Disaster Nursing Competency of Intensive Care Nurses in Jinan, China: A Multicenter Cross-sectional Study

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Abstract

Patients in disaster areas require the most urgent assistance. In recent large-scale natural disasters, intensive care nurses have served as an important reserve component of disaster response teams. In disaster nursing, ability and attitude directly affect the quality and effectiveness of disaster rescues. However, few studies have examined the disaster nursing competency of intensive care nurses in China. This study was designed to describe the current status of disaster nursing competency among intensive care nurses, analyze the related factors affecting the disaster response effectiveness, and evaluate the values of disaster nursing continuing education and training in cultivating professional personnel with disaster emergency rescue competence.

Keywords: Nursing • Intensive care • Cross-sectional study

Introduction

This cross-sectional study was conducted at six tertiary general government hospitals in Jinan, Shandong Province, China. A convenience sampling method was adopted, and the Wenjuanxing website was used to compile the network questionnaire, which participants completed *via* a WeChat group. Descriptive, correlation, and regression analyses were performed using SPSS software. The participants in this study included 285 registered intensive care nurses employed at six hospitals in Jinan. Most were female (77.9%), and the mean age was 29.9 years. The mean total disaster nursing ability score was 122.98 (SD=31.70), and the average scores for each item ranged from 2.78 to 3.70. The incident command system item earned the highest mean score (3.70, SD=1.22), followed by triage (3.24, SD=0.93). The biological preparedness item earned the lowest mean score (2.78, SD=1.04). Being male, being <30 years old, having an understanding of disaster nursing, having previously participated in disaster emergency simulation drills or training, and having a higher self-evaluation of rescue competence were all associated with higher disaster-nursing knowledge scores. Multiple linear regression analyses indicated that understanding of disaster nursing and experience participating in disaster emergency rescue drills or training had the most significant influence on the disaster nursing emergency knowledge score, followed by positive self-evaluation of disaster nursing ability and demand for training [1-5].

The findings of this study indicate that the participants had a moderate disaster-nursing competency and that this competency may be improved through disaster-related continuing education and training. The cognitive attitude of disaster nursing was found to correlate positively with self-efficacy. Simulated emergency drills may effectively improve the disaster nursing competency of critical care nurses. The findings emphasize that experiences other than direct clinical practice such as specialized simulated emergency drills and training as well as willingness for such training are stronger factors for identifying and developing overall disaster nursing competency [6].

Disaster nursing competency refers to the comprehensive knowledge, skills, and behaviors required by nurses to prepare for and respond to the real and potential threats of chemical, biological, radiation, nuclear, and hazardous explosion events; manmade accidents; natural disasters; and other related events. As an indispensable team in disaster relief, nurses play an increasingly important role in disaster prevention, response, and victim recovery. However, previous studies have shown that most nurses worldwide are not adequately prepared to deal effectively with disaster situations. Only a few studies have addressed the question of effective disaster preparedness among nurses, underscoring the need for more research on this topic [7].

With disasters and public health emergencies occurring with increasing frequency, nurses comprise the largest healthcare workforce, and opportunities exist to strengthen disaster readiness, enhance national surge capacity, and build community resiliency to disasters. The best way to increase and maintain response capacity and ensure the sustainability of this capacity is through workforce development. Competency-based disaster nursing programs, standardized disaster curricula, training guidelines, and performance measures are required across all levels of nursing personnel. These competencies help ensure that every nurse has the foundational ability to respond at a basic level and keep themselves and their patients safe. Only by mastering disaster care capabilities can nurses be full of hope, more confident, and more effective in dealing with complex and difficult disasters. Hope can be a life-sustaining force for all nurses and for those in their care. Intensive care nurses (ICNs), accounting for up to 45% of the medical retrograde rescue teams during the COVID-19 pandemic in Wuhan, China, played an important role in disaster and epidemic control. During small-scale disaster events, ICNs are involved mainly in the treatment of critically ill patients transferred to the hospital. During large-scale disaster events, ICNs are also dispatched to provide disaster relief assistance in the disaster area. At present, surveys of disaster preparedness have focused mostly on nurses or emergency department nurses, with little attention given to ICNs. The competency of ICNs in terms of disaster nursing ability is an issue that is not clear in the literature. Therefore, the purpose of this study was to explore the current situation of ICNs' disaster nursing competence and its influencing factors to provide a reference for related training improvement and a basis for future disaster rescue manpower allocation [8].

A convenience sampling method was adopted in this study. With the assistance of the Shandong Provincial Nursing Association, the authors contacted head nurses in the intensive care units of six tertiary, a general hospitals in Jinan. The head nurses organized their units' participation in the investigation after obtaining their consent, and 285 registered intensive care unit nurses from the six target hospitals were enrolled as participants. The study data were obtained using a survey published on the Wenjuanxing, which is a questionnaire survey platform in China. This study was approved by the ethics committee of Qilu Hospital of Shandong University (No. KYLL-2019 [KS]-80), and informed consent was obtained from the participants, who were all volunteers [9].

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From July 11, 2019, to July 13, 2019, the 295 participants were selected using a convenience sampling method based on the following inclusion criteria: (a) being a registered nurse, (b) being currently employed in a hospital, and (c) agreeing to participate. The exclusion criteria included (a) being an advanced nurse, (b) working on a rotating shift schedule, (c) being a student nurse, (d) not holding a nurse qualification certificate, (e) being on sick or maternity leave, and (f) submitting an incomplete questionnaire.

All of the assessments were completed by the researcher and a co-investigator. The Wenjuanxing website was used to compile the results of the online questionnaire. The link address corresponding to the online questionnaire was sent to the head nurses of the intensive care unit of the six hospitals, and the purpose, content, method of completion, and survey precautions were explained. After obtaining the consent of the participants, the questionnaires were allocated to the head nurses in each intensive care unit in batches. The head nurse of each intensive care unit then sent the link address to the WeChat group, and the participants completed the questionnaire. A unified instruction language was used in the questionnaire, which could not be submitted until all of the questions were answered. Submissions of the questionnaire were done anonymously and voluntarily, and completion took less than 15 minutes. At the end of the survey, completed questionnaires were assessed to eliminate data that did not meet the inclusion criteria. All valid data were then downloaded into the IBM SPSS Statistics 22.0 software program for analysis.

IBM SPSS Statistics 22.0 was used for data processing. The total score of disaster nursing ability of ICNs was divided by the six dimensions. Disaster nursing knowledge scores were compared in terms of demographic and professional status. Descriptive analysis was performed first, with results described by category using frequencies and percentages. The measured data were represented by mean and SD. Intergroup comparisons were performed using direct testing or one-way analysis of variance. Multivariate linear regression analysis was used to assess the factors influencing the participants' knowledge score, with $p < .05$ considered statistically significant.

Two hundred ninety-five questionnaires were issued and collected. Ten questionnaires were invalidated, leaving data from 285 valid questionnaires available for data analysis (recovery rate: 96.6%). The average time taken to complete the questionnaire was 6.18 minutes. Of the 285 participants, 222 were female and the average age was 29.9 (SD = 5.7) years. Two hundred seventy-three held bachelor's degrees or higher (95.8%), and 47 (16.5%) held middle or senior professional titles. Moreover, 122 were senior (including N3 and N4) nurses (42.8%). A detailed demographic description of the sample.

The scores for disaster nursing knowledge, which are used to measure disaster nursing ability, were compared among the 285 participants. No statistical difference was found in terms of "educational level," "job title," "critical care specialist nurse," and "experienced disasters and types" ($p > 0.05$). However, significant differences were found between the two groups "male or female," "less than 30 years or 30–50 years," "understanding disaster care or not," and "participate in disaster relief drills or not" ($p < 0.05$). The average scores of senior professional nurses were significantly higher than those of junior professional nurses (nurses and nurse practitioners; $p < 0.05$). Of note, the scores of N1 level nurses were significantly higher than those of N3 level nurses ($p < 0.05$). When assessing continuing education and training of disaster nursing knowledge at different levels, the training scores of the participants who participated in hospital-level, city-level, or national training were significantly higher than those who had participated in provincial training ($p < 0.05$). Furthermore, the disaster nursing knowledge scores of nurses holding a positive self-evaluation of their nursing ability and training willingness were substantially higher than those with negative self-evaluations of the same ($p < 0.05$).

Discussion

Multiple linear regression was used to examine how the several independent variables (gender, age, understanding disaster nursing, participation in disaster relief and emergency drills, self-assessment of on-site disaster nursing ability, and willingness to receive training) related to one dependent variable (disaster-nursing emergency knowledge score). The inclusion criterion was 0.05, and the exclusion criterion was .10. The results of the multiple linear regression analysis showed "understanding disaster nursing," "participating in disaster relief and emergency drills," "receiving different levels of training," "self-assessment of on-site disaster nursing ability," and "willingness to receive training" to significantly affect disaster emergency knowledge scores ($R^2=0.84$, $p < 0.01$).

Conclusion

In this study, a self-assessment-based NDEKS was used to investigate the current situation in China regarding the disaster nursing competence of ICNs and related variables. The disaster nursing competency of ICNs was found to be below average. In addition, understanding of disaster nursing and experience in disaster emergency rescue drills and training were, together with positive self-evaluation of disaster nursing ability and demand for training, the variables found to most significantly affect the disaster-nursing emergency knowledge score.

Conflict of interest

None.

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