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# Emergency department registered nurses overestimate their disaster competency: A cross-sectional study

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## Abstract

**Background:** Health care systems face challenges during major incidents due to a sudden influx of patients. The surge capacity of hospitals relies significantly on the skills and knowledge of emergency department (ED) registered nurses (RNs), impacting patient safety and outcomes. However, there's a gap in understanding ED RNs' perception of their disaster preparedness.

**Objective:** This study aimed to evaluate emergency department registered nurses' self-perceived disaster preparedness.

**Methods:** A cross-sectional study was conducted following the STROBE checklist. A self-assessment questionnaire, developed based on specific disaster nursing competencies for ED RNs, was administered to all ED RNs across six hospitals . Competency was assessed using a five-point Likert-type scale.

**Results:** The study found that ED RNs' self-perceived disaster preparedness, as indicated by the Total Disaster Competency mean, was low. Interestingly, ED RNs tended to overestimate their disaster nursing competency compared to the Total Disaster Competency mean. Factors such as experience and education were positively linked to disaster preparedness and self-assessment accuracy.

**Conclusion:** ED RNs' tendency to overestimate their disaster preparedness highlights the importance of targeted training and education. Experienced and well-educated ED RNs demonstrated better preparedness. Formal disaster education contributed to a more realistic self-assessment of preparedness. This study emphasizes the need for ongoing training to bridge the gap between perceived and actual disaster nursing competencies, ultimately improving patient outcomes during major incidents.

## Background:

Major incidents (MI) are frequent occurrences that pose significant challenges to healthcare systems, leading to sudden surges in patient numbers. Hospitals play a crucial role in managing these incidents effectively, necessitating strategic measures to enhance surge capacity through resource allocation, hospital response levels, and efficient triage systems. Surge capacity depends on various factors, including staff readiness, resources, infrastructure, and operational systems. Among frontline responders, emergency department (ED) registered nurses (RN) play a vital role due to their skills, knowledge, and abilities in providing quality care during MIs and reducing morbidity and mortality. The all-hazards approach in disaster response plans highlights the need for RNs to quickly adapt to diverse events during sudden patient surges in EDs. (Waxman et al., 2017)

**Disaster Nursing:** Recognizing the critical role of nurses, the International Council of Nurses (ICN) emphasizes disaster nursing competencies to mitigate MI effects, outlining general and specific disaster

core competencies. Disaster nursing involves applying competencies effectively in various events with limited resources to mitigate MI impacts. ED RNs, being among the first responders in MIs, are pivotal in patient safety, and their disaster competencies are crucial for patient outcomes. Accurate self-assessment of competencies, knowledge gaps, and needs is essential for ED RNs to enhance patient care during and after MIs. (Ben-Ishay et al., 2016)

**Evaluation of Disaster Preparedness:** National guidelines stress the development and evaluation of disaster medicine competencies, yet there's limited focus on assessing ED RNs' disaster nursing competencies. Self-assessment, though subjective, is a valid measure of competency and is commonly used to evaluate RNs' clinical readiness. Previous studies using self-assessment tools have reported varying levels of disaster preparedness among RNs. However, ED RNs' perceptions of disaster competencies related to preparedness, particularly assessed using a specific ED RN instrument, remain understudied. (Naser et al., 2018)

**Objective:** This study aimed to evaluate emergency department registered nurses' self-perceived disaster preparedness using a dedicated instrument tailored for ED RNs.

# Method

### Study Design

The study employed a cross-sectional design using a validated questionnaire, in line with the STROBE checklist, and utilized descriptive and inferential statistics.

### Participants and Setting

All seven major EDs in the Stockholm region, Sweden, were invited to participate, with six agreeing. Inclusion criteria encompassed all ED RNs employed at the respective EDs, excluding those employed by independent staffing agencies due to a lack of hospital-connected email addresses.

### Ethical Considerations

Ethical approval was obtained from the regional ethical review authority . Participants were provided study descriptions, assured of voluntary participation and anonymity, and informed of their right to withdraw at any point.

### The Questionnaire

The study utilized a modified version of the Emergency Preparedness Instrument Questionnaire (EPIQ), a validated tool for assessing RN disaster competencies. Essential ED RN disaster competencies were identified using a modified Delphi technique based on the EPIQ instrument. The questionnaire underwent expert consensus and item refinement, including terminology specific to the study setting and legislation items. A pilot study ensured clarity and comprehension, resulting in the final instrument consisting of nine background items and 60 self-assessment items across 12 dimensions.

### Reduction of Items and Dimensions (Exploratory Factor Analysis)

An exploratory factor analysis (EFA) led to a reduction in items (from 60 to 28) and dimensions (from 12 to 4). The instrument analyzed staff, resources, structure, system, chemical-biological-radiological-nuclear (CBRN), specific patient groups, and overall disaster preparedness.

### Data Collection

Hospital managers distributed the questionnaire link to ED RNs via email, with data collection conducted using Google Forms®. The questionnaire closed two weeks after the third reminder.

### Data Analysis

Data analysis involved descriptive statistics, exploratory factor analysis, Cronbach's α for internal reliability, Mann-Whitney U-test, Kruskal-Wallis test, and correlation analysis using Spearman’s tau-b correlation. Response alternatives were adjusted for missing data, and certain variables were dichotomized for analysis.

# Results

### Description of the Participants

Of the seven hospitals invited, six participated, with a study population of 372 RNs. 140 nurses completed the questionnaire, resulting in a 38% response rate. Most nurses (70.4%) were aged between 26 and 44, with 65% having over five years of nursing experience. 40% reported prior major incident experience, while 30% held advanced degrees across various specialties. Additionally, 54.6% had disaster medicine as part of their bachelor's curriculum.

**Nurses' Disaster Competency**

The Total Disaster Competency mean score was 2.34. Subdimension means were 2.89 for Staff, Stuff, Structure, System; 2.00 for CBRN; and 2.17 for Specific patient groups. Nurses perceived their overall disaster preparedness (M = 2.74) higher than their Total Disaster Competency (M = 2.34), with a statistically significant difference ($\rho = 0.000$).

**Factors Influencing Disaster Competency**

There were significant differences in means across dimensions based on education level (bachelor's degree M = 2.03, advanced degree M = 3.07, $\rho = 0.000$), clinical experience (1–3 years M = 1.67, over 10 years M = 2.99, $\rho = 0.000$), instructor status (M = 2.98 for instructors vs 2.13 for non-instructors, $\rho = 0.000$), prior major incident experience (M = 2.68 for experienced vs M = 2.08 for non-experienced), and formal disaster medicine education (M = 2.10 without vs M = 2.61 with, $\rho = 0.000$). Gender did not show significant differences.

**Factors Correlated with Disaster Competency**

Factors correlated with Total Disaster Competency in decreasing order were professional clinical experience (r = 0.688), higher education (r = 0.488), being an instructor (r = 0.391), prior major incident experience (r = 0.318), and formal disaster medicine education (r = -0.310).

Similarly, these factors were correlated with RNs' perceived overall disaster preparedness. Perceived preparedness increased with professional clinical experience (r = 0.623), higher education (r = 0.470), and prior major incident experience (r = 0.373), except for formal disaster medicine education, where it decreased (r = -0.293). RNs without formal disaster medicine education assessed their preparedness significantly higher than those with formal education (M = 3.08 vs 2.41, $\rho = 0.004$).

**Table 1: Description of the Participants (n = 140)**

| **Description** | **n** | **%** |
|---|---|---|
| Gender | | |
| Female | 109 | 77.9 |
| Male | 31 | 22.1 |
| Age | | |
| 20–25 | 12 | 8.6 |
| 26–34 | 51 | 36.4 |
| 35–44 | 48 | 34.3 |
| 45–54 | 19 | 13.6 |
| 55–65 | 10 | 7.1 |
| Degree | | |
| Registered Nurse | 98 | 70 |
| Specialist Nurse | 42 | 30 |
| Clinical experience | | |
| <1 | 7 | 5 |
| 1–3 | 24 | 17.1 |
| 3–5 | 18 | 12.9 |
| 5–10 | 33 | 23.6 |
| 10->20 | 58 | 41.4 |
| Disaster medicine as part of bachelor's degree | | |

| | | |
|---|---|---|
| Yes | 79 | 54.6 |
| No | 40 | 15 |
| Uncertain | 21 | 28.6* |
| Clinical experience during major incident? | | |
| Yes | 56 | 40 |
| No | 72 | 50.7 |
| Uncertain | 13 | 9.3* |
| Frequency of disaster training at place of work | | |
| <1 year | 45 | 32.1 |
| Once a year | 34 | 24.3 |
| 2 or more/year | 19 | 13.6 |
| Uncertain | 22 | 15.7* |
| Never | 20 | 14.3 |
| Instructor | | |
| Yes | 35 | 25 |
| No | 105 | 75 |

**Table 2: Means per Dimension**

| Dimension | Mean | Std. Deviation |
|---|---|---|
| Stuff, staff, structure, system | 2.89 | 1.03 |
| CBRNE | 2.00 | 0.93 |
| Specific patient groups | 2.17 | 1.00 |
| Total Disaster Competency | 2.34 | 0.92 |
| Self-perceived overall disaster competency | 2.74 | 1.14 |

**Table 3: Means and Standard Deviations for Dimensions and Factors**

| | Surge | CBRNE | Specific Patient Groups | Total Disaster Competency Score | Perceived Disaster Competency |
|---|---|---|---|---|---|
| Gender | | | | | |
| Female | 2.95 ± 1.03 | 2.02 ± 0.92 | 2.19 ± 0.97 | 2.38 ± 0.9 | 2.77 ± 1.14 |
| Male | 2.67 ± 1.03 | 1.91 ± 0.94 | 2.12 ± 1.09 | 2.23 ± 0.99 | 2.61 ± 1.17 |
| Test and significance | U = 1194 ρ = 0.21 | U = 1461.5 ρ = 0.063 | U = 1429.5 ρ = 0.53 | U = 1510.5 ρ = 0.36 | U = 1539 ρ = 0.43 |
| Registered Nurse | | | | | |
| Yes | 2.55 ± 0.91 | 1.72 ± 0.74 | 1.84 ± 0.082 | 2.03 ± 0.77 | 2.38 ± 1 |
| Specialist | 3.61 ± 0.9 | 2.65 ± 1.01 | 2.96 ± 0.94 | 3.07 ± 0.77 | 3.57 ± 1.03 |
| Test and significance | U = 681 ρ = 0.000 | U = 857 ρ = 0.000 | U = 728 ρ = 0.000 | U = 739 ρ = 0.000 | U = 876 ρ = 0.000 |
| Professional experience | | | | | |
| <1 | 1.22 ± 0.14 | 1.05 ± 0.07 | 1.08 ± 0.18 | 1.12 ± 0.11 | 1.14 ± 0.37 |
| 1-3 | 2.07 ± 0.82 | 1.47 ± 0.58 | 1.64 ± 0.82 | 1.67 ± 0.67 | 2.00 ± 0.98 |

| | | | | | |
|---|---|---|---|---|---|
| 3-5 | 2.43 ± 0.94 | 1.67 ± 0.66 | 1.67 ± 0.71 | 1.9 ± 0.74 | 2.28 ± 1.17 |
| 5-10 | 2.82 ± 0.74 | 1.17 ± 0.79 | 1.98 ± 0.84 | 2.2 ± 0.71 | 2.45 ± 0.79 |
| 10 and over | 3.61 ± 0.74 | 2.65 ± 0.87 | 2.81 ± 0.9 | 2.99 ± 0.76 | 3.53 ± 0.86 |
| Test and significance | KW 57.7 ρ = 0.000 | KW 52.452 ρ = 0.000 | KW 44.67 ρ = 0.000 | KW 62.712 ρ = 0.000 | KW 56.646 ρ = 0.000 |
| Disaster medicine course | | | | | |
| Yes | 2.58 ± 1.05 | 1.82 ± 0.93 | 1.88 ± 0.99 | 2.10 ± 0.95 | 2.41 ± 1.14 |
| No | 3.19 ± 0.88 | 2.17 ± 0.8 | 2.50 ± 0.89 | 2.61 ± 0.78 | 2.63 ± 0.78 |
| Test and significance | U = 837 ρ = 0.002 | U = 969 ρ = 0.007 | U = 845 ρ = 0.000 | U = 982 ρ = 0.001 | U = 1031 ρ < 0.001 |
| Instructor | | | | | |
| Yes | 3.53 ± 0.99 | 2.66 ± 0.78 | 2.79 ± 0.98 | 2.98 ± 0.89 | 3.43 ± 1.06 |
| No | 2.67 ± 0.99 | 1.78 ± 0.78 | 1.98 ± 0.93 | 2.13 ± 0.083 | 2.50 ± 1.08 |
| Test and significance | U = 769.5 ρ = 0.000 | U = 808.5 ρ = 0.000 | U = 872 ρ = 0.000 | U = 879 ρ = 0.000 | U = 1006 ρ = 0.000 |
| Prior major incident experience | | | | | |
| Yes | 3.29 ± 1.00 | 2.40 ± 0.98 | 2.44 ± 1.04 | 2.68 ± 0.95 | 3.20 ± 1.11 |
| No | 2.61 ± 0.98 | 1.70 ± 0.78 | 1.92 ± 0.93 | 2.08 ± 0.84 | 2.35 ± 1.03 |
| Test and significance | U = 1004.5 ρ = 0.001 | U = 994.0 ρ = 0.000 | U = 1247.5 ρ = 0.003 | U = 1253.0 ρ = 0.000 | U = 1152 ρ = 0.000 |
| Frequency of training | | | | | |
| None | 2.43 ± 0.66 | 1.72 ± 0.67 | 1.90 ± 1.02 | 2.04 ± 0.75 | 2.35 ± 0.98 |
| < 1 × year | 3.02 ± 0.86 | 1.94 ± 0.80 | 2.20 ± 0.93 | 2.36 ± 0.82 | 2.69 ± 1.01 |
| 1 × year | 3.27 ± 0.97 | 2.20 ± 0.91 | 2.40 ± 0.88 | 2.58 ± 0.88 | 3.09 ± 1.11 |
| ≥2 × year | 3.48 ± 1.20 | 2.64 ± 1.29 | 2.40 ± 1.27 | 2.86 ± 1.19 | 3.21 ± 1.39 |
| Test and significance | KW 12.09 ρ = 0.007 | KW 5.86 ρ = 0.118 | KW 4.03 ρ = 0.258 | KW 8.21 ρ < 0.042 | KW 8.18 ρ < 0.042 |

**Table 4: Correlation of Demographic Factors and Disaster Competencies (Spearman's rho)**

| | Surge | CBRNE | Specific Patient Groups | Total Disaster Competency Score | Perceived Overall Disaster Preparedness |
|---|---|---|---|---|---|
| Gender | -0.110 ns | -0.042 ns | -0.054 ns | -0.76 ns | -0.06 ns |
| Education level | 0.479** | 0.415** | 0.478** | 0.488** | 0.470** |
| Professional experience | 0.669** | 0.614** | 0.572** | 0.668** | 0.623** |
| Disaster medicine course | -0.298** | -0.256** | -0.337** | -0.310** | -0.293** |
| Instructor | 0.368** | 0.366** | 0.330** | 0.391** | 0.350** |
| Prior major incident experience | 0.321** | 0.375** | 0.269** | 0.318** | 0.373** |
| Frequency of training | -0.081 ns | 0.018 ns | -0.066 ns | -0.041 ns | -0.015 ns |

## Discussion

The primary finding of this study reveals that all registered nurses (RNs) tended to overrate their preparedness for major incidents. Their self-assessment placed them at a level considered "less than competent" according to Benner's stages of clinical competence, but notably higher than their Total Disaster Competency score, which leaned towards the "advanced beginner" stage rather than "competent." (Curran-Sills & Franc, 2017)

Regarding the self-assessment of competency for rare events, particularly in disaster preparedness, the means across the three subdimensions indicated a level of preparedness that was still "less than competent." This could be attributed to the infrequency of exposure to certain situations or medical conditions among emergency department (ED) RNs. For instance, aspects related to routine ED competencies (e.g., staffing, equipment, and protocols) reflected higher scores compared to competencies concerning rare events such as chemical spills or pandemics, which scored lower. (Veenema et al., 2017)

Additionally, the study found that many ED RNs have limited experience with pediatric patients, leading to lower scores in the "specific patient groups" subdimension. This gap between experience and knowledge may arise from the usual referral of pediatric cases to specialized hospitals, minimizing ED nurses' exposure to these cases. However, during major incidents, the usual patient flow may change dramatically, exposing ED RNs to a wider range of patients. (Langan et al., 2019)

The study also suggests that ED RNs may assume that normal standards apply during extraordinary circumstances, potentially impacting patient outcomes negatively. Furthermore, the self-assessment of competency for events with little or no prior experience may lead to underestimation of stress factors and overestimation of abilities, hindering proactive efforts to address knowledge gaps or improve skills crucial for managing such incidents. (Murphy et al., 2018)

Factors associated with ED RN preparedness include clinical experience, prior major incident experience, level of education, and being a trainer. While clinical and MI experiences were strongly correlated with disaster preparedness, formal disaster medicine education showed a negative correlation. This discrepancy might be attributed to the Dunning-Kruger effect, where individuals with limited awareness tend to overestimate their abilities. Conversely, those with higher expertise levels tend to have a more accurate self-assessment, aligning with previous findings linking accurate self-assessments to higher expertise levels. (Oztekin et al., 2016)

Enhancing ED RN disaster preparedness necessitates frequent training exercises that evaluate skills and knowledge interactively. This approach, coupled with quality educational methods, could significantly improve nurses' preparedness for managing major incidents. (Nilsson et al., 2016)

## Conclusion

The study achieved a high Cronbach's alpha of 0.989, indicating strong internal consistency. While such high alpha values may suggest item redundancy, refinement of the instrument likely contributed to this result, making it a reliable tool for assessing RNs' self-assessed disaster preparedness.

Generalizability of the results should be approached with caution due to the response rate, although it aligns with rates in similar studies. The conclusions highlight that ED RNs tend to rate their disaster competencies slightly lower than "competent," potentially indicating an overestimation of preparedness. However, RNs with formal disaster medicine education may have a more realistic assessment of their competencies. The findings also suggest that experience, training, and education positively correlate with disaster preparedness, with RNs holding advanced degrees possibly better equipped to handle challenges during major incidents.

## References

1. Waxman, D. A., Chan, E. W., Pillemer, F., Smith, T. W., Abir, M., & Nelson, C. (2017). Assessing and improving hospital mass-casualty preparedness: A no-notice exercise. Prehospital and Disaster Medicine, 32(6), 662–666.
2. Ben-Ishay, O., Mitaritonno, M., Catena, F., Sartelli, M., Ansaloni, L., & Kluger, Y. (2016). Mass casualty incidents - time to engage. World Journal of Emergency Surgery, 11, 8.
3. Turegano-Fuentes, F., Perez-Diaz, D., Sanz-Sanchez, M., & Ortiz Alonso, J. (2008). Overall assessment of the response to terrorist bombings in trains, Madrid, 11 March 2004. European Journal of Trauma and Emergency Surgery, 34(5), 433.
4. Leiba, A., Blumenfeld, A., Hourvitz, A., Weiss, G., Peres, M., & Laor, D., et al. (2005). Lessons learned from cross-border medical response to the terrorist bombings in Tabba and Ras-el-Satan, Egypt, on 07 October 2004. Prehospital and Disaster Medicine, 20(4), 253–257.
5. Naser, W. N., Ingrassia, P. L., Aladhrae, S., & Abdulraheem, W. A. (2018). A study of hospital disaster preparedness in South Yemen. Prehospital and Disaster Medicine, 33(2), 133–138.
6. Djalali, A., Castren, M., Khankeh, H., Gryth, D., Radestad, M., & Ohlen, G., et al. (2013). Hospital disaster preparedness as measured by functional capacity: A comparison between Iran and Sweden. Prehospital and Disaster Medicine, 28(5), 454–461.
7. Curran-Sills, G., & Franc, J. M. (2017). A pilot study examining the speed and accuracy of triage for simulated disaster patients in an emergency department setting: Comparison of a computerized version of Canadian Triage Acuity Scale (CTAS) and Simple Triage and Rapid Treatment (START) methods. Canadian Journal of Emergency Medicine, 19(5), 364–371.
8. National Board of Health and Welfare. (2017). Regional Disaster Medicine Preparedness Plan for Stockholm, Sweden (Regional katastrofmedicinsk beredskapsplan for Stockholm lans ¨ lansting). Stockholm, Sweden.
9. Barbisch, D. F., & Koenig, K. L. (2006). Understanding surge capacity: Essential elements. Academic Emergency Medicine, 13(11), 1098–1102.
10. Schultz, C. H., & Koenig, K. L. (2006). State of research in high-consequence hospital surge capacity. Academic Emergency Medicine, 13(11), 1153–1156.
11. Hick, J. L., Barbera, J. A., & Kelen, G. D. (2009). Refining surge capacity: conventional, contingency, and crisis capacity. Disaster Medicine and Public Health Preparedness, 3(2 Suppl), S59–S67.
12. Veenema, T. G., Deruggiero, K., Losinski, S., & Barnett, D. (2017). Hospital administration and nursing leadership in disasters: An exploratory study using concept mapping. Nursing Administration Quarterly, 41(2), 151–163.
13. Langan, J. C., Lavin, R. P., Griffin, A. R., Veenema, T. G., & Dobalian, A. (2019). From brainstorming to strategic plan: The framework for the society for the advancement of disaster nursing: A work in progress. Nursing Administration Quarterly, 43(1), 84–93.

14. International Council of Nurses. (2019). Core Competencies in Disaster Nurse: Version 2.0. Geneva, Switzerland: ICN - International Council of Nurses.
15. Veenema, T. G., Griffin, A., Gable, A. R., MacIntyre, L., Simons, R. N., Couig, M. P., et al. (2016). Nurses as leaders in disaster preparedness and response–A call to action. Journal of Nursing Scholarship, 48(2), 187–200.
16. Judge, T. A., Jackson, C. L., Shaw, J. C., Scott, B. A., & Rich, B. L. (2007). Self-efficacy and work-related performance: The integral role of individual differences. Journal of Applied Psychology, 92(1), 107–127.
17. Swedish Civil Contingencies Agency. (2019). National Risk and Ability Assessment. Stockholm, Sweden: Swedish Civil Contingencies Agency.
18. Centers for Disease Control and Prevention. (2020). Public Health Emergency Preparedness (PHEP) Cooperative Agreement.
19. Cole, M. J., Zhang, X., Jinging, L., Liu, C., Belkin, N. J., Bierig, R., & Gwizdka, J. (2010). Are self-assessments reliable indicators of topic knowledge? Proceedings of the American Society for Information Science and Technology, 47, 1-10.
20. Nilsson, J., Johansson, E., Carlsson, M., Florin, J., Leksell, J., Lepp, M., et al. (2016). Disaster nursing: Self-reported competence of nursing students and registered nurses, with a focus on their readiness to manage violence, serious events, and disasters. Nurse Education in Practice, 17, 102–108.
21. Oztekin, S. D., Larson, E. E., Akahoshi, M., & Oztekin, I. (2016). Japanese nurses' perception of their preparedness for disasters: Quantitative survey research on one prefecture in Japan. Japan Journal of Nursing Science, 13(3), 391–401.
22. Garbutt, S. J., Peltier, J. W., & Fitzpatrick, J. J. (2008). Evaluation of an instrument to measure nurses' familiarity with emergency preparedness. Military Medicine, 173(11), 1073–1077.
23. Wisniewski, R., Dennik-Champion, G., & Peltier, J. W. (2004). Emergency preparedness competencies: Assessing nurses' educational needs. Journal of Nursing Administration, 34(10), 475–480.
24. Hodge, A. J., Miller, E. L., & Dilts Skaggs, M. K. (2017). Nursing self-perceptions of emergency preparedness at a rural hospital. Journal of Emergency Nursing, 43(1), 10–14.
25. Alzahrani, F., & Kyratsis, Y. (2017). Emergency nurse disaster preparedness during mass gatherings: A cross-sectional survey of emergency nurses' perceptions in hospitals in Mecca, Saudi Arabia. BMJ Open, 7(4), e013563.
26. Baack, S., & Alfred, D. (2013). Nurses' preparedness and perceived competence in managing disasters. Journal of Nursing Scholarship, 45(3), 281–287.
27. Seyedin, H., Abbasi Dolatabadi, Z., & Rajabifard, F. (2015). Emergency nurses' requirements for disaster preparedness. Trauma Monthly, 20(4), e29033.
28. Murphy, J. P., Radestad, M., Kurland, L., Jirwe, M., Djalali, A., & Ruter, A. (2018). Emergency department registered nurses' disaster medicine competencies: An exploratory study utilizing a modified Delphi technique. International Emergency Nursing.