NEAT ≥4 h. Overall, there was no change in admitted patient ED LOS and so, no effect on admitted patient access block	Single-site study. Data integrity could be questioned owing to multimodal interventions
Fitzgerald et al[17]	To assess the effects of implementing a fast-track system on patient wait times and staff resourcing	Quantitative simulation model	Two health campuses in Massachusetts	Discrete event simulation models applied with queuing to replicate real bed flow events. Three hundred different data simulation sets were explored per scenario. Results demonstrated a 35% reduction in ED wait times with introduction of fast-track during peak flow times	Simulation model. Does not consider real day complexities including capacities to resource staffing models or patient acuity dependent turnover rate

Beck et al[13]	To ascertain whether Lean principles progress ED throughputs and limit ED boarding	Quantitative pre and post retrospective descriptive study	Pediatric patients presenting to general pediatrics and subspecialty services over 2-y period	Lean intervention group, general pediatric ward, demonstrated median order entry and discharge time reductions through introduction of altered staffing model, rounding standards, and multidisciplinary predischarge planning processes. Patients' percentages discharged before noon increased from 14% to 26%. This had a positive effect on reducing ED boarding times by 49 min.	Single tertiary hospital study. Alternative multimodal quality improvement initiatives.
Shetty et al[14]	To explore effects of ED SSU on bed occupancy rates, NEAT and DNW rates	Quantitative descriptive	Emergency department patient presentations between 2012 and 2014	SSU accounted for 10.4% (20,081 patients) of the 43.8% admitted patients from emergency department. There was a mild positive correlation of short stay with NEAT and weak correlation with DNW. Bed occupancy rate of >100% demonstrated briefer short stay admissions, NEAT, and DNW. SSUs should be used appropriately for ED flow, not inpatient flow, and can add to congestions when used incorrectly.	Single tertiary level adult hospital study. However, large sample size suggests statistical significance and reproducibility.

Tenbensel et al[32]	Review the introduction of 4-h rule and its effects on ED wait times	Mixed methods	Four hospitals in New Zealand, 2009-2012	Improving patient flow, as seen with 4-h rule, demonstrates benefits to ED LOS. SSU are being utilized more to supports sites in possible breach of 4-h rule due to increasing demands on the emergency department. Concerns have been raised as to how hospitals will cope if ED presentations continue to grow and efficiencies are maximized, SSU full. SSU tend to mask true ED LOS.	Owing to a multimodal intervention with increased staffing and infrastructures, the research cannot assume that the changes in ED LOS are purely attributable to 4-h rule

Elamir[12]	To explore solutions to address the main causes of ED crowding	Quantitative analytical applied research	ED patient presentations between November 26 and December 2, 2014, Kuwait	A total of 39-bed emergency department with 82 nurses and 40 doctors; 6,383 patients were reviewed, and 210 of these patients experienced ED access wait times more than 6 h. Reasons for delay to ED access were 52% waiting inpatient beds; the remaining 48% of delays was due to lack of Lean throughputs at peak flow times including timely radiology processes. Suggested solutions include themes of inputs, throughputs, and outputs. These themes consider some Lean concepts including use of fast-track systems; electronic health information management systems; inpatient discharge services; bed crisis management protocols; increased rounding, point-of-care testing, nurse shift changes to accommodate surges. ED doctors to have admitting rights.	Inconsistencies in triaging systems, lack of integrated electronic monitoring systems, no specific allocated party to complete audits, so lacks consistency in data collation. Extreme outliers can also distort data.

Blom et al[15]	To explore whether ED primary triage at times of high inpatient bed capacity affects patients' access to ED	Quantitative descriptive-retrospective cohort study	ED patient presentations to Helsingborg General Hospital, 2011-2012, Sweden.	There is an increase in ED admissions during times of high inpatient capacity, suggesting that primary nurse-led triage can increase ED congestions at times of high stressors. Suggested solutions include fast-track, adding physician to triage in times of high inpatient capacity, nurse-led test orders, diverting away from emergency department as per primary triage categorizing as ED, primary care, or discharge home, utilizing chronic disease follow-up in community models.	Single-site study. Limitations in the study power of 72-h readmissions make it difficult to provide statistically relevant assumptions as to the after-effects of discharges by primary nurses

Yarmohammadian[37]	To present scholarly solutions to reduce ED wait times and overcrowding	NR sourced from historical literature until 2016	Sourced from historical literature until 2016	From 1,006 articles, 136 were selected, and 30 informed final review as met inclusion criteria. Articles that did not assess real patient flow in hospital emergency departments or provide solutions to address ED crowding were excluded. Ideal strategies to address crowding discussed including fast-track systems for streaming of minor injuries, team triage, point-of-care testing, nurse-requested X-ray and emergency patient journey models through triage and registration	English and Persian articles only. Possible selection bias

Blom et al[16]	To assess whether hospital bed capacity effects the management strategy of acute abdominal pain presentations to emergency department	Quantitative descriptive	ED patient presentations at Helsingborg General Hospital, 2011-2013, Sweden	Patients with acute abdominal pain are less likely to be admitted when hospitals are experiencing access block. Of 52,790 visits made to the emergency department, 23,884 complained of acute abdominal pain. Patients aged <18 y, patients deceased in emergency department, who DNW or were transferred to another hospital were excluded from evaluation. A total of 19,620 patient presentations were examined; 37.5% were admitted; however, when access block with hospital experiencing 100% capacity, this no. reduced to 35% admissions. ED LOS increased by 20 min; 72-h readmission rates were not affected. This makes one question triage systems and role of nurse- versus physician-led triage.	Single-site study. Lack of analysis of mortality data makes it difficult to analyze ill effects. Lack of procedural data in emergency department makes it difficult to ascertain whether it was triaging processes or procedures in emergency department that made an impact on inpatient admission data.

Zeitz and Watson [5]	To explore suite of principles in support of reducing ED boarding and improving throughputs for mental health patients	Quantitative descriptive	ED consumers presenting with mental health concerns in 2 hospitals in Adelaide and Australia, 2014-2016	The implementation of a 3-phase project addressing leadership; realignment of hospital bed footprints; escalation processes; care planning, journey boards; development of analytic models; revamping of admission processes and implementation of a short stay model of care, reduced boarding in emergency department for MH patients. The ALOS in July 2014 was 20.4 h. After 1.5 y of project implementation, MH ALOS had reduced to 8.5 h.	Multimodal changes implemented over 3 phases, so difficult to ascertain which changes added value and whether there were other changes at a whole of health system level that impacted on results.
Nolan et al[18]	To determine incidence, contributing factors of ED boarding and increased LOS for MH patients in the United States	Quantitative retrospective	MH patients presenting to emergency department in United States, 2008	Patients with MH disorders are 4.78 times more likely to board in emergency department than nonpsychiatric counterparts. Psychiatric patients experience longer boarding times, with 21.5% psychiatric patients as opposed to 11% nonpsychiatric patients experiencing ED boarding in United States	Electronic data systems may not capture all relevant MH diagnostic codes for this study

McKenna et al[36]	To define ED crowding, identify effects, and provide solutions	NR	Literature explored between 2002 and 2018. Key words: crowding; emergency service; hospital; patient safety	ED boarding is a whole of hospital systems issue. ED crowding is generally a function of hospital capacity. Consequences: increased 28-d mortality rates, increased DNW, increased medical errors, has a negative impact on hospital funding due to DNW. Ineffective interventions: expanding emergency department, diverging patients, additional staffs reduce strain but not boarding if admission beds to inpatient wards are blocked. Cures: staggering elective admissions through the wk, DBN, 7-days-a-week discharge, full capacity plans	No systematic nature to literature review therefore potential for author bias

Innes[38]	To focus on ED access block and identify proposed solutions	NR	Literature review, 2004-2018	Clarifies GP-related patients account for an insignificant amount of ED presentations, so are not contributors to access block. Notes that emergency departments are not the problem, rather access block is a whole of systems issue. Identifies positive solutions to throughputs including FCP, Lean principles, 4-h rule, reverse triage. Provides opinions advocating for FCP as a demand-driven protocol, not a preference, and that hospitals should use as such.	Single author. No systematic approach to review. Potential for bias

Richardson and Mountain[3]	To explore the causes of ED crowding and solutions	NR	Literature review, 2001-2009	Identifies causes of ED access block: the reduced no. of hospital beds since 1995 due to improved surgical and medical efficiencies yet the increased demand on emergency departments. Discusses consequences including increased mortality rate, delayed time-critical interventions, medical errors, increased hospital LOS, ambulance diversions. Dispels myths: GP patients have little effect on ED load, less than 3%. ED size does not really make a difference on access block unless in disaster mode. Explains that crowding is a whole of system issue.	Dual authors. No systematic approach to review. Potential for bias

Hullick et al[19]	Review the introduction of a nurse-led phone support service on RACF patient transfers to emergency department	Quantitative, controlled pre-post intervention	4 intervention RACF and 8 matched controls	Despite introduction of nurse-led telephone service, there was no change on ED presentations. However, the study did demonstrate improved care coordination, identification of goals of care early in the mix, reduced ED LOS by 45 min, and overall reduced hospital admission rates by 40%.	
Theme –Care					
Artenstein et al[7]	To explore whether interdisciplinary care optimization reduces inpatient LOS	Mixed-methods performance improvement initiative	Patients admitted to Baystate Medical Center, a 720-bed and 94-ED tertiary hospital in Massachusetts, 2013-2015	Daily IP discharge (d/c) rounds led to a 50% sustained d/c DBN and decrease LOS by 0.3. Despite increased ED presentations those 2 y, boarding reduced by 2.1 h. ED walk-out rates decreased by 32%. Some further solutions discussed including assigning boarding patients to inpatient beds, smoothing elective surgeries, pulling admissions from emergency department, empowering bed managers to support throughputs.	2-y project; therefore, difficult to attribute a cause-and-effect relationship, as there may be other multimodal contributors. Single-site study.

Aziz et al[33]	To explore the effects of a 'Consultant of the Week' model on hospital LOS	Mixed methods	Patients admitted to general medical wards at Sandwell and West Birmingham hospitals, 2017-2018	A 5-d-a-wk service with daily 11:30 am Acute Medical Unit MDT meetings expedited discharge planning and reduced LOS from 9.17 d to 6.61 d. Patients felt better continuity of care, junior doctors felt that education was improved, consultants felt that acute medical unit meeting improved traction with other teams and timely interventions.	Quantitative results seem favorable; however, qualitative components are not exhaustive, with mixed results from consumers, junior doctors, and consultants.
Gilfillan et al[20]	To assess how a patient journey redesign can improve patient flow in a general medical service	Quantitative rapid improvement initiative	Patients in acute general ward at 2 hospitals Victoria and Australia, 2013 and 2014 financial years	Through redesign including 7-days-a-week service, ED pull systems, and ward-based teams, hospitals were able to improve weekend discharge rates by 54.6%, demonstrate reduced bed occupancy of 19 d, and overall LOS by 0.88 d. Consultant hours only increased by 5.5 h across the whole health service, and there was little to no allied health or affordable nurse full-time equivalent variances. Mortality rates declined by 18%. Journey boards facilitated the pull process and identified early referrals and discharge dates.	12-mo project, so difficult to tell whether these interventions solely catered for overall efficiencies or whether there were other rapid improvement initiatives involved

Tariq et al[47]	Identify barriers to journey board use/adoption	Qualitative	Staffs in large teaching hospital in Sydney, Australia	Journey boards not used consistently. Design, configuration, and information regarding shared purpose were identified as contributors to poor implementation. Author suggests co-design in the future to ensure buy-in with new information technology systems	Small sample size n = 33. Qualitative interviews were brief and not exhaustive
Cadel et al[39]	To examine literature and explore best practices in hospital discharge processes; to identify initiatives and gaps.	Scoping review (peer reviewed and gray literature)	Mixed literature, 2004-2019	Articles between 2004 and 2019 sourced. Five themes identified, including practice change; infrastructure; information sharing; tools and guidelines, and other initiatives. Identified a call to action for governments to increase inpatient bed no., integrated care, and financing incentives. Other initiatives included the NHS improvement (United Kingdom) guide, which suggests a patient flow bundle, Red2Green d, long stay patient reviews, and multiagency discharge meetings	Search limited from 2004 to 2016, English articles only. Research was not critically appraised; therefore, all quality improvement projects must be interpreted with caution.

Cudney et al[21]	To develop an event simulation model in support of planning and staff rostering to address access block	Quantitative simulation model	Retrospective study and simulation based on patient data at single site	Simulation models can support service redesign. Three areas for improvement were identified at Sacramento Veterans Administration Medical Center to improve access and address access block.•Reduce bed turnover by 1 h and patient wait time will be reduced in emergency department•Reducing inpatient ALOS by 10 h reduces no. of patients waiting in emergency department from 11 patients to 4 patients•Increase beds in specific units	Data are historical and limited to 1 patient transfer; therefore, not necessarily a true reflection of the whole
Osborne et al[23]	To ascertain whether a specialist Social Work model supports discharge for long-stay patients	Quantitative-prospective, matched cohort study with historical controls	Hospital patients in a tertiary hospital in Southeast Queensland, Australia, 2016	Mean LOS for complex long stay patients reduced by 33 d, equating to 9,999 bed days annually and $A229,000 savings. Control group (n = 60), sample group (n = 52)	Small sample size. Historical controls selected on different criteria; therefore, a degree of researcher bias evident. No analysis of patient outcomes or qualitative data explored

Haines et al[24]	To see whether there are any negative effects from removing a weekend allied health service on patient flow and discharges	Quantitative, 2 stepped-wedge cluster randomized control trial	Six acute medical and surgical wards in 2 metropolitan teaching hospitals, Melbourne, February 2014 to April 30, 2015	Two large trials conducted. Service was removed in trial 1 and redesigned, then reintroduced in second trial. Data demonstrated that removing the allied health service had no ill effects; in fact, LOS dropped by 2%, and adverse events reduced by 3%. The newly developed service had no change in effect when reintroduced.	
Sarkies et al[40]	To assess whether weekend allied health services are effective in reducing LOS in acute sector and rehabilitation	Systematic review and meta-analysis	Literature review January 2000 to May 2017	Providing additional rehabilitation for inpatients reduces LOS by 2.35 d. However, the impact of weekend physiotherapy services was unclear across acute medical and surgical sectors	Potential risk of bias in outcome measures such as hospital LOS where clinicians could expedite/slow down discharges to influence data. Not blind study.
Haas et al[25]	Assess the effects of acute weekend/no weekend physiotherapy service on orthopedic protocol pathway patients LOS and outcomes	Quantitative Pre-post quasi-experimental 2 stepped-wedge cluster	Patients undergoing THR and TKR in public hospital, Melbourne, February 2014 to February 2015	2 sequential studies. Study 1 (n = 131) with weekend physio service in acute sector 6/12. Study 2 (n = 146) when weekend physio service removed 6/12. Outcome measures were primarily quantitative-hospital LOS. Result: no change in LOS; however, improved functional gains.	Single-site study. Casual cohort of staff used on weekends, so skill set may differ from normal acute therapists.

Malik et al[26]	Does day of surgery effect LOS for total joint replacement	Quantitative retrospective cohort study	Patients underwent total joint replacement between January 2007 and December 2015 in University Hospital, Pakistan	Sample size (n = 611). Outcomes:•For unilateral TKR, there was a reduced LOS dependent on day of week surgical intervention had. Tuesdays, Saturdays, and Sundays demonstrated efficiencies•No variance for bilateral joint replacements, though	Retrospective study. Single site
DiSotto-Monastero et al[22]	Evaluate a 7-days-a-week inpatient service on hospital efficiencies	Quantitative, cross-sectional, retrospective review	Data collected from National Rehabilitation Reporting Systems February 2008 to January 2010	A 7-days-a-week allied health model reduces patient LOS, improving access to care. This model was more beneficial than the previous 5-day-a-week model	Retrospective study. Data integrity dependent on coders
Bekker et al[29]	To assess when flexible bed allocations prove beneficial in facilitating bed flow and capacity	Quantitative	Hospital bed allocations (not patient but rather organizational bed no.)	In large hospitals, full flexibility is not desirable as geographic wards and clustering of specialties improves overall efficiencies; however, a little flexibility is generally enough to provide benefits on bed flow and access	

Russell et al[28]	The aim was to assess the effects of inter-hospital transfers on efficiencies including LOS and quality outcome measures	Quantitative, retrospective	Patients in 2 tertiary hospitals from the same health care network, 2010-2012	Patients transferred demonstrated no ill effects, had reduced LOS and readmission rates. However, transfers after 4 pm demonstrated increased hospital LOS by 1 d. Weekend transfers had no impact on LOS. Mean LOS was 1.2 d for Hospital A and half a day less for transferred patients in Hospital B	
Rolls et al[27]	To investigate whether the introduction of electronic journey boards reduces inpatient LOS	Quantitative, retrospective study	Inpatient rehabilitation center in Victoria and Australia 2013-2018	Reduced LOS 4.1 d with introduction of journey boards. Savings of approximately $A3,738 per episode. In total, an 18% reduction in LOS for rehabilitation patients. Annual savings of approximately $A2.6 million	This study does not factor in other potential quality improvement initiatives at the time. There is an assumption that retrospective data are accurate.
Smith[34]	To see whether introducing a Discharge Hospitality Center reduces ED boarding by streamlining flow	Mixed methods	Tertiary medical and level I trauma center, 2014-2017	Findings are not consistent as dependent on patient acuity and eligibility to attend Hospitality Center; however, current research identified a reduction in ED boarding times from 425 h to 368 h a month	Still in infancy stages at time of research, 6-month trial.
Theme - Community					

Feng et al[42]	To provide a profile of long-term care systems and the effects of policy on health care in China	Literature review	Literature review based on published works and gray literature	China has a rapidly aging population. Incidence of disability is high. Informal carer no. are low owing to recent rescind of 1 Child Policy in 2015. Government systems are exploring 90:7:3 policy; 90% care in the home, 7% community-based services, and 3% institutional, to address community need and increasing demands on health services	NR, so prone to bias. Mitigated by referencing scholarly works and OECD data.
Ergas and Paolucci[43]	Reviews the financing of Aged Care in Australia	Literature review	NR based on key word finding-published and gray literature	Provides forecasted epidemiology growth rates for aging population within Australia. Notes rates of dementia/disability and cost on health care and Gross Domestic Price. Discusses cost of institutional care versus formal and informal care. Proposes strategies to address exit block:•addressing voluntary tax-assisted savings dedicated to aged care,•universal mandatory insurance to address fiscal pressures on Commonwealth and improve aged care access	Two authors, narrative in style, prone to bias

Gaughan et al[31]	To explore whether increased nursing home/care beds reduce no. of delayed discharges	Quantitative descriptive		An increase in care home beds by 10% reduces delay in discharges related to aged care by 6%-9%. Care home prices also affect delay in discharges. Lack of beds affects patient migration to different regions to access care. Increasing the supply of care beds will not necessarily affect total costs of care; however, the impacts of hospital long stay and institutionalization have not been addressed with this research. The research has only explored effect on delayed discharges and is therefore relevant to access block.	Authors have no conflict. Limitations include lack of qualitative review of impacts on patients in hospital long stay or potential hospital-acquired complications and negative incentivizing with activity-based funding.
Salonga-Reyes and Scott[35]	Identify causes of delayed discharges in maintenance care type patients, quantify problem, and offer solutions	Mixed methods retrospective	Nonacute maintenance type patients presenting to Princess Alexandra Hospital, Queensland, January 2012-May 31, 2015	A total of 131 maintenance patients had long stays accounting for 5,420 of 6,033 nonacute hospital type bed days. Causes: 44% lack of RACF beds, 13% guardianship and public trustee issues, funding issues for social services 4%-5%, carer refusal 7%, and 1%-3% aged care assessment team processes.	No conflict of interest declared. Sample limited to 1 tertiary hospital. Patient sample size small but still statistically significant. Staff survey response rate low 24% (13 of 55 people)

Bryan[41]	To review literature related to Community Care (delayed discharge) Act 2003 and policy to ascertain effects of Act on reducing no. of discharge delays	Literature review (published and gray)	Literature review	Roll out of the Act in 2003 with 99 Social Service Departments partaking in the initiative. After 1 y, there was a reduction of 1.9% in delayed transfers to care; this rise continued in 2004-2005 with a further 1.6% reduction. Grants were more of an incentive for RACF than penalties/tariffs. The Act (2003) did demonstrate improvements in reduction of ALOS from 8.1 to 7.1 d despite increased admissions from 7.5 to 8.2 million patients in the same period. There was a growth rate of 33.3% in RACF admissions during this period. Concerns raised regarding institutionalizing patients when they could be cared for at home. Some suggestions include addressing prioritization, hospital factors, intermediate care factors, and social services.	Single author. Narrative style literature review. Previous similar studies by same author on topic may lead to perception of author bias

Kneale and Smith[30]	To examine whether extra-care housing can be a home for life	Quantitative study	Clients journey through 9 extra-care homes cross-matched with nearest-neighbor method to compare with those living at home	Extra-care housing can be a home for life for majority of patients, with only 8% of residents transferring to RACF. The exit to institution versus exit due to death is 1:3 at 5-year mark. Patients aged 75 to ≥80 y were more likely to move into institutions from home (35%-50%) than if they lived in extra-care housing.	To reduce error, demographics were matched as best practicable; however, there is a possibility of endogeneity as unobserved factors may impact on one's choice to move into extra-care housing versus RACF. Lack of qualitative data, which would make this study richer
Tao and McRoy[44]	To explore and provide suggestions on alternative heterogenous care models, rather than institutional type care	Literature review (published and gray)	Narrative literature review with keywords: aging, caregiver, technology	The review provides statistics on no. of formal and informal carers in the United States; the stressors that carers face, including poverty and job dissatisfaction. Discussions regarding the role of technology to support patient monitoring in the home were suggested, including home monitoring with biometric devices that can track set patient parameters.	NR prone to author bias, small search engines. Only 2 authors. No conflicts declared

Magode and Lebar[45]	To provide an overview of the challenges facing long-term care across Europe	Literature review (published and gray)	NR	Aging population's need for long-term care and cost of health care on GDP are growing exponentially. Possible solutions suggested to improve access to care include cash benefits for carers, carers' rights, respite supports, counseling, social security (pension and health insurance), legislation, and policy changes	Not systematic review, no search engine identified, 2 authors

Arons on and Neys mith[46]	To explore the implications of long-term care on patients, family, and formal carers	Discussion paper, historical	Review of primarily qualitative literature to inform audience of patients,' families,' and caregivers' perspective on issues surrounding long-term care	This article provides commentary around 3 areas:•the patients' perception regarding care,•the families' perception•and the carers' perceptionPatients prefer to be at home but do not want to be a burden on their children. Patients are dissatisfied with carer work at times but do not wish to offend if standards not up to scratch as they need the service; choice is limited. Carers/family often have no choice in the caregiver role and are not paid appropriately. There is limited to no choice in social service providers or care homes too. Formal carers find that jobs are demanding and pay is poor; they often work outside their scope of practice with poor job satisfaction. This historic article calls for policy reform	Two authors, prone to bias, discussion paper

Author	Recommendations

Salonga-Reyes and Scott[35]	•Reduced or no RACF entry fees•Penalties against RACFs if refusal to accept eligible clients•Legal sanctions to levy financial imposts•Reinstatement of state public funding for community services•Agreements with providers to offer flexible care arrangements•Addressing family factors of refusal to accept offer of RACF bed
Bryan[41]	•Charge social service departments a daily tariff for delayed discharges
Innes[38] Cadel[39] Bryan[41] Salonga-Reyes and Scott[35] Kneale and Smith[30] Ergas[43] Aronson and Neysmith[46]	Increase choice of community options•with optimization in the home•increase in transitional community packages•increase in residential aged care packages•increase in step down and respite beds

DETAILS

Subject:	Health care access; Research; Emergency medical care; Databases; Patients; Hospitals; Emergency services; Elective surgery; Teams; Evidence based research; Health services; Access; Surgery; Triage; Lean manufacturing; Medical screening; Literature reviews; Departments; Inpatient care; Hospital systems; Mental health care
Business indexing term:	Subject: Lean manufacturing
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COVID-19 Seroprevalence in ED Health Care Professionals Study: A Cross-Sectional Study: JEN

ProQuest document link

ABSTRACT (ENGLISH)

Introduction

ED health care professionals are at the frontline of evaluation and management of patients with acute, and often undifferentiated, illness. During the initial phase of the SARS-CoV-2 outbreak, there were concerns that ED health care professionals may have been at increased risk of exposure to SARS-CoV-2 due to difficulty in early identification of patients. This study assessed the seroprevalence of SARS-CoV-2 antibodies among ED health care professionals without confirmed history of COVID-19 infection at a quaternary academic medical center.

Methods

This study used a cross-sectional design. An ED health care professional was deemed eligible if they had worked at least 4 shifts in the adult emergency department from April 1, 2020, through May 31, 2020, were asymptomatic on the day of blood draw, and were not known to have had prior documented COVID-19 infection. The study period was December 17, 2020, to January 27, 2021. Eligible participants completed a questionnaire and had a blood sample drawn. Samples were run on the Roche Cobas Elecsys Anti-SARS-CoV-2 antibody assay.

Results

Of 103 health care professionals (16 attending physicians, 4 emergency residents, 16 advanced practice professionals, and 67 full-time emergency nurses), only 3 (2.9%; exact 95% CI, 0.6%-8.3%) were seropositive for SARS-CoV-2 antibodies.

Discussion

At this quaternary academic medical center, among those who volunteered to take an antibody test, there was a low seroprevalence of SARS-CoV-2 antibodies among ED clinicians who were asymptomatic at the time of blood draw and not known to have had prior COVID-19 infection.

FULL TEXT

Contribution to Emergency Nursing Practice

••ED health care professionals are often the first point of hospital contact for patients with an acute illness. There were concerns that ED health care professionals may have been at increased risk of exposure to SARS-CoV-2.

••At a single institution, there was a seroprevalence of 2.9% for SARS-CoV-2 antibodies among ED health care professionals who had never been formally diagnosed with COVID-19.

••Adherence to infection control protocols, including implementation of universal masking and use of appropriate personal protective equipment for patients with suspected or confirmed COVID-19 or confirmed exposures, can effectively mitigate risk of transmission in health care settings.

Introduction

ED health care professionals (HCPs) are often the first point of hospital contact for patients with an acute illness. Because of this, ED HCPs may encounter patients with communicable diseases before identification and isolation and in environments of care where effective patient isolation may be more challenging owing to ED capacity constraints and rapid turnover of patients.[1-4]

Early reports in 2020 documented elevated risk to HCPs, including in Italy, where nearly 2 in 10 people infected with COVID-19 were HCPs and in China, where health care workers constituted 14% of initial COVID-19 infections.[5] However, more recent larger studies have demonstrated that the risk of occupational exposure and acquisition is low, and that SARS-CoV-2 infection in HCPs is associated with community and demographic risk factors and not occupational risks.[6,7] In 2020, in a multistate hospital network study involving 13 academic medical centers, the authors found that seroprevalence among HCPs correlated with community COVID-19 incidence.[6] Moreover, in 2020, in a hospital-wide screening study at a Tertiary Center in Belgium, researchers found that having a household contact with COVID-19 was associated with seropositivity when compared with having no household exposure. They did not find a correlation with a health care worker being involved in the clinical care of patients with COVID-19.[7] Understanding the prevalence of COVID-19 antibodies among ED HCPs without prior infection knowledge sheds light on occult infection rates among ED professionals and could further guide efforts to protect health care coworkers and patients.

Methods Study Design

We performed a prospective, cross-sectional study to estimate SARS-CoV-2 seroprevalence among ED HCPs,

defined as attending physician, emergency resident physician, advanced practice provider, or full-time emergency nurse. An ED HCP was deemed eligible for the study if they had worked at least 4 shifts in the adult emergency department within and including the dates of April 1, 2020, and May 31, 2020. This period corresponded with the initial surge of COVID-19 in Massachusetts with a peak of 2988 confirmed COVID-19 cases on April 17, 2020.[8] The HCP also needed to be asymptomatic on the day of the blood draw and not known to have had a prior documented COVID-19 infection. Blood was drawn from December 17, 2020, until January 27, 2021.

ED HCPs were sent an email inviting them to participate and were assessed for eligibility on the basis of study inclusion criteria. Eligible participants were then invited to enroll in the study and verbally consented. Participants completed a questionnaire in REDCap (Research Electronic Data Capture; https://projectredcap.org/resources/citations/), which is a secure, web-based software platform designed to support data capture for research studies, and scheduled a blood draw.[9] Samples were analyzed using the Roche Cobas Elecsys (Roche Diagnostics, Indianapolis, IN) Anti-SARS-CoV-2 total antibody assay. This assay has emergency use authorization from the Food and Drug Administration for the qualitative detection of SARS-CoV-2 antibodies. It detects IgM, IgA, and IgG antibodies to the SARS-CoV-2 nucleocapsid antigen with reported specificity of >99% and analytic sensitivity of >90%.[10,11] When the test is performed more than 2 weeks after symptom onset in patients infected with COVID-19, the analytical sensitivity approaches 100%.[10-12] This particular antibody test was chosen as it met the specificity guidance from the Infectious Diseases Society of America when performing seroprevalence studies to avoid false positives.[13] If the antibody test was positive, the subject subsequently underwent SARS-CoV-2 nucleic acid amplification testing (NAAT) from a nasopharyngeal swab to assess for active infection. Of note, vaccination for SARS-CoV-2 at our study site had just started in late December of 2020. However, the Cobas Elecsys Anti-SARS-CoV-2 total antibody assay only detects antibodies to the SARS-CoV-2 nucleocapsid antigen, which indicates infection by exposure rather than immunization by vaccination.[14]

In addition, using the electronic health record, we identified each subject's number of encounters with ED patients with confirmed COVID-19 (diagnosed before ED arrival or diagnosed based on NAAT performed in the emergency department) from April 1, 2020, to the day before the blood draw date. The participant must have either assigned themselves to the patient's treatment team or written a note in the patient's chart for the encounter to be included in the analysis.

Setting

The study was performed in Boston at an emergency department of an urban, 1043-bed quaternary care academic center with level I trauma center designation and an Accreditation Council for Graduate Medical Education–accredited 4-year emergency medicine residency program. At this institution, patients are cared for by resident physicians or advanced practice providers (physician assistants and nurse practitioners), attending emergency physicians, and emergency nurses. Before March 6, 2020, the personal protective equipment (PPE) required for HCPs interacting with patients with suspected or confirmed COVID-19 or confirmed COVID-19 exposures included gowns, gloves, eye protection, and N95 respirator. Between March 6 and March 21, 2020, the PPE requirement for respiratory protection changed from an N95 respirator to a surgical or procedural mask, with N95 respirators reserved for aerosol-generating procedures. On March 22, 2020, universal masking was implemented for all HCPs; universal masking for all patients and visitors was instituted on April 6, 2020. On April 10, 2020, the PPE policy for HCPs changed to gown, gloves, eye protection, and N95 respirator for all patients with suspected or confirmed COVID and confirmed COVID-19 exposures. Recommended PPE was consistently available at this institution.

This study was approved by our institutional review board (Protocol# 2020P002587).

Results

Of the 446 ED HCPs invited to participate, 163 (37%) completed the eligibility questionnaire. Of the 163 HCPs, 60 (37%) did not schedule a blood draw. Subsequently, a total of 103 (23%) HCPs (16 attendings, 4 emergency residents, 16 advanced practice providers, and 67 nurses) had blood samples drawn and completed the survey. Eighty-one (79%) of 103 HCPs were female. Of the 103 HCPs, 3 (2.9%; 95% CI, 0.6%-8.3%) were seropositive for SARS-CoV-2 antibodies. One was an attending physician, one was an advanced practice provider, and one was an emergency nurse. All 3 had subsequent negative SARS-CoV-2 NAAT results. Additional characteristics of the seronegative and seropositive participants are summarized in the Table.

When asked whether coworkers wore the recommended PPE when caring for patients with confirmed or suspected COVID-19, 47% of respondents strongly agreed, 48% agreed, and 3% disagreed with the statement. When asked whether the study participant wore the recommended PPE when caring for patients with confirmed or suspected COVID-19, 68% strongly agreed, 33% agreed, and 1% disagreed with the statement.

Discussion

At a single quaternary academic medical center among those who volunteered to take an antibody test, we found a seroprevalence of 2.9% for SARS-CoV-2 antibodies among our ED HCPs who had never been formally diagnosed with COVID-19. In 2020, Wang et al[15] reported the same seroprevalence rate of 2.9% at their academic medical center in San Francisco, CA, but lower than that reported by Madsen et al,[16] which was 5.9% at their academic medical center in Salt Lake City, UT. However, both of these studies included participants with known prior COVID-19 infection or active symptoms of COVID-19. Moreover, in 2020, Stubblefield et al,[17] assessing seropositivity in ED and intensive care unit HCPs, found a seroprevalence rate of 7.6% among frontline health care personnel during the first month of caring for patients with COVID-19. The seroprevalence rate among personnel who recalled no symptoms was 3.2%.[17]

A substantial proportion of enrolled HCPs (19 of 103) suspected that they had been infected previously and were anticipating positive SARS-CoV-2 titers. Our results, however, suggest that the frequency of COVID-19 infection was lower than what our frontline HCPs predicted. Of the 19 participants believing that they had prior COVID-19 infection, only 2 (11%) of them were seropositive. This could be due to the nonspecific symptoms of COVID-19 and the similarities to other respiratory viral infections. This could also be due to waning immunity.[18] These results may also indicate concerns among participants about contracting SARS-CoV-2 after reflecting on their own behaviors and baseline risk. For example, among seronegative HCPs, 73% had attended a social function. While 68% of HCPs strongly agreed that they wore the recommended proper PPE, only 47% strongly agreed that their colleagues wore the recommended proper PPE. On the basis of the survey results, adherence to proper PPE was likely high. Of note, a quarter of respondents practiced at another site. Although this study is unable to ascertain risk of contracting COVID-19 in clinicians working at multiple facilities, staff working in multiple facilities may be associated with the interfacility spread of COVID-19.[19]

Limitations

The primary limitation of the study is selection bias, and the results should be interpreted with caution. It is possible that those who did not respond were more or less likely to have contracted COVID-19 than our sample population. It is plausible that those who enrolled in our study would be more likely to believe that they had previously contracted COVID-19, making it unlikely that the true seroprevalence is significantly higher than our results. A second limitation is the time elapsed between the first pandemic surge and the study period. Some subjects may have been SARS-CoV-2 seropositive and over time converted to seronegative. A third limitation is that we were precluded from doing an analysis of potential risk factors for having antibodies because we did not collect demographic information, and

there was a low number of subjects with a positive antibody test. Finally, our results may not be generalizable to hospitals that were unable to secure sufficient quantities of PPE or were unable to implement infection prevention and control strategies recommended by public health.

Implications for Emergency Nurses

Adherence to infection control protocols, including implementation of universal masking and use of appropriate PPE for patients with suspected or confirmed COVID-19 or confirmed exposures appears to mitigate risk of transmission in health care settings. Health care leaders should ensure that staff have access to and use recommended PPE.

Conclusion

At a single quaternary academic medical center among those who volunteered to take an antibody test, there was a low seroprevalence of SARS-CoV-2 antibodies among ED HCPs who were asymptomatic at the time of blood sampling and not known to have had prior documented COVID-19 infection. Seropositivity was considerably lower than participants themselves anticipated, suggesting that PPE and other infection control protocols were more effective than HCPs believed. While there have been concerns about asymptomatic infections in health care workers—and the downstream consequences—it appears this was in fact a rare occurrence in our ED setting.

Author Disclosures

Conflicts of interest: none to report.

Characteristics	Reported responses among seronegative HCPs (n = 100)	Reported responses among seropositive HCPs (n = 3)

Yes	No	Yes	No	1. Between and including the dates of April 1, 2020, and May 30, 2020, participate

				d in a er o s ol - g e n er at in g pr o c e d ur e s (e g, in tu b at io n/ e xt u b at io n, c h e st c o m pr e ss io n

				s, nebulization, non-invasive positive pressure ventilation, high flow nasal cannul

				a at > 15 L, etc.)

74	74%	26	26%	3	100%	0	0%	2. Were you notified by Occupational Health Services that you were exposed to an

								individual with COVID-19 (ie, notified of confirmed exposure)?

52	52%	48	48%	1	33%	2	66%	Who was the individual with confirmed COVID-19?
Fellow employee	2	4%	-	-	0	0%	-	-
Patient	48	92%	-	-	1	100%	-	-
Do not know	2	4%	-	-	0	0%	-	-

3. Since April 1, 2020, I have clinically worked outside of the study site emergency department to care for patients with confirmed or suspected COVID-19 (ie, other hospital emergency departments, other floors/ICUs at or outside of study site, etc.)	24	24%	76	76%	1	33%	2	66%
4. I have had household contact with persons with diagnosed COVID-19	5	5%	95	95%	0	0%	3	100%
5. Outside the hospital, I have had non-household contact with persons with diagnosed COVID-19 (ie, community exposure)	6	6%	94	94%	0	0%	3	100%
6. Since April 1, 2020, I have attended a social function or gathering with 2 or more people outside of my household	73	73%	27	27%	2	66%	1	33%
Did you adhere to social distancing and/or mask guidelines?								
Yes (social distancing)	13	18%	-	-	1	50%	-	-
Yes (masking)	5	7%	-	-	0	0%	-	-
Yes (social distancing and masking)	38	52%	-	-	1	50%	-	-
No	17	23%	-	-	0	0%	-	-
7. I think I have had COVID-19 infection	17	17%	83	83%	2	66%	1	33%
8. Median number (interquartile) of COVID-19 encounters	39 (43)				68 (31)			

DETAILS

Subject:	Infections; Infectious diseases; Eye protection; Emergency medical care; COVID-19 vaccines; Severe acute respiratory syndrome; Personal protective equipment; Antibodies; Severe acute respiratory syndrome coronavirus 2; Questionnaires; Hospitals; Nurses; Emergency services; Serology; Patients; Health care; COVID-19; Nursing care; Blood tests; Medical research; Medical personnel; Antigens; Viral infections; Coronaviruses; Disease transmission
Identifier / keyword:	COVID-19 seroprevalence; COVID-19 antibody; SARS-CoV-2 antibody; SARS-CoV-2 seroprevalence
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Document type:	Journal Article
DOI:	https://doi.org/10.1016/j.jen.2022.04.003
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Document URL:	https://www.proquest.com/scholarly-journals/covid-19-seroprevalence-ed-health-care/docview/2683119011/se-2?accountid=211160

An Improved Perspective on Courage in Leadership and Embracing New Experiences: JEN

ABSTRACT (ENGLISH)

At the end of 2021, I was unsure of how I would perform in the role of Emergency Nurses Association (ENA) President and, honestly, felt a bit like an imposter. Yes, I was apprehensive about my first interview on live television and jittery about speaking in front of a live audience for the first time in 2 years, but I did it, and the feeling afterward was better than I could have imagined. The association has made great strides in developing new programs and offering continuing education and, most recently, the launch of the Emergency Nurse Residency Program.

FULL TEXT

As I sit and ponder what readers will want to hear from me when my President's Message is published nearly 3 months after I write it, I hope that the words that I write today will resonate with emergency nurses. That hope is what sparked my message for this issue of the journal. This year, a true pinnacle of my career, has been moving at lightning speed. At the end of 2021, I was unsure of how I would perform in the role of Emergency Nurses Association (ENA) President and, honestly, felt a bit like an imposter. I considered the previous ENA Presidents, appreciating all of their expertise and their accomplishments. They are truly an amazing group of professionals that I have looked up to throughout my career, and now I was heading into the lead role with the association that has been my professional home for years. I was full of excited energy and maybe bit fearful of the unknown. Needless to stay, the first half of this year as President has been one of the most rewarding experiences of my life. I also hit my 20th year in nursing this year. Twenty years! Time truly does fly. My role as ENA President is the best honor I could have asked for as an emergency nurse and as a leader. My love and passion for nursing has always lived in emergency nursing, no matter what role I've had.

You may be wondering why I am opting to share my thoughts on this role with all of you. My perspective after being in the role, doing the job, and being able to be a courageous leader is vastly different from how it was when I took on this role. Yes, I was apprehensive about my first interview on live television and jittery about speaking in front of a live audience for the first time in 2 years, but I did it, and the feeling afterward was better than I could have imagined. I would encourage each of you to try and face the challenges in front of you; start small if you would like, and the payoff could be big. It could change your life and open new doors for you that you couldn't ever have imagined.

This year we have focused on how nurses can recharge, taking care of ourselves so that we can better take care of others. Part of my own recharging is to stay present, to stay in the moment, and take it in. So now, rather than focusing on the worry or the things I don't feel confident in, I am trying to slow down and take in each moment for what it is.

ENA has also focused on finding ways to support emergency nurses and the care they provide. The association has

made great strides in developing new programs and offering continuing education and, most recently, the launch of the Emergency Nurse Residency Program. In September, we will participate in our first in person annual conference since 2019. This will be a great way for emergency nurses to connect and recharge through networking with peers and attending the learning events. The conference will consider all important safety measures.

I am incredibly grateful for the experiences, friendships, and professional connections I have made through this association. These will last a lifetime, even as my role changes. I am excited for the rest of the year ahead and looking forward to connecting with you all in my last two President's Messages.

Author Disclosures

Conflicts of interest: none to report.

DETAILS

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NCPD Earn Up to X.X Contact Hours: JEN

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Examination of the Effects of 4-Hour Nonvalved Filtering Facepiece Respirator Use on Blood Gas Values of Health Care Professionals: A Before and After Study: JEN

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ABSTRACT (ENGLISH)

Introduction

The use of personal protective equipment increased rapidly during the COVID-19 pandemic that began in 2019. The purpose of this study was to examine the effects of uninterrupted 4-hour use of internationally certified nonvalved filtering facepiece respirators on venous blood gas in health care workers during the COVID-19 pandemic.

Methods

A before-after design included venous blood gas analyses collected at the beginning of shifts before nonvalved filtering facepiece respirator had been put on and after 4-hour uninterrupted use of nonvalved filtering facepiece respirator.

Results

In this study, 33 volunteer health care workers took part. In terms of blood gas values, mean pCO2 values were 47.63 (SD = 5.16) before and 47.01 (SD = 5.07) after nonvalved filtering facepiece respirator use, mean HCO3 values were 23.68 (SD = 1.10) in first blood gas analysis and 24.06 (SD = 1.31) in second blood gas analysis, and no significant difference was observed between before and after the use of nonvalved filtering facepiece respirator (t = 0.67, P = .50, t = −2.0, P = .054, respectively). The only significant difference in parameters investigated between

the groups was in pH levels, at pH = 7.35 (SD = 0.29) before and pH = 7.36 (SD = 0.20) after nonvalved filtering facepiece respirator use (t = −2.26, P = .03).

Conclusion

Continuous nonvalved filtering facepiece respirator use for 4 hours was not associated with clinician impairment in blood gas and peripheral SpO2 levels during nonexertional clinical ED work.

FULL TEXT

Contribution to Emergency Nursing Practice

••Nonvalved filtering facepiece respirators are frequently used by nurses, paramedics, and other health care personnel who intervene in suspected and diagnosed patients with COVID-19, especially during the pandemic with high respiratory transmission.

••The main finding of this article is that continuous nonvalved filtering facepiece respirator use for 4 hours was not associated with impairment in blood gas and peripheral SpO_2 levels during nonexertional clinical work in the emergency department. A statistically significant increase was observed in pH values, which remained within physiological limits and may not have clinical significance.

••Recommendations for translating the findings of this paper into emergency clinical practice include the following: continuous 4-hour use of nonvalved filtering facepiece respirators does not appear to have a negative impact on clinician respiratory physiology.

Introduction

Diseases transmitted by respiration can cause epidemics and pandemics. Health care workers adopted a series of measures to protect themselves during the severe acute respiratory syndrome (SARS) epidemic caused by the SARS coronavirus originating in Hong Kong in 2002 and during the influenza A H1N1 swine flu epidemic originating in Mexico in 2009. The most important of these measures was the use of surgical masks and nonvalved filtering facepiece (N95/FFP2) respirators.[1] The use of personal protective equipment (PPE) increased rapidly during the COVID-19 pandemic that began spreading across the world from the Chinese city of Wuhan in 2019. Studies have also emphasized the importance of PPE use.[2] Studies performed during the SARS outbreak have also revealed significant findings regarding the protective nature of PPE.[3]

Health care professionals serving patients with probable and confirmed COVID-19 were advised to use respirators (N95, FFP2, or equivalent standard), especially for aerosol-generating procedures.[4] It may be reasonable to consider European FFP2 as “equivalent” to US NIOSH N95 respirators, for filtering at least 94% of non–oil-based particles such as virus bio-aerosols.[5]

We hypothesized that the pCO_2 value in the blood gas might increase, and the pH and SpO_2 values may decrease after the continuous use of N95/FFP2 respirators. The purpose of this study was to examine the effects of uninterrupted 4-hour N95/FFP2 respirator use on venous blood gas in health care professionals.

Methods Study Design and Participants

We used a before-after design. The study population consisted of health care professionals (emergency nurses and physicians) working in the emergency department of a tertiary hospital between March 1, 2021, and April 1, 2021. Inclusion criteria were age 18 or over, voluntary participation with written consent, being clean-shaven, and receiving training in the use of PPE. Exclusion criteria were the presence of severe chronic pulmonary disease or mask use being medically contraindicated and participants who removed their N95/FFP2 respirator for any reason during the study period. No incentive was provided.

Ethical Considerations

This study was conducted under the approval of the local ethics committee (approval number: 2021/12).

Study Procedures

Venous blood gas measurements were performed at the beginning of shifts before the N95/FFP2 respirator had been put on and after 4-hour uninterrupted use of internationally certified N95/FFP2 (3M VFlex 9152E) respirators. Participants continued with their routine activities for 4 hours. They did not engage in high-effort interventions such as providing cardiopulmonary resuscitation and did not leave the emergency department for any reason. An average of 2 volunteers participated in the study each weekday, and the participants were observed by an author working in the same field.

Measures Demographic Information

Age, sex, smoking, and medical history were recorded on a research form for each participant (see Supplementary Appendix).

Questionnaire for Side Effects

Major symptoms such as headache, nausea, palpitations, shortness of breath, or anxiety were questioned. At the end of 4-hour respirator use, participants were verbally asked whether they had any of these symptoms during the 4-hour period, and the results were recorded on a research form (see Supplementary Appendix).

Blood Gas Analysis

Blood gas analyses were performed on a bench analyzer (Rapidlab 1265, Bayer Health Care LLC, Pittsburgh, PA). The device was calibrated at regular intervals (1-point calibration every 4 hours, 2-point calibration every 8 hours). The pH (reference range: 7.35-7.45), pCO_2 (reference range: 35-45 mmHg), and standard-HCO_3 (reference range: 21.2-27 mmol/L) levels were measured. The results were printed on a paper and stored.

Statistical Methods

The study data were recorded onto Microsoft Excel software (Microsoft Corporation, Redmond, WA) and analyzed using Statistical Package of Social Sciences version 24.0 (IBM Corp, Armonk, NY) and MedCalc software (MedCalc Software Ltd, Oostende, Belgium). Compatibility with normal distribution was evaluated using the Shapiro Wilk or Kolmogorov Smirnov tests. Normally distributed numerical variables were expressed as mean and standard deviation and 95% confidence interval. Non-normally distributed numerical variables were expressed as median (minimum-maximum) and 95% confidence interval. Categorical variables were defined as n (number) and %. The matched pairs *t* test was used to compare before and after values of normally distributed numerical variables. Wilcoxon's test was employed to compare non-normally distributed numerical variables. The independent samples *t* test was used to compare normally distributed numerical demographic variables between independent groups, and numerical data not exhibiting normal distribution were compared using the Mann-Whitney U test. *P* t test in 2 dependent groups (matched pairs) using the GPower 3.1.9.7. program (Heinrich-Heine-University, Düsseldorf, Germany), we calculated that the sample size of the study should be at least 31.

Results

Thirty-three volunteer health care professionals (emergency nurses and physicians) participated in the study. No participants were excluded from the study, and no data were missing. Men constituted n = 17 (51.5%) of the participants and women n = 16 (48.5%). Median ages were 28 years (24-47) among men and 27 years (24-29) among women. Nonsmokers (tobacco) were n = 26 (78.8%) while n = 7 (21.2%) smoked tobacco. Intermittent asthma was present in 2 participants (Table 1). Median fingertip oxygen saturation values in room air were SpO_2 = 98 (95-99) before N95/FFP2 use and SpO_2 = 98 (92-100) after N95/FFP2 use, and the difference was not statistically significant (z = −1.48, *P* = .13). Mean pCO_2 values were 47.63 (SD = 5.16) before N95/FFP2 use and 47.01 (SD = 5.07) after N95/FFP2 use, and no significant difference was observed between these groups (*t* = 0.67, *P* = .50). The

mean HCO3 levels were 23.68 (SD = 1.10) and 24.06 (SD = 1.3) before and after N95/FFP2 use, respectively, and no significant difference was observed (t = −2.0, P = .054). The only significant difference in parameters investigated between the groups was at pH levels. Mean pH levels were found at 7.35 (SD = 0.29) before N95/FFP2 use and pH = 7.36 (SD = 0.20) after N95/FFP2 use (t = −2.26, P = .03) (Table 2). No major side effects (headache, nausea, palpitations, dyspnea, or anxiety) were reported by the participants.

Discussion

The new global threat SARS-CoV-2 is transmitted by droplets and aerosols. Health care workers were advised to use PPE to prevent transmission of the disease during the COVID-19 pandemic.[4] One recent meta-analysis showed that surgical masks provided a degree of protection comparable to that of N95/FFP2 respirators for aerosol-free procedures.[6] However, in aerosol-generating procedures, the use of N95, FFP2, or FFP3 respirators may be appropriate.[4]

Although their findings vary, several studies have investigated the effects of N95/FFP2 and FFP3 respirators on metabolic and respiratory parameters. The present study examined the effect of 4-hour continuous N95/FFP2 respirator use on venous blood gas and peripheral oxygen saturation values. While a significant difference was observed in pH values, there was no significant difference between PCO_2, HCO_3, and peripheral SpO_2 values. Despite the significant difference in pH values, both groups remained within physiological limits. Although the reason could not be determined through measurements, this might be related to increased respiration rates. A study showed that the use of N95/FFP2 for 1 hour was associated with increases in respiratory rate (range, 1.4-2.4 breaths per minute).[7] Kao et al[8] performed a blood gas study on 39 patients receiving dialysis during the SARS epidemic. They reported that 4-hour use of an N95/FFP2 respirator significantly reduced PaO_2 in patients with end-stage kidney disease and increased respiratory side effects in those patients. These findings need to be confirmed in studies with a contemporaneous comparison or control group to address the unmeasured confounding of the work shift itself.

Ong et al[9] and Lim et al[10] both reported that N95/FFP2 caused a significant increase in headaches among health care workers. In a study performed during the COVID-19 pandemic, Ong et al[9] reported headaches associated with PPE use in 82% of health care workers. In another study carried out during the SARS epidemic, Lim et al[10] reported that 37.3% of participants had a headache after N95/FFP2 use. These authors interpreted that this headache finding might be related to increased inhaled CO_2 levels, but blood gas measurements were not performed in their study. There was no difference between pCO_2 levels before and after N95/FFP2 respirator use in our study, and the participants did not report any side effects. Coca et al[11] recommended establishment of appropriate working and rest periods to avoid undesirable side effects of PPE. When using respirators for extended periods of time during the COVID-19 pandemic, health care professionals may have developed physiological and behavioral adaptations or ignored side effects with extended PPE wear. Changes in nutrition, hydration, and resting habits, and adjustment of work tempo may be some of these adaptation mechanisms. Further studies targeting pulmonary function tests or behavioral changes can be beneficial to clarify possible clinician adaptations.

Bharatendu et al[12] examined the effect of N95/FFP2 use on end-tidal CO_2 ($ETCO_2$), and no significant increase in $ETCO_2$ values was observed in participants using N95/FFP2. A recent study found that the use of N95/FFP2 for 1 hour in 10 healthy emergency residents did not cause a significant difference in the pH and pCO_2 values measured at 20, 40, and 60 minutes.[13] A study conducted with 57 nurses and 47 paramedics working in the SARS coronavirus-2 intensive care unit showed that the use of FFP2 and FFP3 respirators did not cause deterioration in blood gas values in a median time of 240 minutes.[14] The results of these 2 studies are similar to our findings.

Yalciner et al[15] reported that using an FFP3 respirator for at least 4 hours caused no significant change in blood gas

parameters in 15 health care workers. None of the participants removed the respirator for any reason during the study period, and this is interpreted as it being well tolerated by participants.[14] The methodology and results of our study are similar to those of Yalciner et al,[15] although we used N95/FFP2 respirators in our research. In their study of 43 health care workers, Nafisah et al[16] reported that continuous N95/FFP2 use significantly reduced pO_2 levels and increased pCO_2. The results of our study are not consistent with this research, suggesting that respiratory parameters can be affected differently by the use of different brands of respirators. In a study with the participation of 154 health care professionals, the effect of using only the N95 and combined use of the N95+Powered Air Purifying Respirator (PAPR) on cerebral hemodynamics and blood gas parameters was examined. They found a significant increase in $ETCO_2$ values after using only the N95 respirator for 5 minutes. After the combination of N95+PAPR at 5 minutes, the $ETCO_2$ values measured at 10 minutes returned to their basal values. These N95+PAPR results are not corroborated by our study. The reasons for this difference may be that clinician adaptations to extended PPE wear had not yet developed in the early pandemic period, or it may be related to the measurement method (capnometer). In addition, it is not clear whether the $ETCO_2$ values returning to basal levels in that study is due to the combination of N95+PAPR or due to the adaptation that may occur over time. We did not perform a respirator fit test for the participants; therefore, air leaking from around the respirator may have affected the results and differences in our findings from those of other studies.[12]

Currently, the evidence in the published literature does not provide consistent results, especially regarding changes in pCO_2 levels.[13,16] Most studies have shown that respirator use does not lead to significant changes in pCO_2 levels.[12-14] The fact that pCO_2 levels were not impaired in our current study corroborates evidence in the published literature. However, our study contradicts other evidence in the published literature regarding side effects related to mask use.[9,10] Headache associated with respirator use has been reported frequently in the published literature, but in our study, the participants did not report any side effects. Respirator type, duration of use, age groups, sample size, or different working conditions may be the reason for different results. We recommend that determining the duration of PPE use, respirator change frequency, and respirator reuse be aligned with current World Health Organization recommendations, health care administrator recommendations, and manufacturer recommendations.[4]

Limitations

The relatively low number of participants may be regarded as a limitation of this study, and the average age of study participants was young, which may not be generalizable to the typical health care setting. In addition, the results were based on venous blood gas tests, and arterial blood gas samples might have yielded more accurate results. Another limitation may be that we were unable to show the effects of respirator use in participants with chronic disease or with exertion during the clinical shift. A history of intermittent asthma was present in only 2 members of the study population, and no statistical comparison was possible. As another limitation the pre-4-hour and post-4-hour measurements reflect values only at that immediate time and do not give an indication of short-term excursions that may have occurred during the 4-hour period. We did not perform a respirator fit test for the participants before the study; therefore, we cannot comment on whether there was air leakage around the mask that affected our results. The N95/FFP2 respirator was fixed to the dorsum of the nose with a tape to support a mask seal to the face.

Implications for Emergency Nurses

In light of evidence from the previously published literature with the findings of our study, using N95 respirators continuously for 4 hours by nurses and physicians working in nonexertional tasks in the emergency department who do not have pulmonary disease and have no contraindications for mask use is not associated with major side effects or blood gas deterioration. Our findings should be interpreted with caution and may not apply to older workers or those with characteristics markedly different from our study participants. We also think that it would be appropriate

for other health care personnel working under similar conditions to use respirators for the same period of time. Since the COVID 19 pandemic began, the use of PPE has been of the most significant importance for health care professionals' self-protection. The importance of using proper PPE cannot be underestimated. It is important to consult with the respirator manufacturer regarding the maximum number of uses they recommend for the N95/FFP2 respirator. If no manufacturer guidance is available, data suggest limiting the number of reuses to no more than 5 total uses per device to ensure an adequate respirator performance.[17] In a survey of 27 countries overall, 17 countries (63%) provide no information on their websites about the long-term use or reuse of N95/FFP2 respirators. Some countries have proposed specific methods for decontamination of N95/FFP2 respirators, and some countries have left the decision to health care administrators. The maximum extended use time ranged from 4 hours to 40 hours.[18] World Health Organization recommends that wearing a respirator longer than 4 hours can cause discomfort and should be avoided.[4]

Conclusion

Contrary to our initial concerns, continuous N95/FFP2 respirator use for 4 hours was not associated with any impairment in blood gas and peripheral SpO2 levels. At the same time, a statistically significant increase was observed in pH values, although these remained within physiological limits and may not be clinically significant. In light of the evidence in the published literature and the results of our study, we conclude that N95/FFP2 respirators can be used safely for 4 hours without interruption for nonexertional clinical tasks in the emergency department. More research is needed on the impact of extended PPE wear during exertional activities, such as chest compressions in cardiopulmonary resuscitation.

Data, Code, and Research Materials Availability

Patient consent statement: written consent of the participants was obtained.

Author Disclosures

Conflicts of interest: none to report.

Supplementary Data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.jen.2022.03.006.

	1ST BLOOD GAS SAMPLE (Before N95/FFP2 use)	2ND BLOOD GAS SAMPLE (After N95/FFP2 use)
BARCODE NUMBER		

Supplementary Appendix

Form 1. Examination of the effects of 4-hour n95/FFP2 respirator use on blood gas values of health care professionals

DATA COLLECTION FORM

Age:

Gender:

Chronic Disease:

Smoking (tobacco):

Occupation:

Fingertip $Sp0_{2:}$ Before N95/FFP2 use …….. After N95/FFP use …….

SIDE EFFECTS OCCURED DURING RESPIRATOR USE

•▫Headache

•▫Nausea

•▫Palpitations

•▫Shortness of breath

•▫Anxiety

•▫Other (……)

Sex	n	%
Male	17	51.5
Female	16	48.5
Smoking		
Yes	7	21.2
No	26	78.8
Past medical history		
Asthma	2	6.1

Variable	Median	Min-Max	z*	P
SpO2 before	98	95-99	−1.48	.13
SpO2 after	98	92-100		

DETAILS

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Role and Training of Emergency Department Charge Nurses: A Mixed Methods Analysis of Processes, Needs, and Expectations: JEN

ABSTRACT (ENGLISH)

Introduction

Charge nurses (CNs) are shift leaders who manage resources and facilitate patient care, yet CNs in EDs receive minimal training, with implications for patient safety and emergency nursing practice. The purpose of the study was to describe the experiences of emergency nurses related to training, preparation, and function of the CN role.

Methods

An explanatory sequential mixed methods design using survey data (n = 2579) and focus group data (n = 49) from both CN and staff nurse perspectives.

Results

Participants reported minimal training for the CN role, with divergent understandings of role, required education and experience, the need for situational awareness, and the acceptability of the CN taking on other duties.

Conclusions

The ED CN is critical to the safety of both nursing environment and patient care. Nurses in this pivotal role do not receive adequate leadership orientation or formal training in the key areas of nurse patient assignment, communication, and situational awareness. Formal training in nurse-patient assignment, communication, and situational awareness are critical to appropriate patient care and maintenance of interprofessional trust necessary for successful execution of the CN role. ED nurse managers should advocate for this training.

FULL TEXT

Contribution to Emergency Nursing Practice

••CN role in the emergency department is a role critical to safe care of patients and smooth functioning of an emergency care setting. There is a paucity of information on the training of ED CNs.

••The role of the CN is understood differently by ED CNs and staff nurses. Preparation and training are very minimal and contribute to role confusion, inconsistent execution of duties, and variable success.

••Recommendations for translating study findings into emergency clinical practice include identification of ED CN competencies and implementation of formal training.

Introduction

Charge nurses (CNs) are shift leaders whose role includes managing nursing resources and facilitating appropriate patient flow and care.[1-5] As clinical leaders, CNs ideally use knowledge, expertise, and experience to guide the flow of patients in a way that maximizes resources while ensuring safety.[5,6] The leadership of CNs has been examined in the literature with seminal research pointing to 2 main categories: transactional and transformational. Transactional leadership works as an exchange of staff compliance for praise, rewards, and resources or the avoidance of disciplinary action and clarifies expectations and offers recognition when goals are achieved.[7] It works reasonably

well in pulling a team together when expectations are clear. Transformational leadership is a more individualized approach, with the elements of idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration.[7] Although more recent literature related to CN development focuses on improvements in transformational and transactional leadership, resiliency,[8] and observed behaviors of clinical leadership,[9] this literature is descriptive, situated in the inpatient unit, focused on assessment of education, and does not provide evidence for specific training modalities.[1] There is a decided lack of research findings centered on the problem of leadership development in the ED CN role.

CNs play a pivotal role in the socioclinical dynamics of an emergency department[10] because they manage interdisciplinary communication, patient flow, and patient assignments. Allen[11] described the process of nurse-patient assignment (NPA) as crucial to safe care, nurse satisfaction, and hospital costs. NPA decision-making is focused on elements particular to the nurse (competence, ability), the patient (acuity), and the environment (the layout of the unit and the rooms, the ability to cluster patients together in an assignment) to balance the abilities of the nurse and the needs of the patient.[11] Well-performed NPA that aligns nurse capacity with patient need is critical to a healthy, supportive nursing environment. When NPA is not in alignment, the environment of care suffers commensurately.

CNs have been identified as potential facilitators of bullying dynamics in the emergency care environment,[10] specifically, in their role in deciding NPAs that are misaligned with nurses' experience and skills. This may be related to the lack of leadership preparation and training for the role and the intermediary leadership status of CNs.[12] There is a dearth of literature on both the processes by which ED CNs are oriented to the role and on the specific NPA training that impacts nursing and patient outcomes. The aim of this study was to explore both the clinical and social aspects of the training process and leadership orientation to the CN role in emergency departments in the United States.

Methods

This mixed methods study utilized an explanatory sequential design to examine both charge and staff nurses' perspectives of United States CNs training, practices, and lived experiences. A mixed methods approach was chosen because research on the CN role has largely focused on inpatient settings and there is an identified gap in understanding the role, function, and preparation in emergency departments. In addition, a tangential area of interest was the further exploration of previous research regarding CNs influence on emergency nurse bullying.[10] Survey items were developed in a twofold process that included constructs based on the literature examining the process of NPA[11] CN development,[1] competencies,[5] and social dynamics,[10] along with question items generated from earlier studies by the authors (see Supplementary Appendix). The sequential design provided triangulation and validation of quantitative results through qualitative data that incorporated both charge and staff nurse perspectives of necessary preparation, expected duties, and experiences of trust in the charge/staff nurse relationship.

Sample

A purposive sample was recruited for both quantitative survey data collection (n = 2579) and qualitative focus group participants (n = 49) from a demographically diverse population of emergency nurses who were members of the Emergency Nurses Association. (see Figure, Tables 1 and 2). Inclusion criteria consisted of English-speaking emergency nurses over the age of 18 years practicing in United States emergency departments as staff nurses or permanent or intermittent CNs.

Institutional Review Board approval was obtained from Advarra, Inc (Columbia, MD), before recruitment of study participants. All participants were given a summary of the study and assurance of confidentiality via a Certificate of Confidentiality provided by the National Institutes of Health. This information was provided again to focus group

participants before the beginning of the focus group discussion.

Quantitative Data Collection

Qualtrics survey software was used to collect personal and facility demographics, work experience, education and training requirements, and role expectations and responsibilities specifically for the CN role. The 32-item survey was disseminated online from March 15 through April 15, 2021.

Qualitative Data Collection

Focus groups were conducted online; the Zoom (San Jose, CA) “waiting room” feature allowed for verification of participants into the focus group sessions.[13] Participants were asked to identify themselves online using only their first names.

A total of 49 participants (27 charge, 22 staff) attended 1 of a series of 6 1-hour focus groups held via Zoom with 6 to 11 participants per session. Session recordings were transcribed by the Zoom software and verified by a transcriptionist. The research team facilitated sessions using a structured interview agenda that was theoretically derived[1,10,12,14] tailored to staff or CN groups and vetted by the team.

Data Analysis

Quantitative survey data were exported to SPSS (Armonk, NY), and 3 members of the research team (L.W., A.D., and C.P.) analyzed results of descriptive statistics. Qualitative focus group transcripts and session notes were compiled in a secure data site that was accessible to the team for analysis. Mayring’s content analysis process[15] provided a framework for investigator’s data coding and analysis. Mayring’s content analysis process comprises a step-by-step formulation of inductive categories derived from the interview transcripts, followed by a review of categories after 10% to 50% of material (formative check of reliability), revision, and collective comparison among coinvestigators including frequencies of key elements (summative check of reliability) to arrive at the final determination of themes and categories and interpretation of results. The theoretical underpinning for these analyses is based on extant literature pointing to role discrepancies between CNs leadership skills, preparation, and increasing administrative responsibilities vs organizational expectations, supports, and authority delegated to these frontline nurse leaders.[1,6]

Data Integration

Results from both datasets were separately analyzed and interpreted sequentially. Quantitative findings were evaluated first and informed the interview guide and moderation of focus group sessions, allowing for interpretive data integration during qualitative data collection. Results are presented in thematic categories both narratively and using a side-by-side format that incorporates major themes, statistics, and meta inferences from integrated results.[16,17]

Results

The final quantitative sample comprised 2579 emergency nurses, with 685 self-identifying their primary role as staff, and the remainder identified as either permanent or occasional CNs (Figure). Qualitative focus group participants consisted of 49 participants evenly distributed between charge (44.9%) and staff nurses (55.1%). Twenty of 49 participants (41%) responded to the member checking request and verified the interpretation of qualitative data. Findings from both datasets are presented along with the interpretive results of integrated data (see Tables 3-6).

Q1: What Preparation Should CNs Have in Terms of Education, Experience, and Training for the Role?

This question was answered using both survey and focus group data, with differences between the 2 groups of nurse respondents (see Table 3).

Survey Results

Most CN survey respondents (n = 1894) indicated that their emergency departments had no expectation for

education or certification before assuming the role (67.4%), but there was some expectation for having had experience in the emergency department (50.1%). CN participants reported the expectation for ED experience was from 1 to 3 years (45.3%) to more than 3 years (24.2%).

Two-thirds of the CN sample (62.1%) reported training primarily by shadowing other nurses; 29.5% of respondents reported that they had no training at all for the role. Only 8.4% reported any kind of formal class to orient them to the role. About one-third of the CNs who received training identified learning about NPAs, clinical practice and decision-making, policy implementation, and communication skills management of patient complaints and violence prevention. In contrast, staff nurse survey respondents (n = 685) overwhelmingly reported a need for CNs to have a minimum expectation for education and experience, with almost half indicating that more than 3 years should be the minimum requirement for ED experience before assuming the role.

Focus Group Findings

Qualitative themes emerging from focus group respondents about preparation included “Tag, you’re it” and “charge nurse personality.” A third theme, “situational awareness as the ideal state,” described the optimal result of training. Both staff and CNs in this sample report that CNs have a broad role, significant responsibility without commensurate training, and reported deficiencies in skills, education, and ED experience, expressed by the theme “Tag, you’re it,” which described how nurses were often placed in the role without warning or adequate preparation.“Well kind of I, I started out in an ER in Montana, and it was kind of like ‘Hey you’re charge tonight’ and I’d been there for maybe 2 years.” (CN1)“Zero training at my facility.” (SN1)

A second theme, that of the “charge nurse personality,” arose from both groups. Staff nurses reported the “charge nurse personality” as describing desirable traits such as good communication skills, clinical knowledge, and situational awareness. In contrast, among CN participants there was a sense of having acquired the role by way of personal attributes.“I’ve ‘been there/done that’ before already and I had the attitude they thought that would get things done on the mid shift.” (CN2)“Yeah, I think mainly it’s kind of like whoever doesn’t fight it just is charge.” (SN2)

Finally, the staff nurse participants reported a need for education and training that would give CNs situational awareness as an ideal state. Their concerns reflected the broad scope of the role, which is further discussed in our analysis of research question 2.

Q2: What is the Function and Purpose of this Role?

This question was answered using both survey and focus group data with differing results between the 2 groups of survey respondents. We asked how often CNs should be expected to take patient assignments or serve as the triage or resuscitation nurse and asked them to expand on the actual and expected responsibilities of the role (see Table 4).

Survey results

CN survey respondents reported that their responsibilities primarily included maintaining patient flow and throughput often (18.0%) or always (77.9%) but also included ensuring quality patient care often (32.6%) or always (42.8%), providing clinical expertise often (37.1%) or always (55.0%), reinforcing policies and procedures often (32.0%) or always (52.8%), supporting staff (eg, managing conflicts) often (29.3%) or always (53.0%), and supporting patients’ experience (eg, handling complaints) often (34.7%) or always (38.8%).

They reported that they were expected to take a patient assignment often (21.0%) or always (16.0%), assume the triage nurse function often (32.4%) or always (13.9%), and assume the resuscitation nurse function often (27.9%) or always (11.1%). In contrast, staff nurse respondents reported that the CN should be expected to take a patient assignment often (12.4%) or always (4.2%), to assume the triage nurse function often (15.0%) or always (3.4%), or assume the resuscitation nurse function often (16.8%) or always (4.5%).

Focus Group Findings

Three themes arose from qualitative data on function and purpose of the CN role: “logistical management,” “it’s a handful,” and “situational awareness to see where help is needed and give it,” and describe the work of flow management, the addition of other responsibilities without warning, and the need to have a high-level view of the conditions in the emergency department. Focus group participants discussed “logistical management” overall as part of the function and purpose of the role, and CN participants reported more narrowly on the logistical aspects of patient throughput.So, I coordinate the flow of our department, don’t do any administrative type of work, so I don’t do timecards, I don’t do disciplinary action, but I do work closely with our management team and giving feedback. I will do some coaching with employees. Yeah, that’s all. (CN3)The flow that department, basically, you must overlook the people walking through the department, patient registration and how that’s going, worry about staffing, scheduling, and the admissions or the orders correct. So, the patients go upstairs currently if your patients have COVID testing--that’s what the holdup is legally, so you just make sure that’s all done. (CN4)

CNs also report taking on additional roles, including triage and patient care assignments for at least part of the day. This was reported as manageable in small hospitals but stressful and challenging in larger emergency departments. Participants described the education and training needed to manage these complicated elements, uncovering the theme of “it’s a handful.”… the charge nurse also has for 6 hours every day, a patient load, so we carry 3 rooms on top of everything else that we’re doing with throughput of the department, any issues that arise, EMS, service recovery, coordinating with physicians and nurses, and any concerns that anybody has. And then also dealing with the House Supervisors and admissions and all of that… You know when you’re doing all of that and trying to take care of 3 rooms at the same time, you know, it’s kind of a handful. (CN5)…as you know, working in that smaller type facility, there can be just 3 of us and we’ve got 15 rooms and we’ve had to open up fast track to run ER because we’re holding everything. So, the charge nurse is very important in those smaller institutions and to have somebody who is not afraid to stand up for patient rights is very important and the proper education that backs that. (CN6)

In contrast to the CN group, the staff nurse participants reported a deeper appreciation for the nuances of understanding changing conditions and managing accordingly, uncovering the theme of “situational awareness to see where help is needed and give it.”The charge nurse has to know what’s going on, so that they can distribute the patients and distribute the workload. People don’t like to work with people who are, who are not keeping aware of the whole environment. (SN1)I think it’s really important that the charge nurse is also a staff advocate and walk around and, of course, it can be crazy and busy and cold and everything and, but when they have a chance to walk around, not just stay at the charge nurse desk, but walk around and actually see how the staff is doing. (SN3)

Q3 To Q6: Relationships With Other Staff, Ancillary Staff, Providers, and Management (Social Dynamics and Trust)

This area of inquiry highlighted the management of social dynamics (specifically, CN-SN trust) and teamwork that is required of CNs. (see [Table 5])

Survey Results

CN survey respondents reported minimal formal training in communication skills (31.4%) and conflict resolution (29.5%) to help navigate professional relationships. The aspect of “trust in the charge nurse” was included as a survey measure among staff nurse respondents who reported that they trust their CNs often or always to assist with a patient complaint (70.8%), to have the necessary clinical expertise (67%), to assist with clinical care of a difficult patient (63%), to make fair assignments (54.5%), and to help manage conflict with colleagues (43%).

Focus Group Findings

Both charge and staff nurses described the skill associated with social dynamics and relationships with colleagues as “bridging the gap.”They actually bridge that gap for us by kind of like saying like, okay, Where are you coming

from? Because there's a lot of patients, not just the one you're admitting right now. And actually, our ER doctor is concerned about with [whether] you're admitting this patient, are refusing to admit this patient, where they have to be admitted. The service to bridging [that] gap to defend nurses as well in our department and backed up by management to defend us nurses. (SN6)

Another critical element in social relationships was the attitude of the CN and how that affected ED function. This was reflected in the theme "The charge nurse sets the tone," which emerged from both charge and staff nurse focus group data.But you know, if the charge nurse comes in and she's got a bad attitude and she's griping, complaining about housekeeping because they haven't done this room yet, it's going to spread down to the rest of us down and who are not in charge, you know because we may or may not know what's going on. And that you know, starts leading to more of a toxic environment which we're trying to avoid. (SN7)

The importance of trust in the CN was reiterated in all focus group discussions.It's [trust] vital, absolutely vital when you've got certain people in charge, I would know when I walk in and oh, so and so is in charge - alright no problem. I can handle whatever walks through the door because they have my back. (SN8)Trust is very huge and that charge role - there are people that want to be a charge nurse, and you know, the providers have input and they're telling management: "You know what, I know that person's been a nurse for, you know, 10 years, but they just don't have those skills, they just don't have that." (CN7)

Q7: What is the Process By Which CNs Assign Patients?

This question was answered using survey data and focus group data from both CNs and staff nurses. (see Table 6)

Survey Results

There were stark differences between the 2 groups of survey respondents, with about half in each group reporting that they decide the order in which patients would be seen.

When asked, "How do you assign patients?" CNs reported that they assigned patients often or always based on the patient's acuity as compared with other patients being cared for by that nurse (91.0%), the number of patients being cared for by the nurse (87.0%), the experience level of the nurse (66.1%), the stress level of the nurse (56.2%), and which nurse or pod is next in line (55.3%).

Staff nurses perceived patients were assigned often or always based on which nurse or pod is next in line (49.2%), the number of patients being cared for by the nurse (46%), the patient's acuity as compared with other patients being cared for by that nurse (46%), the experience level of the nurse (27%), and the stress level of the nurse (15 %).

Focus Group Findings

In focus groups, CN participants reported no formal training in patient assignment decision-making strategies. They described different strategies accounting for the strength of the nurses and the volume of the emergency department and reported that "bad" CNs make patient assignments that leave nurses feeling abandoned and unsupported. A few staff nurse participants reported that some CNs make assignments based on friendships, giving the "good" assignments to nurses they favor. The discussion highlighted aspects of the ED environment that influence appropriate assignment of patients, which relies on a choice of where to place patients. CNs reported that when ED volume or patient acuity spiked, they put patients into open beds. The theme that arose was "it's a chess game."…if I can shuffle a couple of rooms to another nurse and a nurse that doesn't have much experience or try to put them with that more experienced nurse, so eventually they can also be an experienced nurse, that I can, you know, trust to take those heavier loads of patients. So, it's very flexible and fluid depending upon what walks in the door, at that time and at that moment; there is no standard, more of experience. (CN5)When you assign patients, you have to look at who you're assigning it to, like if you know it's somebody with no experience… But I always tell everybody

when I'm orienting them, it's a checker game or chess game - if you don't make the right move that affects your whole day. And you just gotta know what piece to move because if not, you're going to get screwed later on. (CN4)
Another theme, reported by staff nurses, was "throwing them on back," a description of a seemingly random NPA process.All at one time and with no rhyme or reason, they don't look at the acuity level, they just throw them on back... It is very tough when you're given 3 critical at one time out of 4 patients and so you're ignoring 1 and you're trying to take care of the rest of them to the best of your ability and it's just impossible. (SN9)It doesn't matter if they need a cardiac monitor, they just put them in a bed. If there's not a nurse there, then they must put them in the bed. So that's how they're running it lately and it's very unsafe. (SN10)

Discussion

The purpose of this study was to explore both the clinical and social aspects of the CN role as well as the training and orientation process in United States emergency departments. Participants in both charge and staff nurse roles reported actual and ideal training and orientation states and processes by which the charge role is optimized.

Clinical Aspects of the Role

Competencies for the CN role have been identified in the literature as including self-management, management of others, clinical competency, conceptual-cognitive competencies, professional-legal competency, communication, and team leadership.[5] Our staff nurse participants focused on these elements as important attributes of CN success. In contrast, our CN participants' understanding of their role was more in alignment with the prosaic, logistical aspects of the role described by Husebø and Olsen,[9] including receiving an overview of the team and patients and planning the shift, ensuring resources, monitoring and ensuring appropriate patient flow, monitoring and securing information flow, and securing patient care and treatment. This difference in perspective speaks to a need for a more thorough grounding in the socioclinical aspects of the role, allowing for effective communication and management of others within a clinical context.

Research findings suggest that health care organizations pay little attention to the training of nurses in the charge role, and this has consequences for nurses who assume the CN position as well as for staff and patients. Inadequate preparation can result in deficits in the confidence and leadership skills necessary for successful execution of the role.[1-5] Integrated findings from this study confirm that most training for the role stems from a process of exposure to the role via short-term shadowing. Similar research also pointed to this lack of training as a source of role ambiguity that may influence CNs confidence, impacting both overall success[18] and performance metrics for patient outcomes.[6]

Social Aspects of the CN Role

Examination of key elements of the role sheds light on how those elements promote or inhibit functional social dynamics within the ED setting. Both charge and staff nurse participants reported that it is the CN who sets the tone for the shift, a harbinger of a functional or nonfunctional shift. How the CN manages the elements of NPAs can create an environment where nurses feel either supported or overwhelmed, but there are no standard criteria for making those decisions. Allen[11] and Wolf et al[10] suggest that NPAs made in alignment with nurses' capabilities are more effective for managing patient care as well as optimizing staff performance, job satisfaction, and nurse retention. In our study, integrated data analyses revealed a discord between charge and staff nurse participants' views of NPA processes in terms of responsibility and criteria for making NPA decisions. Mismanagement of NPA (eg, a heavy workload, mismatch between nurse's skill level and patient care requirements) has also been identified as a manifestation of bullying in emergency departments[14] and, thus, is critical to the quality of patient care and a healthy work environment.

CN Role in Nurse Bullying

The management of the ED socioclinical environment is a compelling place to begin more formal training for the role, given that the CN can be instrumental in the presence or absence of bullying behaviors in emergency departments.[10,14] Longo et al[12] reported that CNs may experience bullying themselves, interfering with the CN's ability to establish rapport and cohesion within the health care team. This may also impede the interprofessional trust necessary for success in the role.[9,19] CN inexperience and micromanagement can impact the CN's ability to function successfully and maintain cohesion within the health care team, potentially contributing to a culture in which bullying is permissive.

Our study supports recommendations for CN leadership training, including clarification of authority, responsibilities, and expectations[18]; ongoing mentoring and coaching[20]; communication, conflict, and team management[1,6]; fostering interprofessional trust[9,19]; and prevention of workplace bullying and aggression.[10,12]

Limitations

Limitations include use of a convenience sample drawn from Emergency Nurses Association members leading to potential for selection bias. In addition, those who voluntarily participated in a study about CNs may have different thoughts and feelings than nonresponders. A large and diverse survey sample and further corroboration from focus group findings allows some generalizability. However, because both samples were recruited from the Emergency Nurses Association member database, there may be response bias that does not reflect unknown differences between members and nonmembers.

Implications for Emergency Nurses

The role of the CN is an under-recognized driver of both nurse and patient outcomes, rooted in role responsibilities comprising patient assignment and flow management, interdisciplinary communication, and socioclinical support necessary to effective ED operations. Nurse directors and managers should consider minimum education, experience, and training for CNs. Specific training in social management and in NPA may be useful for creating and maintaining a successfully functioning, emotionally supportive, and clinically safe emergency department.

Conclusions

The role of the ED CN is critical to the smooth functioning of a chaotic, clinically challenging, and resource-limited environment of care. Findings from this study suggest that the perception of the role is different from the perspectives of CNs and the staff nurses they work with. This study highlights a gap in role understanding, including organizational expectations and assigned responsibilities that are incommensurate with leadership training opportunities and requirements. Both staff and CN participants agreed that emergency nurses in this critical role do not receive adequate training in the areas of NPA, communication, or situational awareness and advocate for improvements in these leadership domains. Further research should focus on identifying competency requirements and designing interventions to improve education and training, particularly in the areas of communication, leadership, management of sociocultural interactions, development and maintenance of interprofessional trust, and evaluation of the CN role on nursing and patient outcomes.

Author Disclosures

Conflicts of interest: none to report.

Ethical approval from Advarra, Inc Institutional Review Board (IRB) (Columbia, MD) # Pro00049333.

Supplementary Data

Supplementary Appendix

Supplementary Data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.jen.2022.03.009.

Nurse demographics (n = 2579)			Facility demographics (n = 2579)		
Years of experience	Mean	SD	Facility size (n = 2579)	Mean	SD
As a nurse in all areas	14.9	11.1	Average daily volume	131	85.6
As an emergency nurse only	11.5	9.2	No. of ED beds	32.9	21.6
As a nurse in your current emergency department	7.4	7.5			
All other roles in emergency care, excluding nursing	6.2	9.2			
Age (y)	42.5	11.0			
Sex	%		Geographic location	%	
Female	83.0		Urban	42.0	
Male	16.6	Suburban	37.3	Nonbinary	0.1
Rural	20.7	Prefer not to say	0.3		
Education	%		ED patient population	%	
Nursing diploma	1.7		General emergency department	83.8	
Associate	17.7	Adult-only emergency department	10.7	Bachelor	62.3

Pediatric-only emergency department	5.5	Master	17.0	Geriatric-only emergency department	0
Doctorate	1.4			One or more EN specialty certification (eg, CEN, CPEN)	52.2
		Primary ED role	%		Facility type

%		Staff nurse	21.4		Nong overnment/ not for profit
71.0		Different primary role, occasionally staff	5.1	Investor-owned/for profit	17.3
Charge nurse	7.1	State/local government	7.2		
Federal government/military	42				%
	Primarily charge, occasionally staff	23.7	Academic medical center	47.5	
Primarily staff, occasionally charge	34.5	Community hospital	70.7	Different primary role, occasionally charge	8.2

Critical access hospital	41.3			Freestanding emergency department	11.7

Nurse demographics (n = 49)							
Years of experience	Staff RNs (n = 22)		Charge RNs (n = 27)		Combined demographics (n = 49)		
Mean	SD	Mean	SD	Years of experience	Mean	SD	In all areas of nursing
12.9	11.6	13.6	10.0	In all areas of nursing	13.3	10.7	Emergency nursing only

6.8	5.7	10.8	7.4	Emergency nursing	9.0	6.9	In current emergency department
5.2	5.0	7.3	5.6	In current emergency department	6.4	5.4	All other emergency care roles, excluding nursing
6.3	7.8	5.3	7.8	All other emergency care roles	5.8	7.3	Age (y)
41.4	10.9	40.7	9.1	Age (y)	41.0	9.8	Sex

Staff RNs	Charge RNs	Sex	%	Female
77.3	85.2	Female	81.6	Male
22.7	14.8	Male	18.4	Education
Staff RNs	Charge RNs	Education		Nursing diploma
4.5	3.7	Nursing diploma	4.1	Associate
4.5	3.7	Associate	4.1	Bachelor
81.8	51.9	Bachelor	65.3	Master
9.1	33.3	Master	22.4	Doctorate

Domain: education and experience Quantitative results (n = 1894 CNs; n = 685 SNs)	Qualitative results (n = 49)	Interpretation of mixed results

•SN expectation for education requirement (79.4%) and ED experience (97.1%); recommended minimum >3y (46.9%)•CN's ED experience minimum <3 y (75.8%); No education requirement (67.4%)	Theme: "Tag, you're it" (CN) Theme: "Charge nurse personality" (CN, SN)	Confirmatory: CNs are not adequately prepared and often assume the role out of necessity or opportunity rather than expertise. Discordant: Expectations for minimum requirements in CN education and experience were higher among SNs compared with the actual ED minimums reported by CNs. Expanded: More research is required to ascertain minimum competencies necessary for CNs to function successfully in their role.
One-third (29.4%) of CNs reported no training for the role, while 62.1% reported training primarily by shadowing.	Theme:"Tag, you're it" (CN) Theme: "Charge nurse personality" (CN, SN)	Confirmatory: There is a significant lack of formal CN training. Discordant: CNs and SNs describe a culture where CNs are chosen by virtue of personality; they described individual CNs as having either "negative" or "positive" personality traits. Expanded: "Shadowing" has limited efficacy because its brief and is focused on "learning" tasks rather than leadership skills.

Domain: role expectations and responsibilities Quantitative results (n = 1894 CNs; n = 685 SNs)	Qualitative results (n = 49)	Interpretation of mixed results.
	Theme: Logistical management (CN) Theme: Situational awareness (SN)	Confirmatory: The CN role is challenging and demanding, yet often ill-defined. Discordant: CNs focused on logistical considerations, primarily patient flow. SNs recognized the need for CNs to account for changing conditions (eg, crowding, staffing, patient acuity) and managing accordingly. Expansive: SN perspectives are valuable for facilitating the success of CNs.

	Theme: It's a handful (CN, SN)	Confirmatory: CNs report frequently assuming nonmanagerial functions such as resuscitation, triage, and taking patient assignments. Discordant: SNs report that they do not believe that CNs should have to assume additional duties so that they can focus on managing the department. Expansive: Expectations of the CN role are often ambiguous and unrealistic, resulting in role confusion for both CNs and SNs.

Domain: Social dynamics and trust Quantitative results (n = 1894 CNs; n = 685 SNs)	Qualitative results (n = 49)	Interpretation of mixed results
	Theme: CN sets the tone (CN, SN) Theme: They [staff] have to trust you (CN)	Confirmatory: CN sets the tone for the shift, both in terms of management of challenges, positivity, and teamwork. Discordant: SN trust in the CN's ability to perform in the role varies across duties and is lowest for managing staff conflicts even though CNs frequently perform this duty. Expansive: SNs trust in CN ability is critical for CN success. However, CN inexperience can impact their ability to function successfully and maintain cohesion within the health care team, potentially contributing to a culture in which bullying is permissive.

Domain: nurse-patient-assignment Quantitative results (n = 1894 CNs; n = 685 SNs)	Qualitative results (n = 49)	Interpretation of mixed results

	Theme: It's a chess game (CN) Theme: Throwing them on back (SN).	Confirmatory: CNs lack training in NPA decision-making and apply different strategies depending on conditions in the emergency department and nurse's capabilities. Discordant: CNs more often reported being responsible for, and applying specific criteria to, NPA decisions. SNs reported making NPA decisions more frequently, and that CNs lack consistency in their NPA decisions. They reported that CNs consider a nurse's experience or stress level less often than CNs reported applying those criteria. Expanded: NPA is a critical function of the CN role and can support or inhibit nurse performance at the bedside, but there is no standard process or criteria.

DETAILS

Subject:	Emergency medical care; Polls &surveys; Software; Clinical medicine; Patients; Content analysis; Leadership; Emergency services; Nursing; Nurses; Nurse managers; Professional training; Focus groups; Confidentiality; Decision making; Charge nurses; Data collection; Interdisciplinary aspects; Hospital costs; Nursing education; Professional practice; Patient communication
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Hypertriglyceridemia-Induced Pancreatitis and a Lipemic Blood Sample: A Case Report and Brief Clinical Review: JEN

ABSTRACT (ENGLISH)

Hypertriglyceridemia is the third most common cause of acute pancreatitis after gallstones and long-term alcohol use. There are specific therapeutic options unique to hyperglyceridemia-induced pancreatitis, such as continuous insulin therapy and plasmapheresis, emphasizing the importance of identifying hypertriglyceridemia as the cause. Triglyceride levels > 1000 mg/dL may result in a visibly lipemic blood sample. Lipemic samples may interfere with laboratory equipment, resulting in erroneous levels or the inability to measure several serum blood tests. Consider hypertriglyceridemia as a cause for acute pancreatitis in the setting of a lipemic blood sample or when gallstones

have been excluded.

FULL TEXT

DETAILS

Subject:	Laboratories; Etiology; Diabetes; Hemoglobin; Serum; Pancreatitis; Insulin; Alcohol use; Cysts; Blood tests; Gallbladder diseases; Equipment; Glucose; Pain; Hypoglycemia; Gallstones; Abdomen; Potassium; Intensive care; Ultrasonic imaging; Creatinine; Analgesics; Emergency medical care; Case reports; Apheresis; Triglycerides
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COVID-19 and New Onset IgA Vasculitis: A Systematic Review of Case Reports: JEN

ABSTRACT (ENGLISH)

Introduction

Immunoglobulin A vasculitis is historically more commonly found in children after certain viral infections such as Epstein-Barr, varicella virus, and parvovirus B19. COVID-19 has not been formally established in literature as a trigger for immunoglobulin A vasculitis. However, a main pathogenetic mechanism of COVID-19 is vascular damage, which makes it likely that vasculitis associated with COVID-19 (ie, COVID-19–mediated immunoglobulin A vasculitis) could be biologically plausible, with serious implications, especially for adults. The purpose of this review is to assist emergency nurses in gaining knowledge on the pathophysiology, symptoms, and treatment of COVID-19–mediated immunoglobulin A vasculitis.

Methods

A systematic search for case reports of COVID-19–associated immunoglobulin A vasculitis was conducted in the PubMed and Scopus electronic databases. The search terms used were COVID-19, coronavirus 2019, SARS COVID-19, and IgA vasculitis, case reports. The following were the inclusion criteria: publication dates between December 1, 2019, and December 1, 2021; full-text article, clinical case studies, and letters to the editor available electronically in English. The following were exclusion criteria: a summary of reports and newspaper publications.

Results

Only 13 clinical cases met the inclusion criteria. The median age of patients described in the case reports were 38.1 years. Of them, 3 children were less than 5 years old. Twelve patients were male. In 7 of 13 cases of immunoglobulin A vasculitis, renal involvement was found.

Discussion

The analysis of published clinical cases showed that COVID-19–associated immunoglobulin A vasculitis affected mostly adults and was characterized by a more severe course because of renal involvement. COVID-19 may be a possible trigger for immunoglobulin A–related disorders. More research is needed to better understand the relationship between immunoglobulin A vasculitis and COVID-19.

FULL TEXT

Contribution to Emergency Nursing Practice

••The current literature on immunoglobulin A vasculitis indicates that it may be triggered by upper respiratory tract infections. Cases of COVID-19–mediated immunoglobulin A vasculitis are characterized by a more severe disease

course because of increased renal involvement.

••This article contributes the finding that existing literature suggests immunoglobulin A vasculitis may result from COVID-19 infections and that prompt recognition and treatment are necessary to improve patient outcomes.

••Key implications for emergency nursing practice found in this manuscript are being aware that COVID-19 is a provoking factor that may lead to the development of immunoglobulin A–related disorders. In addition, the manuscript outlines management and treatment for patients diagnosed with immunoglobulin A vasculitis.

Introduction

COVID-19 has rapidly spread worldwide, affecting 504 million people and causing more than 6.2 million deaths to date.[1] Typically, patients with COVID-19 present with fever, computed tomography signs of interstitial pneumonia, and respiratory distress; dermatological manifestations of infection have been reported in only a few publications.[2-5] The incidence rate of dermatological manifestations of COVID-19 ranges from 0.2% to 20.4%.[6,7] Immunoglobulin A vasculitis (IgAV) has been identified in previous case reports as a potentially uncommon complication of COVID-19, with no data on its prevalence.

Purpose

The purpose of this systematic review of case reports is to explore the relationship between IgAV and COVID-19 and assist emergency nurses in gaining knowledge on COVID-19–associated IgAV. In this manuscript, we discuss the symptoms and treatment of this condition and review case reports published between December 1, 2019, and December 1, 2021.

Overview of IgA vasculitis Definition

Vasculitis is a condition that occurs when swelling and inflammation occur to the walls of blood vessels. Vasculitis can occur as a result of autoimmune disorders, infections, and trauma. IgAV is a disease that causes the antibody IgA to collect in small blood vessels, which then experience inflammation and leak blood.[8] The site of vessel involvement, size of the affected vessels, extent of vascular injury, and underlying pathology determine the disease phenotype and severity. IgAV is a leukocytoclastic vasculitis of small vessels with predominant IgA deposition. The exact cause of the illness, however, is unknown. It often occurs after acute respiratory infection (Epstein-Barr, varicella virus, parvovirus B19, Mycoplasma, Campylobacter jejuni).[8,9] IgAV notably affects children between 3 and 15 years. It is estimated that approximately 10% of the affected population are adults and that this category of patients is prone to kidney involvement and malignancy.[10]

Pathophysiology

The current COVID-19 pandemic has led to a small but growing body of evidence that IgAV may be caused by a viral infection. It is known that COVID-19 can affect the circulatory system and cause apoptosis, inflammation, and dysfunction of endothelial cells and thrombosis.[11] Cutaneous manifestations of COVID-19 include urticaria,[7] reticular rash,[12] red-purple papules,[13] urticarial and varicella-like exanthema,[14,15] petechiae,[16] and even ecchymosis.[17] Moreover, according to some authors, petechiae, purpura, and acral ischemia accompanied by coagulation disorders are prognostically unfavorable symptoms and may indicate a more severe course of the disease.[18] A clinical case of large vessel vasculitis after COVID-19 has been reported recently. The authors suggested that infection and endotheliitis may lead to the development of vasculitis.[19] Exaggerated immune response to COVID-19 leads to IgA accumulation in the vascular wall and renal mesangium and the development of IgAV[20] (Figure 1).

Manifestations

Palpable nonthrombocytopenic purpura of lower extremities and buttocks is a characteristic and hallmark sign of

IgAV. Other manifestations include acute enteritis, renal impairment, and arthritis. Colicky abdominal pain, abdominal tenderness, and melena are typical gastrointestinal symptoms of IgAV. Intussusception is more common in children. IgAV may occur during the course or before the diagnosis of malignant tumors, particularly with adult-onset IgAV. Adults diagnosed with IgAV are also at a greater risk of kidney involvement.

Diagnostics

The clinical classification of IgAV is based on research from the European League Against Rheumatism (EULAR), the Paediatric Rheumatology European Society (PRES), and the Paediatric Rheumatology International Trials Organization (PRINTO).[21] Purpura or petechiae must be present, as well as 1 of the other 4 criteria: abdominal discomfort, histopathological appearance, arthralgia, and renal involvement. In addition to the EULAR/PRES/PRINTO clinical criterion for IgAV, histological studies confirming leukocytoclastic vasculitis and IgA deposition in blood vessel walls can be used to confirm the diagnosis. In patients with unusual distribution of rash (extensive lesions or diffusely distributed lesions) and atypical clinical manifestation, tissue biopsy (skin or kidney) must be done to confirm the clinical diagnosis.[22] Similarly, the absence of IgA staining on biopsy does not rule out the possibility of IgAV.[23]

IgA vasculitis is characterized as vasculitis with IgA1-dominant immune deposits that affect small vessels in the skin and gastrointestinal tract and frequently cause arthritis, according to the 2012 Chapel Hill Consensus Conference.[24] IgAV is also linked to glomerulonephritis, which is indistinguishable from IgA nephropathy (IgAN). Deposition of glomerular IgA on biopsy is characteristic of both IgAV and IgAN. While both IgA nephropathy and IgAV can cause hematuria, IgAV clinically differs from IgA nephropathy in that the pathology includes extra-renal involvement of skin (purpuric rash), joints (arthralgias), and gut (abdominal pain, melena).[24] IgAV is indicated by strong IgA deposition in the absence of other antibody deposition.

Management

IgAV is a self-limiting disease, especially in children. Glucocorticoids are standard treatments in IgAV and are used to reduce inflammation and prevent complications.[22] According to SHARE (Single Hub and Access point for paediatric Rheumatology in Europe) initiative, glucocorticoids should be considered in the presence of the following conditions associated with IgAV: orchitis, cerebral vasculitis, pulmonary hemorrhage and severe gastrointestinal involvement, IgA nephritis, severe abdominal pain, and/or rectal bleeding. The dose of oral glucocorticoids (prednisoLONE/predniSONE) is 1-2 mg/kg/day. In severe cases, intravenous MethylPREDNISolone (eg, 10-30 mg/kg with a maximum of 1 g/day on 3 consecutive days) may be considered.[22]

Additional immune suppressors such as azathioprine, mycophenolate mofetil, and cyclophosphamide are prescribed to patients with more severe cases, including those with renal and gastrointestinal involvement. Although the results of treatment are controversial, a retrospective study by the French Vasculitis Group,[25] as well as a prospective study by Pillebout et al,[26] showed that there is no significant difference between combined treatment of glucocorticoids with immune suppressors (cyclophosphamide) and glucocorticoid treatment alone as it relates to patient outcome and mortality. Recent studies demonstrated the efficiency of riTUXimab, a monoclonal antibody medication, in the treatment of adult-onset IgA vasculitis.[27] Colchicine and dapsone have also been reported to be effective for treating chronic IgA vasculitis. However, there are still no randomized controlled trials to determine the optimal therapeutic dose and duration of treatment.[28] Finally, plasma exchange in combination with steroids has been associated with good outcomes in adults with IgA vasculitis.

Relapses typically occur in 20% to 30% of individuals diagnosed with adult-onset IgA vasculitis. The predictor of relapse was persistent purpura, severe leucocytoclastic vasculitis, abdominal pain, hematuria, and adult onset of the disease.[29]

Method of Identification of Case Reports

We searched PubMed and Scopus databases for articles including case reports published between December 1, 2019, and December 1, 2021, using the following keywords: “COVID-19,” “coronavirus 2019,” “SARS COVID-2,” and “IgA vasculitis.” Clinical case studies and letters to the editor that were written in English and accessible in full text were included. Summary reports and newspaper publications were excluded. For inclusion, we independently reviewed the titles and abstracts of retrieved citations, and any inconsistencies were resolved by consensus. The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) checklist for writing a systematic review of case reports was used. The quality of clinical cases were evaluated by Equator network’s Clinical Case Reporting Guideline Development (CARE) checklist. In total, 680 full-text publications were checked, with reference lists manually scanned for additional studies (See Figure 2).

Discussion of Case Reports

There were only 13 cases that met the requirements for inclusion. In the presented clinical cases, 5 of 13 were found in children. IgAV is more common in children, while COVID-19–associated IgAV is more common in adults (8 cases of 13). Our data are consistent with the results of other study.[30] The analysis of clinical cases showed that COVID-19–associated IgA vasculitis affects mostly adults, and concomitant diseases are characterized by a more severe course of the disease with damage of the skin, joints, and kidneys. Renal involvement was found in 7 of the 13 published clinical cases of IgAV. Renal involvement ranged from proteinuria and/or hematuria to acute renal insufficiency with elevated creatinine. Four of the patients had no respiratory symptoms. It can be assumed that asymptomatic COVID-19 infections in children and young people may cause latent vascular damage. Only 3 patients had pneumonia. In almost all cases, a positive effect from the use of glucocorticoids was reported, which is similar to the findings of previously reported studies.[31] Only 2 pediatric cases did not require treatment with glucocorticoids.

Adult Cases

One of the first studies that described COVID-19–related IgAV was published by Allez et al[32] in November 2020 (Tables 1 and 2). This study involved a 24-year-old man with Crohn’s disease under anti-TNF therapy and showed skin, joint, and abdominal symptoms of IgAV. A similar case was also described in a 22-year-old young man but with the development of IgA nephritis.[33] Nasopharyngeal swabs for COVID-19 and polymerase chain reaction (PCR) testing were positive in both cases (Table 1). In the first case, the patient complained of a skin rash, and further examination revealed a positive PCR test. In the second case, the COVID-19 symptoms and vasculitis developed simultaneously. In both cases, a skin biopsy confirmed the diagnosis of IgAV. In the second case, a kidney biopsy was performed, as IgAN developed. The authors hypothesized that COVID-19 causes IgA-mediated diseases with the deposition of immunoglobulin A in the skin and other organs and the development of vasculitis.

A similar case was described by Li et al[34]: a 30-year-old man with clinical signs of active COVID-19 infection presented with purpuric rash, joint, and abdominal pain, proteinuria, and hematuria. COVID-19 was verified by a positive throat swab and SARS-CoV-2 nucleic acid testing. The diagnosis of IgAV was confirmed by a biopsy of the skin and kidneys. A skin biopsy showed signs of leukocytoclastic vasculitis. Given the persistence of the urinary syndrome (proteinuria, hematuria), a kidney biopsy was performed, which showed signs of IgAN. Rowley and Shulman[35] found IgA plasma cell infiltration of the coronary arteries, pancreas, and kidneys in patients who died of Kawasaki disease. They hypothesized that the virus or pathogen invades through the respiratory or digestive tract, and IgA producing plasma cells affect the coronary arteries and heart muscles, etc. Comparative characteristics of the clinical cases are presented in Tables 1 and 2.

Pediatric Cases

In children, IgAV most commonly affects males under 5 years of age. A 3-year-old male with palpable purpura and abdominal pain, without renal or musculoskeletal involvement, presented during an active COVID-19 infection.[36] A nasopharyngeal swab tested positive for SARS-CoV-2 using reverse transcriptase-PCR. He was diagnosed with IgAV after meeting 2 clinical criteria (palpable purpura and abdominal syndrome). AlGhoozi[37] also reported the case of a 4-year-old male with skin and joint symptoms 37 days after a COVID-19 upper respiratory infection. A PCR test performed 2 distinct times, 5 days apart, confirmed his COVID-19 positivity. The patient's clinical presentation was consistent with the EULAR/PRINTO/PRES criteria for IgAV,[21] as it met the requirement of a characteristic rash in the absence of thrombocytopenia, as well as one of the supportive criteria of acute arthralgia of the ankle joints. An additional case of a 2-year-old male positive for SARS-CoV-2 with gastrointestinal (hematochezia, vomiting streaked with blood, abdominal pain) and skin manifestation (palpable purpura and ecchymosis) without respiratory symptoms was recently published. Unlike other cases, the child had an elevated D-dimer (19.88 mg/ml) and c-reactive protein (2.5 mg/dl).[38] COVID-19 was diagnosed simultaneously with IgAV. COVID-19 was detected in a nasopharyngeal sample using PCR. A skin biopsy of the patient's right thigh revealed superficial perivascular inflammation with neutrophils and positive immunostaining for IgA.

A 16-year-old male developed a purpuric rash of his lower limbs and buttocks, severe abdominal pain, hematochezia, and hemoptysis 2 days before testing positive for SARS-CoV-2. This patient also had renal involvement, including severe proteinuria and hematuria. This patient was prescribed oral prednisoLONE for a month in combination with ramipril.[39] A similar case was described by Borocco et al[40] in a 13-year-old girl with a positive PCR for SARS-CoV-2 and Epstein-Barr virus. IgAV was diagnosed clinically according to EULAR/PRINTO/PRES criteria in both cases.

Older Adult Cases

Five cases of IgAV in older adults were found in the literature. Suso et al[41] reported the case of a 78-year-old man with COVID-19 pneumonia, who developed cutaneous vasculitis, arthritis, and nephritic syndrome 5 weeks after COVID-19. The diagnosis of COVID-19 was made based on a positive reverse transcription-PCR test for SARS-CoV-2 in a nasopharyngeal swab and a positive result for anti-SARS-CoV-2 by chemiluminescent immunoassay.

A 62-year-old patient with respiratory distress due to COVID-19 pneumonia developed cutaneous, renal, and gastrointestinal manifestations of IgAV 10 days after admission. The skin biopsy showed leukocytoclastic vasculitis and IgA deposits revealed on immunohistochemistry.[42] Similar cases of vasculitis with development of acute renal failure have been reported in patients 70, 84, and 87 years old ([Tables 1] and [2]).[30,43]

It should be noted that in all cases, older adults had kidney damage, and 4 of them developed acute renal failure. Thus, more severe forms with renal involvement were observed in the older adult patients.

The Link Between COVID-19 and Vasculitis

It is known that IgA levels increase in inflammatory diseases such as AIDS, IgAN, IgAV, dermatitis herpetiformis, celiac disease, inflammatory bowel disease, Sjögren's syndrome, ankylosing spondylitis, and alcoholic liver cirrhosis. It is unclear what role IgA plays in these inflammatory disorders.[44] We believe that it is critical to be aware of the potential link between COVID-19 infection and IgA vasculitis. One of the possible mechanisms of microvascular injury and thrombosis is the deposition of C5b-9, C4d complement complexes, and co-localization of COVID-19 spike glycoproteins in endothelial cells, which activate pathways of the complement system. The activation of the complement system leads to the activation of the clotting pathway and fibrin deposition with thrombus formation.[45] The main causes of death due to COVID-19 are hypercoagulability, vasculitis, cytokine storm with the development of ARDS, and multiorgan failure syndrome.[46] A recent study of Zhang et al[47] showed that treatment with anti-inflammatory medications (glucocorticoids, IL-6 antagonist, JAK inhibitors, and

chloroquine/hydroxychloroquine) can prevent severe complications and mortality due to COVID-19.

Biological Plausibility

SARS-COV-2, the etiological agent of coronavirus infection, is known to cause vasculitis-like diseases. Clinical data also show a higher prevalence of Kawasaki disease (KD) in pediatric patients with COVID-19.[48] The pathophysiology of KD is based on extensive endothelial dysfunction. Some scientists suggest that KD vasculitis is a type of IgA vasculitis that involves the gut-vascular system.[49] COVID-19 affects skin cells, endothelial cells across the whole body via angiotensin-converting enzyme 2, thus leading to generalized endothelial damage and inflammation, so-called endotheliitis. SARS-COV-2 virus penetrates human cells by binding to angiotensin-converting enzyme transmembrane protein receptors of vascular endothelium and can cause systemic inflammatory response with subsequent development of a cytokine storm, which may play a role in the development of IgAV.[36] In addition, medications used to treat SARS-COV-2 (ie, antibiotics, TNF-alpha blockers, immunomodulatory agents) can cause drug-induced IgAV, which can also be one of the possible mechanisms of the development of vasculitis.[50] In 7 of our reviewed cases, SARS-CoV-2 infection preceded the development of IgA vasculitis. The latency time between infection and the onset of vasculitis ranged from 2 days to 4 months. These data support the theory of immune dysregulation as the main etiopathogenic factor of IgAV. In 6 cases, there were simultaneous manifestations of symptoms of COVID-19 and IgA vasculitis. In these cases with simultaneous manifestations, we considered the simultaneous presentation may have been due to delayed COVID-19 diagnosis, delayed health care utilization, or an asymptomatic course of SARS-CoV-2 infection.

Limitations

We have some limitations in our study. The small number of clinical cases makes it challenging to draw any definitive conclusions or establish a causal relationship between COVID-19 and IgAV. The absence of exact dates and methods of the diagnosis of COVID-19 infection and IgAV in the included case reports is a notable limitation as well. Finally, published case reports may reflect clinician and publication bias. The claim that IgAV affects men is premature. There is clear and abundant literature that chronic inflammatory and autoimmune processes are more prevalent in women[51] and that women experience substantially longer diagnostic delays and have symptoms and presentations that are often dismissed, misdiagnosed, considered vague, or not taken as seriously by health care providers and scientists. A fair and balanced interpretation must include that the published reports may reflect clinician and publication bias that tend to be much more (and unjustly) sensitive and responsive to men in the health care system, science, and publishing rather than a true underlying sex difference in prevalence and pathology.

Conclusion

COVID-19 associated IgAV affects mostly adults; it is characterized by a more severe course of the disease due to renal involvement. As the number of patients with COVID-19 increases worldwide, we suspect to see more cases of IgA-related disorders, especially IgAV, and it may indicate a severe course of infection. In asymptomatic patients with SARS-CoV-2, emergency care providers should maintain an index of suspicion for vascular damage. Emergency clinicians who note the possibility of IgAV in their differential diagnosis for patients with COVID-19 infection should consider referral to hematologist and recommend the following diagnostic testing: skin and kidney biopsy with direct immunofluorescence. Anticoagulants, glucocorticoids, and intravenous immunoglobulin are used to treat COVID-19–associated IgAV.[30,31] Further studies are warranted to determine the role of SARS-CoV-2 in the pathogenesis of IgAV and further clarify these relationships. It is important for emergency clinicians to be aware of the prevalence and presentation of COVID-19–mediated IgAV to assist in timely recognition and treatment of the condition.

Data, Code, and Research Materials Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Author Disclosures

Conflicts of interest: none to report.

N	Reference	Age /sex	Diagnostic date/method for IgAV	Diagnostic date/method for COVID-19	The period from a positive PCR test to the appearance IgAV signs
1	Allez et al[32]	24 y/male	Not reported/skin biopsy H/E: perivascular and vessel wall infiltration by neutrophils and lymphocytes, leukocytoclasia DIF: C3 and IgA deposits in dermal capillaries	Not reported/ a positive PCR test for SARS-CoV-2 in a nasopharyngeal swab. Positive serology for COVID-19.	Not reported
2	Suso et al[41]	78 y/male	3 wk after discharge date 17 April 2020/kidney biopsy H/E: segmental mesangial expansion with hypercellularity in 4/7 glomeruli, epithelial crescents in 2/7 glomeruli, without tubular or interstitial defects DIF: IgA granular deposits in the glomerular mesangium	4 April 2020/a positive PCR test for SARS-CoV-2 in a nasopharyngeal swab. Positive result for anti-SARS-CoV-2 by chemiluminescent immunoassay.	5 wk
3	Sandhu et al[33]	22 y/male	Not reported/skin and kidney biopsy Skin biopsy: H/E: signs of LCV DIF: negative for IgA deposition (after 48 hours) Kidney biopsy H/E: signs of focal necrotizing, mesangial, and focal endocapillary proliferative IgA nephropathy DIF: IgA mesangial granular deposition	30 August 2020/a positive PCR test for SARS-CoV-2 in a nasopharyngeal swab	Simultaneously
4	Jacobi et al[36]	3 y/male	Not reported/ clinically (palpable purpura and abdominal pain)	Not reported/ a positive RT-PCR of a nasopharyngeal swab.	Simultaneously

5	AlGhoozi and AlKhayyat[37]	4 y/male	Not reported/ clinically (palpable purpura and arthralgia)	Not reported/a positive PCR test for SARS-CoV-2 in a nasopharyngeal swab.	37 d
6	Hoskins et al[38]	2 y/male	Not reported/ skin biopsy H/E: perivascular inflammation with neutrophils Immunostain: positive for IgA DIF: not performed	Not reported/ a positive PCR test for SARS-CoV-2 in a nasopharyngeal swab.	Simultaneously
7	Li et al[34]	30 y/male	Not reported/skin and kidney biopsy Skin biopsy: H/E: a neutrophil-rich small-vessel vasculitis-LCV DIF: IgA, IgG, IgM, and C3 was negative Kidney biopsy: H/E: focally crescentic and segmentally necrotizing IgAN with focal endocapillary hypercellularity DIF mesangial and segmental peripheral capillary wall staining for IgA, C3, IgM, IgG, and C1q was negative E/M: mesangial and subendothelial immune-type deposits	Not reported/ a positive throat swab and nucleic acid testing for SARS-CoV-2.	Simultaneously
8	El Hasbani et al[39]	16 y/male	Not reported/ clinically (palpable purpura, abdominal pain, proteinuria, elevated Ig A)	Not reported/ a positive PCR test for SARS-CoV-2.	2 d

9	Jedlowski and Jedlowski[30]	70 y/male	Not reported/skin and kidney biopsy Skin biopsy: H/E: signs of LCV DIF: IgA, C5B-9, fibrinogen deposition Kidney biopsy: H/E: mesangial hypercellularity, tubular atrophy, interstitial fibrosis, lymphocytic tubulitis with absence of crescents DIF: granular mesangial deposition of IgA. E/M: patchy effacement of podocytes	Not reported/ a positive PCR test for SARS-CoV-2 in a nasopharyngeal swab.	Simultaneously (1 wk later after URI symptoms)
10	Borocco et al,[40]	13 y/female	April 2020/clinically (palpable purpura, arthralgia, periarticular edema, abdominal pain)	Not reported/ a positive RT-PCR of a nasopharyngeal swab.	Simultaneously
11	Barbetta et al[42]	62 y/male	Not reported/skin biopsy H/E: perivascular and interstitial lymphocytic infiltrate, with extravasated red blood cells, ectatic capillary vessels, endothelial cells with signs of swelling without atypia DIF: IgA deposition	Not reported/ a positive RT-PCR of a nasopharyngeal swab.	10 d
12	Oñate et al[43]	84 y/male	Not reported/skin and kidney biopsy Skin biopsy: H/E: signs of LCV DIF: IgA, C5B-9, fibrinogen deposition Kidney biopsy: H/E: interstitial fibrosis, tubular atrophy, without crescents DIF: granular mesangial deposition of IgA. C3, IgM, IgG, C1q were negative	March 2020/ a positive PCR test for SARS-CoV-2 in a nasopharyngeal swab.	4 mo
13	Oñate et al I[43]	87 y/male	December 2020/skin biopsy H/E: signs of LCV DIF: perivascular granular IgA deposition	October 2020/ a positive serology for Ig G, negative for Ig M.	8 wk

N	Reference/country	Age/sex	Concomitant diseases	Brief scenario	Treatment
1	Allez et al,[1] France	24 y/male	Crohn's disease	-COVID-19 symptoms: none-IgAV symptoms: skin rash, asymmetric arthralgia, periarticular swelling, and abdominal pain, palpable purpura on the legs and arms, swelling in the left hand, and pain in several joints on palpation.-Laboratory and instrumental findings: CRP, D-dimer, fibrinogen, and complement C4, IgA levels were all elevated. An enlarged ileitis on CT scan.	MethylPREDNISolone enoxaparin
2	Suso et al,[41] Spain	78 year/male	Hypertension, alcohol consumption, bladder cancer in remission	-COVID-19 symptoms: history of bilateral pneumonia with respiratory failure, treated with hydroxychloroquine, lopinavir/ritonavir, dexamethasone, ceftriaxone, azithromycin, and tocilizumab (IL-6).-IgAV symptoms: returned to the ER 3 wk later with wrist arthritis, lower limb purpura, and hypertension.-Laboratory findings: elevated creatinine, hypoalbuminemia, massive proteinuria (10 g/d), and hematuria with 60% dysmorphic red blood cells.	PrednisoLONE, methylPREDNISolone+ riTUXimab

3	Sandhu et al,[33] India	22 y/male	No	-There was a simultaneous development of symptoms of COVID-19 and vasculitis: fever, abdominal pain, vomiting, and painful swelling of both ankle and wrist joints were the first symptoms of the illness accompanied by multiple purpura, edema of the joints 2 d later.-Laboratory findings: proteinuria, elevation of liver function test.	Dexamethasone, oral prednisoLONE, mycophenolate mofetil
4	Jacobi et al,[36] Israel	3 y/male	Hirschsprung disease	-COVID-19 symptoms: none-IgAV symptoms: a palpable purpuric rash on the buttocks and extensor surface of the lower extremities, abdominal pain and emesis.-Laboratory findings: microcytic anemia and mild thrombocytosis.	NSAIDs, predniSONE
5	AlGhoozi and AlKhayyat,[37] Bahrain	4 y/male	No	-COVID-19 symptoms: signs of upper respiratory tract infection.-IgAV symptoms: lower limb arthralgia and maculopapular rash, edema of the ankles.-Laboratory findings: normal full blood count, normal electrolytes, normal liver and renal function tests, normal coagulation profile, erythrocyte sedimentation rate and C reactive protein values.	Paracetamol

6	Hoskins et al,[38] [d]Baltimore	2 y/male	No	-COVID-19 symptoms: none-IgAV symptoms: severe abdominal pain, purpuric rash, ecchymotic lesions, hematochezia, emesis was observed-Laboratory findings: elevated D-dimer. CRP and high inflammatory markers.	Steroids, low-molecular weight heparin
7	Li et al.[34] Canada	30 y/male	No	-There was a simultaneous development of symptoms of COVID-19 and vasculitis: fever, runny nose, cough, diarrhea, abdominal pain, painful purpuric rash to his lower extremities, distal upper extremities, and trunk.-Laboratory findings: proteinuria, mild hematuria, cholestatic liver enzymes elevated.	Steroids
8	El Hasbani et al,[39] United States	16 y/male	No	-COVID-19 symptoms: sore throat, muscle pain.-IgAV symptoms: palpable purpura both lower limbs, abdominal pain, hemoptysis, hematochezia.-Laboratory findings: elevated inflammatory markers (ESR,CRP) and serum Ig A, proteinuria, microscopic hematuria, hypogammaglobinemia, hypoalbuminemia.	PrednisoLONE, ramipril, trimethoprim/Sulfamethoxazole

9	Jedlowski and Jedlowski,[30] United States	70 year/male	Dyslipidemia	-COVID-19 symptoms: rhinorrhea, shortness of breath, fever, chills.-IgAV symptoms: diarrhea, bilateral symmetrical arthralgia of wrists, ankles, and knees, abdominal pain, purpuric rash on the bilateral lower extremities and buttocks, hematochezia, enterocolitis, ileitis.-Laboratory findings: elevated inflammatory markers (ESR,CRP), proteinuria, gross hematuria, acute kidney injury (elevation of creatinine).	Dexamethasone, MethylPREDNISolone, predniSONE
10	Borocco et al,[40] French	13 y/female	Panhypopituitarism, suprasellar germinoma in remission	-COVID-19 symptoms: sore throat, pharyngitis.-IgAV symptoms: purpuric and ecchymosis lesion of lower limbs, buttocks. abdominal pain, arthralgia, periarticular edema.-Laboratory findings: leukocytosis with neutrophilia, lymphocytosis, elevation of CRP, Ig G and A.	Pain relievers
11	Barbetta et al,[42] Italy	62 y/male	Diabetes mellitus, arterial hypertension	-COVID-19 symptoms: dyspnea, fever, bilateral interstitial pneumonia.-IgAV symptoms: purpuric rash of lower extremities, buttocks, abdominal pain, vomiting, hematochezia.-Laboratory findings: hematuria, proteinuria, glycosuria, hyaline cylinders.	CPAP, hydroxychloroquine, lopinavir/ritonavir, enoxaparin, MethylPREDNISolone 1 mg/kg

12	Oñate I[43] Spain	84 y/male	Arterial hypertension, dyslipidemia, atrioventricular block tricuspid endocarditis congestive liver disease, atrial flutter, chronic obstructive pulmonary disease, obstructive sleep apnea syndrome, axonal polyneuropathy	-COVID-19 symptoms: dyspnea, fever, bilateral interstitial pneumonia.-IgAV symptoms: palpable purpura, acute renal failure with increase creatinine, proteinuria-Laboratory findings: increase of creatinine, proteinuria, microhematuria, purpuric skin lesion, increase in IgA level,	Hydroxychloroquine, lopinavir/ritonavir, azithromycin, tocilizumab, anticoagulant drugs. MethylPREDNISolone, oral prednisoLONE, mycophenolate mofetil.
13	Oñate I[43] Spain	87 y/male	Hypertension, hypertensive cardiomyopathy, pulmonary hypertension, diverticulosis, prostate hyperplasia, cognitive impairment	-COVID-19 symptoms: upper respiratory tract infection, ipsilateral crackles.-IgAV symptoms: purpuric skin lesion in the lower limbs, increase in IgA levels. creatinine, proteinuria, microhematuria.-Laboratory findings: increase of creatinine, proteinuria, microhematuria, increase in Ig A level.	Amoxicillin-clavulanate, MethylPREDNISolone, oral prednisoLONE

DETAILS

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The effects of motivational messages sent to emergency nurses during the COVID-19 pandemic on job satisfaction, compassion fatigue, and communication skills: A Randomized controlled trial: JEN. (2022). Journal of Emergency Nursing, 48(5), 547-558. doi:https://doi.org/10.1016/j.jen.2022.06.001

IntroductionDuring the COVID-19 pandemic, emergency nurses have been adversely affected physically, socially, and psychologically by factors such as increased workload, longer working hours, isolation from family, and limited resources. This study aimed to investigate the effect of motivational messages sent to emergency nurses during the COVID-19 pandemic on their job satisfaction, compassion fatigue, and communication skills.MethodsThis was a randomized controlled experimental study. The study was conducted with 60 emergency nurses in 2 training and research hospitals in Istanbul between July 31 and August 31, 2021. The participants were randomly assigned to the intervention and control groups. Participants in the intervention group (n = 30) received daily motivational messages to their mobile phones by short message service for 21 days; those in the control group (n = 30) received no motivational messages. The Job Satisfaction Scale, Compassion Fatigue Scale, and Communication Skills Scale were administered before and after the intervention.ResultsThe mean age was 29.8 (SD = 7.5) and 28.7 years (SD = 6.9) in the intervention and control groups, respectively. Before the intervention, there were no significant differences in the groups' scores for job satisfaction (P = .561), compassion fatigue (P = .687), or communication skills (P = .355). After the intervention, the intervention group had significantly higher scores for job satisfaction (P < .001) and communication skills (P < .001) and significantly lower compassion fatigue scores than the control group (P < .001).DiscussionOur results suggest that motivational messages sent to emergency nurses during the COVID-19 pandemic increase job satisfaction and improve communication skills while reducing compassion fatigue.

Comparison of death anxiety, death obsession, and humor in nurses and medical emergency personnel in COVID-19 pandemic: JEN. (2022). Journal of Emergency Nursing, 48(5), 559-570. doi:https://doi.org/10.1016/j.jen.2022.02.004

IntroductionCOVID-19 has created numerous challenges for the health system. Nurses and medical emergency personnel are at the forefront of fighting COVID-19 and exposed to psychological disorders such as death anxiety and death obsession. Humor is a defense and coping mechanism against the anxiety and obsession associated with death. This study aimed to compare death anxiety, death obsession, and humor among nurses and medical emergency personnel during the COVID-19 pandemic.MethodsThis descriptive cross-sectional study was conducted with 230 nurses and medical emergency personnel. To collect data, the Templer death anxiety scale, death obsession scale, and humor styles questionnaire were used. SPSS 19 was used for data analysis. The significance level was considered at P < .05.ResultsMean and standard deviation of death anxiety in the nurses and medical emergency personnel were 6.86 (4.04) and 5.68 (3.57), respectively; these values for death obsession were 29.82 (12.30) and 25.30 (12.66) and for humor 116.75 (30.87) and 118.48 (24.66), respectively. The nurses had significantly higher death anxiety (t = 2.33, P = .02) and death obsession (t = −2.68, P = .008) than the medical emergency personnel; moreover, there was no significant relationship among humor, death anxiety (r = .11, P = .10), and death obsession (r = .07, P = .31) in nurses and emergency personnel.DiscussionThe results of this study showed that the levels of death anxiety and death obsession were higher in the nurses than the medical emergency personnel. There was no significant difference between the hospital nurses and medical emergency personnel in terms of humor.

Enhancing hospital-wide patient flow to reduce emergency department crowding and boarding: JEN. (2022). Journal of Emergency Nursing, 48(5), 603-609. doi:https://doi.org/10.1016/j.jen.2022.06.002

IntroductionED overcrowding and boarding is a global phenomenon that negatively affects patients, hospital staff, and hospital-wide operations. Poor patient flow has been identified as a major contributing factor to ED overcrowding and boarding, which is directly linked to negative patient outcomes. This project implemented a multidisciplinary rounding team that addressed barriers to patient flow in real time. By reducing the inpatient length of stay bed capacity will improve, which in turn will help alleviate ED boarding and overcrowding.MethodsThis

before-and-after process improvement project took place on a 30-bed, inpatient medicine floor of a level-I trauma, tertiary, regional transfer center. Multidisciplinary rounding was used to improve care team communication and collaboration. Concepts from a Real-Time Demand Capacity model were used in this project to help develop a plan for capacity issues regarding bed supply and demand. Outcome variables included inpatient length of stay and ED boarding hours.ResultsImplementation of multidisciplinary rounding resulted in a statistically significant reduction of 0.83 days in the length of stay for patients on this floor. By increasing inpatient bed capacity, ED boarding hours for patients targeted to the 3000-medicine floor was reduced by an average of 8.83 hours per month, a reduction > 50% from baseline.DiscussionIncreasing inpatient bed capacity helps decrease ED access block, and contributes to reducing ED overcrowding. Implementing a daily multidisciplinary rounding structure on the inpatient floor helped hospital throughput by expediting discharges, which in turn created inpatient bed capacity.

Networking, education, and an opportunity for innovation: JEN. (2022). Journal of Emergency Nursing, 48(5), 493. doi:https://doi.org/10.1016/j.jen.2022.07.005

The emergency department remains one area where all patients arrive with an unplanned health-related crisis or concern. The challenges the health care system faces are large and complex. Let us all remain optimistic and committed to improving care, providing services our communities need, and growing and expanding the emergency nursing specialty.

Emergency nurse consensus on most effective and accessible support strategies during COVID-19: A delphi study: JEN. (2022). Journal of Emergency Nursing, 48(5), 538-546. doi:https://doi.org/10.1016/j.jen.2022.06.003

IntroductionEmergency nurses face significant risk for stress-related complications while working during the COVID-19 pandemic. However, there is limited empirical evidence on the effectiveness and accessibility of support strategies for nurses in this novel situation. Expert consensus may help fill this knowledge gap. Therefore, the study objective was to gain expert consensus from emergency nurses on the most effective and accessible strategies during the COVID-19 pandemic.MethodsThis 2-round Delphi study recruited an online expert panel from emergency nurses practicing during the COVID-19 pandemic within a single Mountain West health system spanning 9 urban and rural emergency departments. Over 10 weeks in the summer of 2021, participants completed 2 sequential surveys to rate and rank employee-led and employer-led support strategies collated from a literature review.ResultsOf 327 recruitment emails sent, 28 nurses joined the expert panel. Emergency nurses reached a consensus on preference for employee-led self-care activities, including enhancing social well-being and strengthening emotional well-being. None of the employer-led strategies reached group consensus regarding high effectiveness, accessibility, and the likelihood of participation. Additionally, emergency nurses favored in-person support strategies over other delivery methods.DiscussionNumerous studies have explored the impact of the COVID-19 pandemic on health care workers. Although experts and researchers seek to determine the best support strategies, this study highlights how emergency nurses wish to be supported. Employers can tailor support strategies for maximum effect by understanding health care worker perceptions and preferences.

I am so tired and we pretend: JEN. (2022). Journal of Emergency Nursing, 48(5), 588. doi:https://doi.org/10.1016/j.jen.2022.04.005

Information for readers: JEN. (2022). Journal of Emergency Nursing, 48(5) doi:https://doi.org/10.1016/S0099-1767(22)00190-8

Evidence-based protocol for administering first dose of cephalosporins via intravenous push in the emergency department: JEN. (2022). Journal of Emergency Nursing, 48(5), 610-615.e1. doi:https://doi.org/10.1016/j.jen.2022.03.004

...]IV cephalosporins are typically administered via the IVPB route in the emergency department. First is the fluctuation in availability of small-volume parenteral solutions, often due to manufacturing issues and natural disasters. ...]the shift toward high value care and the importance of controlling costs and being good stewards of limited health care resources have created the opportunity to explore the feasibility of IVP delivery of IV antibiotics.

...]education was distributed to nursing staff both electronically via email and posts to the staff's private Facebook group and face-to-face during morning staff huddles.

Editorial board: JEN. (2022). Journal of Emergency Nursing, 48(5) doi:https://doi.org/10.1016/S0099-1767(22)00188-X

Association of cannabis use and at-risk alcohol use with intimate partner violence in an urban ED sample: JEN. (2022). Journal of Emergency Nursing, 48(5), 504-514. doi:https://doi.org/10.1016/j.jen.2022.04.002

IntroductionUrban ED patients have elevated rates of substance use and intimate partner violence. The purpose of this study is to describe the risk profiles for intimate partner violence among urban ED patients who report at-risk alcohol use only, cannabis use only, or both types of substance use.MethodsCross-sectional survey data were collected from study participants (N = 1037; 53% female; ages 18-50) following informed consent. We measured participants' past-year at-risk drinking (women/men who had 4+/5+ drinks in a day), cannabis use, psychosocial and demographic characteristics, and past-year physical intimate partner violence (assessed with the Revised Conflict Tactics Scale). We used bivariate analysis to assess whether rates of intimate partner violence perpetration and victimization differed by type of substance use behavior. Multivariate logistic regression models were estimated for each intimate partner violence outcome. All analyses were stratified by gender.ResultsRates of intimate partner violence differed significantly by type of substance use behavior and were highest among those who reported both at-risk drinking and cannabis use. Multivariate analysis showed that women who reported at-risk drinking only, cannabis use only, or both types of substance use had increased odds for intimate partner violence perpetration and victimization compared with women who reported neither type of substance use. Men's at-risk drinking and cannabis use were not associated with elevated odds of intimate partner violence perpetration or victimization.DiscussionBrief screening of patients' at-risk drinking and cannabis use behaviors may help identify those at greater risk for intimate partner violence and those in need of referral to treatment.

Table of contents: JEN. (2022). Journal of Emergency Nursing, 48(5) doi:https://doi.org/10.1016/S0099-1767(22)00187-8

Ability to care in acute Situations—The influence of simulation-based education on new graduate nurses: JEN. (2022). Journal of Emergency Nursing, 48(5), 515-524. doi:https://doi.org/10.1016/j.jen.2022.05.005

IntroductionSimulation-based education is frequently used in transition programs for new graduate nurses. Simulation-based education is implemented as a measure to practice nursing skills, gain experience, and prepare nurses for caring in challenging situations, such as acute situations. However, concerns about the data supporting the use of simulation are obtained from small studies that do not use validated measurement scales.ObjectiveThis study aimed to explore the influence of simulation-based education on new graduate nurses' perceived ability to provide care in acute situations.MethodsA total of 102 new graduate nurses participated in simulation-based education as a mandatory part of an introductory program. They completed a premeasurement and a postmeasurement using the Perception to Care in Acute Situations scale. The Wilcoxon signed-rank test and the paired samples t test were used to test the statistical significance of outcomes for the simulation-based education, with the alpha set at 0.05. Cohen's d formula was used to calculate the effect size.ResultsThe Wilcoxon signed-rank test on the total scale score showed that simulation-based education resulted in a statistically significant change in the nurses' perceptions of their ability to care in acute situations (N = 99; Z = 7877; P < .001). The paired samples t test showed that the mean posteducation score was significantly higher (P < .001) in the total score. Cohen's d formula (−1.24) indicated a large effect size on the total score.DiscussionSimulation-based education can provide an effective means of improving new graduate nurses' perceived ability to provide care in acute situations.

Connecting the dots! from bench to stretcher side: JEN. (2022). Journal of Emergency Nursing, 48(5), 494-495. doi:https://doi.org/10.1016/j.jen.2022.07.003

Owing to the competition in generating knowledge based on high-level evidence and obtaining elevated journal impact factors, journals strive to publish randomized controlled trials and research-focused articles to ensure a

heightened number of citations. Given the need of stretcher-side emergency nurses to hit the ground running and gain access to peer-reviewed and evidence-based knowledge, JEN has decided to shift its focus to clinically relevant articles that provide an updated review of common topics in emergency nursing. To review the author guidelines or submit a manuscript for consideration, go to https://www.jenonline.org/.Author Disclosures Conflicts of interest: none to report.Acknowledgments We acknowledge Andrew Reil, BSc, MS, Academic Development Center, Mount Royal University, Calgary, Alberta, Canada, for figure development.

Effectiveness of 2 pretreatment methods in antifogging of goggles in a COVID-19 isolation ward: A randomized controlled trial: JEN. (2022). Journal of Emergency Nursing, 48(5), 571-582. doi:https://doi.org/10.1016/j.jen.2022.06.004

IntroductionThis study aimed to compare the effectiveness of the pretreatment of goggles with iodophor solution and antibacterial hand sanitizer to reduce the fogging of goggles.MethodsA total of 90 health care workers were divided into a control group (n = 30), an iodophor solution group (n = 30), and an antibacterial hand sanitizer group (n = 30). This study evaluated the degree of fogging of goggles and the light transmission, comfort, eye irritation, and the impact of goggles on the medical work of staff.ResultsThe antibacterial hand sanitizer group had the lowest amount of goggle fogging and the most transparent view. Participants in the control group reported the worst light transmission and comfort level, followed by the iodophor solution group. In contrast, the goggles in the antibacterial hand sanitizer group had the best light transmission and comfort level. The iodophor solution group participants reported more eye irritation. Participants in the control group reported that the goggles severely impacted their medical work, with a less severe impact reported by the iodophor solution group. The antibacterial hand sanitizer group did not report any impact on their medical work.DiscussionWhen the goggles were internally coated with antibacterial hand sanitizer solution (diluted 1:1 with distilled water), the antifog effect was significant. Moreover, the goggles treated with antibacterial hand sanitizer had a clearer field of vision, were reported as non-irritating to the eyes, and significantly improved the efficiency of COVID-19 health care workers, including emergency nurses and providers.

NCPD earn up to X.X contact hours: JEN. (2022). Journal of Emergency Nursing, 48(5), 616. doi:https://doi.org/10.1016/S0099-1767(22)00202-1

Improving timeliness of pediatric emergency department admissions: JEN. (2022). Journal of Emergency Nursing, 48(5), 496-503. doi:https://doi.org/10.1016/j.jen.2022.05.006

IntroductionThe goal of this quality improvement project was to improve timing, communication, and continued care for pediatric patients who present to the emergency department at a Level I pediatric trauma center and require inpatient admission.MethodsUsing continuous improvement methodology, a patient flow process was created to improve the throughput of pediatric patients requiring inpatient admission from the emergency department, aimed at decreasing the time from decision to admit to actual admission. The new workflow included ED and inpatient nursing collaboration, with nursing leaders coordinating patient transfer.ResultsBaseline data indicated that, in 2019, patients admitted to a short-stay pediatric unit from the emergency department had an average time of 106.8 minutes from decision to admit to the actual admission. After the implementation of a new admission process, time from decision to admit to actual admission decreased from a mean of 106.8 minutes to 82.84 minutes for patients admitted to a short-stay unit. This illustrates an improvement from 59.75% to 68.75% of patients admitted within 60 minutes from ED admission to arrival on a short-stay unit. This model was then replicated throughout other units in the hospital.DiscussionThere are no known benchmark data to guide practice for rapid admission from the pediatric emergency department to inpatient units and continuing care. This quality improvement project demonstrates a model that has been successful admitting patients in an efficient, time-controlled manner. Additional research is needed to document benchmarks for admission timing and to demonstrate other measurable outcomes in patient care.

What a rat race: A case study of rat bite fever in an emergency department: JEN. (2022). Journal of Emergency Nursing, 48(5), 583-585. doi:https://doi.org/10.1016/j.jen.2022.07.001

Rat bite fever is an acute illness caused by bacteria from rodents. In the United States, rat bite fever is considered rare; however, actual incidence is unknown because of lack of mandatory disease reporting requirements. Risk of development of rat bite fever after being bitten by a rat is approximately 10%. Early treatment is imperative as death is a potential complication. The following case study demonstrates the gravity of the syndrome.

Board of directors: JEN. (2022). Journal of Emergency Nursing, 48(5) doi:https://doi.org/10.1016/S0099-1767(22)00189-1

Critical clinical events and resilience among emergency nurses in 3 trauma hospital-based emergency departments: A cross-sectional study: JEN. (2022). Journal of Emergency Nursing, 48(5), 525-537. doi:https://doi.org/10.1016/j.jen.2022.05.001

IntroductionEmergency nurses experience occupational stressors resulting from exposures to critical clinical events. The purpose of this study was to identify the critical clinical events for emergency nurses serving 3 patient populations (general, adult, pediatric) and whether the resilience of these nurses differed by the patient population served.MethodsThis study used a cross-sectional survey design. A total of 48 emergency nurses were recruited from 3 trauma hospital-based emergency departments (general, adult, pediatric). Clinical Events Questionnaire, Connor-Davidson Resilience scale, and an investigator-developed demographic questionnaire were used to collect data from respondents.ResultsAll respondents were female (n = 48, 100%), and most were White (n = 46, 96%). The average age of participants was 39.6 years, the average number of years as a registered nurse was 12.7 years, and the average number of years as an emergency nurse was 8.8 years. Clinical events considered most critical were providing care to a sexually abused child, experiencing the death of a coworker, and lack of responsiveness by a colleague during a serious situation. The least stress-provoking event was incidents with excessive media coverage. Nurses were less affected by the critical events they experienced more frequently at work. Nurses in the 3 trauma settings had high level of resilience, with no statistically significant differences between groups.DiscussionThe occupational stress from exposure to significant clinical events varied with the patient population served by emergency nurses. It is important that interventions be adopted to alleviate the effect of work-related stressors and promote the psychological health of emergency nurses.

Duty to work during the COVID-19 pandemic: A cross-sectional study of perceptions of health care providers in jordan: JEN. (2022). Journal of Emergency Nursing, 48(5), 589-602.e1. doi:https://doi.org/10.1016/j.jen.2022.04.004

IntroductionThis study aimed to assess perceptions of duty to work among health care providers during the coronavirus disease 2019 response and to identify factors that may influence their perceptions.MethodsThis was a cross-sectional study conducted from April 1, 2020, to April 20, 2020, using an online survey distributed to health care providers in Jordan. Descriptive statistics were used, as well as chi-square test for independence to assess relationships between variables.ResultsA total of 302 questionnaires were included. Commitment to serve the community was the primary reason for coming to work (36%), followed by commitment to faith (29.6%). The major perceived barriers for coming to work were lack of appropriate personal protective equipment and appropriate training (62.6% and 53.5%, respectively). Males perceived higher work obligations than females in all potential barriers ($P < .05$), except for the lack of appropriate training. Nurses perceived higher work obligations than other health care providers despite the lack of appropriate training ($\chi2 = 11.83$, $P = .005$), lack of effective vaccine or treatment ($\chi2 = 21.76$, $P < .001$), or reported infection among coworkers ($\chi2 = 10.18$, $P = .03$).DiscussionWhile the majority of health care providers perceive an obligation to work during the coronavirus disease 2019 pandemic, specific conditions, mainly lack of protective gear and training, may significantly alter their perception of work obligation. Providing training and proper personal protective equipment are among the vital measures that could improve the work environment and work obligation during pandemic conditions.

Emergency nursing review questions: September 2022: JEN. (2022). Journal of Emergency Nursing, 48(5), 586-587. doi:https://doi.org/10.1016/j.jen.2022.06.006

Cardiopulmonary resuscitation is in progress and the patient has an implantable cardioverter defibrillator (ICD) per family's history. Narcotics may be used to treat pain caused by decreased blood flow or vasospasms (D).2 Correct

answer: C If a patient remains in ventricular fibrillation with an ICD and the defibrillator does not function, the rescuer should proceed with standard defibrillation and cardiopulmonary resuscitation (C). A bar (or clinical ring) magnet that is placed directly over the ICD device will temporarily deactivate the defibrillator function (the magnet may be taped in place) (D).3 Correct answer: A The dreaded ear irrigation is not a favorite procedure for the emergency nurse.

Coronavirus disease 2019 in the emergency department: Establishing an interprofessional incident command system: JEN. (2022). Journal of Emergency Nursing, 48(4), 477-483. doi:https://doi.org/10.1016/j.jen.2022.01.004

Coronavirus disease 2019 was declared a national emergency in the United States on March 13, 2020, at which time the Children's National Hospital Emergency Department in Washington, DC, mobilized to develop and implement a unit-based Incident Command System. Anticipating that the unique and challenging nature of this pandemic might require a large interprofessional team, emergency nurses, emergency physicians, and emergency physician assistants were placed in traditional Incident Command System roles to provide an organizational framework for the ED response. This framework served multiple purposes but most importantly it helped to efficiently streamline and coordinate communications within the emergency department, with hospital leadership and with other hospital departments. The focus on intentionally taking an interprofessional approach to assigning Incident Command System roles was key to optimize staff safety, patient care, and clinical efficiency. This paper highlights a unique concept of applying the Incident Command System model to a single hospital department in a disaster scenario, using existing ED staff to function in various roles not typically held during regular operations. Given that policies and procedures can be ever-changing during a pandemic, emergency departments can implement an interprofessional incident command structure to provide a framework for communications and operational planning that allows for agility based on evolving priorities. The Children's National Hospital ED Incident Command System model established during the coronavirus disease 2019 pandemic can serve as a guide for other emergency departments during a disaster response.

New light on the person with the lamp: Tales from shanghai, china: JEN. (2022). Journal of Emergency Nursing, 48(4), 465-466. doi:https://doi.org/10.1016/j.jen.2021.11.004

A cross-sectional study of self-perceived educational needs of emergency nurses in two tertiary hospitals in nairobi, kenya: JEN. (2022). Journal of Emergency Nursing, 48(4), 467-476. doi:https://doi.org/10.1016/j.jen.2022.04.001

BackgroundMany low- and middle-income countries lack resources for well-functioning emergency care systems. Emergency nurses interact with injured and critically ill patients as the first contact in many health care settings. However, insufficient training limits nurses from providing ideal emergency care. The purpose of this research was to highlight educational needs specific to nurses working in 2 emergency departments in Nairobi, Kenya.MethodsA descriptive cross-sectional study involving emergency units of 2 of the largest referral and teaching hospitals (Aga Khan University Hospital, Nairobi, and Kenyatta National Hospital) in Nairobi, Kenya, was conducted. Data were collected by using an adapted structured, self-administered questionnaire. The data were analyzed using descriptive statistics. The skills and competencies of the participants were assessed. In addition, the educational gaps and needs of the participants around emergency care such as trauma, cardiovascular diseases, and respiratory and neurological illnesses were described. Results were presented in frequencies and percentages.ResultsThe questionnaire response rate was 63.6% (n = 84). Most of the respondents held associate degrees in nursing (72.6%), whereas 19% had a bachelor's degree in nursing. Most respondents (84.5%) perceived themselves as being highly competent in basic skills such as performing cardiopulmonary resuscitation and assessment of body systems. Less than half of the respondents (48.8%) perceived themselves as being highly competent in intermediate skills such as assisting with endotracheal intubation. In advanced competencies, such as analyzing electrocardiograms and administering thrombolytic medications, only 16.7% perceived themselves as highly competent.ConclusionThe results of this study suggest there is a knowledge gap and educational needs among emergency nurses in Nairobi, Kenya. It identified injuries/trauma; cardiovascular, respiratory, and neurological disease; and other emergencies as topics of focus areas with a high need. To address these knowledge and skills needs, a future specialty training in emergency nursing is recommended and this could be achieved through continuing professional development and short courses or postgraduate-level training.

Table of contents: JEN. (2022). Journal of Emergency Nursing, 48(4) doi:https://doi.org/10.1016/S0099-1767(22)00129-5