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ORIGINAL RESEARCH

National disaster preparedness and emergency response of nurses in Germany: An exploratory qualitative study

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Abstract

Aim: This study aimed to explore the German nurses' perceptions of their knowledge, roles and experience in the field of national preparedness and emergency response.
Methods: An exploratory qualitative design was used with open-ended questions during semi-structured interviews with qualified nurses currently working in hospitals. The setting of the study consisted of wards of different hospitals in three northern federal states of Germany. The data analysis was done by summarizing analysis of the contents. From a convenient sample of n=31 hospitals, n=13 nurses were included in the study.
Results: The median age of the participants was 45 years and 38% were female. Within the three professional socialization fields, knowledge, roles and experience, 17 themes were clustered.
Conclusion: Within the themes of knowledge, role and experience in national disaster preparedness and emergency response, similarities and differences were explored in comparison to international literature.

Keywords*: disaster management, disaster planning, disasters, emergencies, emergency preparedness, experience, knowledge, nurses, qualitative research, roles.*

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Conflict of interest: None declared

Introduction

Disasters have always been a challenge and disasters are to happen all over the world, including Europe and Germany. In the future, disasters will be likely to happen again all over the world. The situation in Germany may serve as an example for other European countries, when reviewing European disasters in past years and comparing the preceding situation to the current health and climatic situation.

A concrete current example is the COVID-19 pandemic that lead to disasters globally, including Europe.

Nurses already play a central role in disaster preparedness and management, as well as in emergency response, in many countries all over the world (1). All nurses, regardless of their level of professionalization, need to receive disaster preparedness education in their undergraduate and continuous nursing education, in order to have a great pool of nurses during a disaster. In Germany, the law on health care explicitly mentions that the training of nurses has to qualify to be actively involved in disaster preparedness and emergency response (2).

However, involvement in disaster preparedness and emergency response is neither a particular part of the formal qualification nor the regular professional practice of nurses in Germany (3).

Care providers are considered important protagonists of disaster preparedness and emergency response (4). In the literature, an essential role is allotted to nurses for integrating communicating efforts and for having role competencies in disaster preparation (5). Nurses are able to reduce premature death, impaired quality of life, and altered health status, which can be caused by disasters (5). Health care professionals, including nurses, are feeling responsible for responding to disasters. However, nurses' intention to respond to disasters, the needs of nurses who respond to disasters and other health emergencies, as well as the influence of the nursing shortage and the lack of education preparing nurses for disaster response are scarcely known (6).

In order to prepare for emergency response, education within the field of disaster nursing is essential. In the USA, before 2001, few nurses received any formal education in the areas of emergency preparedness or disaster response, unless they served in the military, worked as pre-hospital providers, were employed in a hospital emergency department, or participated in humanitarian disaster relief work (7). Occasionally, disaster nursing education is seldom provided at the basic nursing education level (8). It has become apparent, that there is a distinct need for disaster nursing curricula and for preparation of nursing faculty members to teach disaster nursing in order to adequately prepare nursing students for possible disaster situations in future (9). According to the World Health Organization and the International Council of Nurses, nurses, as the largest group of health care practitioners, need to develop competencies in disaster response and recovery, but training is often fragmented or not available (10).

In order to understand the essence of national disaster preparedness and emergency response for and of nurses as well as the meaning they give to this topic in Germany, the following research questions were formulated for providing nursing practice and nursing research with valuable information: 'How do German nurses perceive the educational system in the field of disaster nursing?', 'How do German nurses describe their role in the field of national preparedness and emer-

gency response?' as well as 'What is the experience of German nurses in the field of national preparedness and emergency response?'. Therefore, the aim of this study was to explore the knowledge, role and experience in national disaster preparedness and emergency response of German nurses.

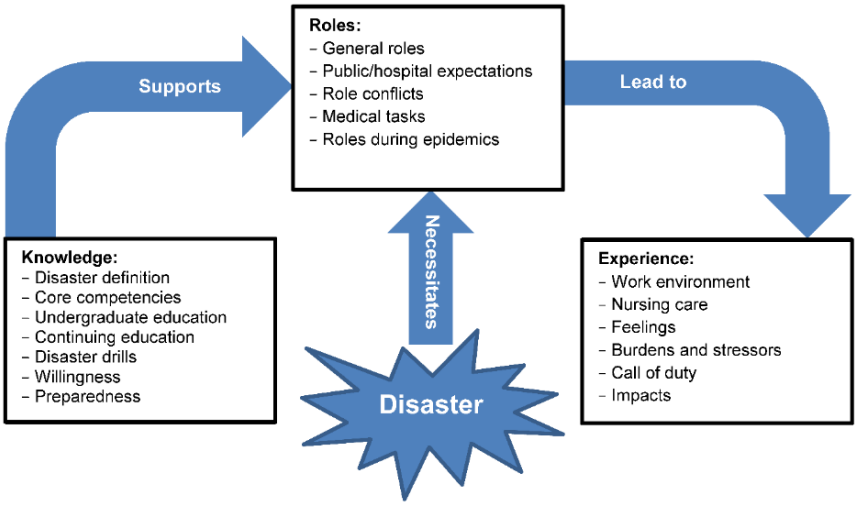
Methods

An exploratory qualitative design was used with open-ended questions during semi-structured interviews with qualified nurses currently working in hospitals.

Research design

The field of nursing care might be well described by lived experiences of nurses working in this field. In order to reach insight in these lived experiences, a careful description of ordinary conscious experience of everyday life is necessary. Based on the pre-formulated research aim, it was essential to identify preconceived beliefs and opinions to bracket out any presuppositions to confront the data in pure form (11). For not violating the inductive assumption of qualitative research, theory was used to focus the inquiry and to give it boundaries for comparison in facilitating the development of the theoretical or conceptual outcomes. This means that the conceptual framework of this research was used as a template, with which results will be compared and contrasted (Figure 1) (12). The conceptual framework consists of the three relevant fields of professional socialization: knowledge, roles and experience (13). According to the conceptual framework, knowledge in disaster nursing supports necessary roles during a disaster and having roles during a disaster leads to experience. Based on a literature review, sub-topics for each field have been identified (14). Basic interpretivist research was followed, in fact to gather qualitative data and to analyse their content in a way that experiences, as well as perceived general roles, tasks and responsibilities as well as knowledge of nurses in the topic under research can be best described and interpreted.

Figure 1. Conceptual framework [based on: Grochtdreis et al. (14)]



Setting and sample

The setting of the research was different wards of hospitals in three northern federal states of Germany (Bremen, Hamburg, Lower Saxony). Based on experience, for gathering enough data for a sufficient analysis, at least twelve qualified nurses were considered to participate in the study. In order to have a comparable gender distribution between the participants and qualified nurses in general, at least two male nurses were considered to take part in the research. In Germany, approximately 14% of qualified nurses were male in the year 2010 (15) and it was anticipated that the interpretation of experience of men and women is somehow different. Eligible participants were qualified nurses currently working in the field of nursing care. Furthermore, it was anticipated to select participants with different lengths of work experiences. The participants were not selected randomly, since it was more important to select people who will make good informants. Good informants were defined as knowledgeable, articulate, reflective, and willing to talk at length with the researcher (11). The basic approach of the sampling was a convenient approach, based on a volunteer sample out of all hospitals. The volunteer sample was put together from nursing managers of cooperating hospitals. In total, a convenient sample of n=31 hospitals was asked for participation. Of those, n=4 hospitals provided access towards potential participants (n=5 hospitals were willing to participate, n=9 hospitals were unwilling to participate, n=13 hospitals did not respond). Finally, n=13 nurses were included in the study.

Data collection

In order to elicit data in the study, nurses working in hospitals were asked identical open-ended questions during an interview. The specific questions were developed out of a literature review on nurses' roles, knowledge and experience in national disaster preparedness and emergency response (14). Based on relevant topics extracted from the literature review, a semi-structured interview guideline with open-ended questions was developed and pretested (11,16,17). During the interviews (male interviewer, TG), it was given as much time as needed to narrate to the questions of the interview guideline. All interviews were audio taped with a digital recording device and transcribed using the computer software f4 (dr. dresing & pehl GmbH, Germany) (18).

Ethical considerations

The ethical review committee of University of Bremen ascertained no reason for an objection of the study. All interviewees gave written informed consent. A description of the purpose of the study was made available during recruitment, reiterated in writing within the consent form and verbally before each interview. Withdrawal of consent without personal consequence was possible at any time point and participants were aware of their freedom. Confidentiality of participation was secured and participants were made aware of the anonymization of personal information.

Data analysis

The data analysis was accomplished by using summarizing analysis of the contents of semi-structured interviews using Mayring's method (TG) (19). Therefore, the interviews have been open coded as a first step, using the computer software MaxQDA 11 (VERBIGmbH, Germany) (20,21). Out of these coded text parts paraphrases have been created. In a next step, these paraphrases were abstracted. Synonymous paraphrases were

deleted. These two last steps were repeated until a satisfactory level of abstraction was reached (19). Based on these abstracted statements, themes were developed, which were validated by the original text passages. All analyses were based on texts in its original language, translation into English took place while the first abstraction of paraphrases. As all interviews were conducted in German, presentation of original quotations in the results was waived.

Results

Participant characteristics

Characteristics of the participants are presented in Table 1. The median age was 45 years (interquartile range 5) and 38% were female. The specialty areas of nurses were emergency care (n=5), intensive care (n=4), internal medicine (n=3) and orthopaedics (n=1). The median practical nursing experience was 21 years (interquartile range 9). The majority of participants (n=11) reported one or two job specializations, including specialization as head nurse (n=8) as well as in anaesthesia care and intensive care (n=5). Participation in disaster nursing-related continuing education programs was reported by five participants with a mean participation number of six education programs. Volunteer involvement in an aid organization was reported by two participants.

Disaster preparedness and knowledge

Within the first professional socialization field, knowledge, seven themes were clustered (Table 2).

Table 1. Participant characteristics (n=13)

Characteristics	Median (IQR)	N (%)**
Age: years	45 (5)	-
Work experience: years	21 (9)	-
Female sex	-	5 (38.5)
Specialty area		
Emergency care	-	5 (38.5)
Intensive care	-	4 (30.8)
Internal medicine	-	3 (23.1)
Orthopaedics	-	1 (7.7)
Job specialisation*		
Head nurse	-	8 (61.5)
Anaesthesia care and intensive care	-	5 (38.5)
Disaster-related continuing education	-	5 (38.5)
Volunteer involvement: n (%)	-	2 (15.4)

IQR: interquartile range
**Multiple response allowed*
***Absolute numbers and their respective percentages (in parentheses)*

Table 2. Identified themes of relevant topics

Topic	Themes
(I) Disaster preparedness and knowledge of German nurses	Definition of a disaster Knowledge and skills Undergraduate nursing education Continuing education programs Disaster drills Willingness to help Disaster preparedness
(II) Roles of German nurses during emergency response	General roles of nurses Expectations of society and the hospital Role conflicts Assignments of medical tasks Special roles during a pandemic influenza
(III) Disaster experiences of German nurses	Work environment Nursing care Feelings Burdens and stressors Call of duty Impacts

A dominant definition of a disaster was that disasters are man-made and technical. Furthermore, terror attacks, meteorological and natural disasters as well as biological and chemical disasters were described as possible disaster sub-groups. A majority of participants defined a disaster as a mass casualty incident, which is hardly controllable without external assistance and accompanied by severe personal and material damage. Alternatively, disasters were defined as a situation with a large number of affected and/or killed people as well as an unpredictable, sudden and challenging event, lasting for a longer time.

Knowledge and skills were perceived as highly necessary regarding disasters. Knowledge about the hospital emergency action plan and the corresponding roles during a disaster was considered essential. Additionally, knowing the hospital structures such as the hospital alarm system, the triage system and the supplies maintenance as well as knowing the federal state law for disaster control and about the duty to report to work were assumed important. Emotional skills, communicative and organizational skills, and professional skills were considered important for disaster preparedness.

According to the participants, undergraduate nursing education did not address disaster nursing, yet emergency care and trauma care nursing has been addressed. However, communicative and organizational skills as well as certain professional skills are well trained in undergraduate nursing education. A future need for an explicit disaster nursing education for undergraduate nurses was addressed. A need for nurses to be continuously educated and trained in disaster nursing has been made clear. A minority of participants affirmed that training and education in disaster nursing would be existent in their own hospital.

The plurality of the participants stated that disaster drills had not been performed in their hospitals yet. However, nearly every partici-

pant saw advantages in regular and mandatory disaster drills, such as experiencing disasters in hospitals, recognizing roles and emotions during a disaster and practising and optimizing alerting, assembly, the hospital emergency action plan, communications and triage.

Willingness to help during a disaster was taken for granted and as an ethical obligation by almost all participants. Willingness and unwillingness to help were influenced by several factors, such as preparedness, prior disaster experience, the scope and type of the disaster or being personally affected by a disaster.

Professional disaster preparedness was perceived by barely half of participants, as they already had training in psychosocial emergency care, long-term caring experience or knowledge of the hospital emergency action plan and medical care. Furthermore, aspects of disaster preparedness were receiving regular education in disaster management and knowing the own roles during a disaster. Half of the participants felt personally prepared, due to volunteer activity in a disaster relief organisation, knowledge about behaviour during disasters or information of the own family.

Roles during emergency response

Within the second professional socialization field, roles, five themes were clustered (Table 2).

Most of the participants defined the following general roles during disasters: patient care, assistance during triage, on-scene command, setting priorities, communication, public relations, clearing of space for additional patients, recruitment and deployment of personnel. According to the participants, patient care will be reduced to psychological care and emergency care.

According to the majority of the participants, nurses are expected by society and the hospital to be willing to help and to stay able to cope during a disaster. Furthermore, nurses are expected to be prepared, knowledgeable and skilled and to give quick and high quality aid. In particular, the hospital was believed to expect professional care, psychological care, organizational capabilities, teamwork, courage and versatility during a disaster.

Participants identified conflicts between their professional and private, either when they would be personally hit by a disaster or when they were single parents, have an infant or were responsible for the care of relatives.

The assignment of medical tasks, such as triage or tracheal intubation, was perceived as "realistic" by the majority of participants. However, others stated that they could not imagine performing medical tasks, such as diagnosis or the administration of drugs, during a disaster.

For the case of a pandemic influenza, participants identified that nurses were responsible for infection protection, hygiene, disinfection and of the correct use of personal protective equipment. Furthermore, nurses needed information about the course of epidemics, conduct case investigations and educate colleagues, patients and relatives about epidemics in order to calm their fears.

Disaster experiences

Within the third professional socialization field, experience, five themes were clustered (Table 2).

Almost all participants described a (potential) work environment in hospital during a disaster as being tense, chaotic, rushed, panicky as well as crowded with patients and relatives. Moreover, a disaster was described an exceptional situation for a hospital, accompanied

by an overwhelmed capacity. The work environment was also described as being disturbed by the military or the press.
Nursing care was described as possible to a limited extend and controlled by priorities. According to the participants, different nursing tasks were attributed to different groups of nurses during a disaster (Table 3).
Participants described six domains of feelings they may experience during a disaster: Excessive demands, fear and panic, feeling of horror, feeling of terror, feeling of incapability, as well as positive feelings, such as feeling of security and a good feeling of being able to help. Furthermore, the larger part of the participants agreed that disasters are or might be physically and psychically burdensome. Nurses described four domains of disaster burdens: disgusting conditions, work environment-related burdens, care-related burdens and disaster impact-related burdens.
The majority of the participants took it for granted to get to the hospital and to work beyond regular working hours when they would be called for duty during a disaster. In addition, there was almost no doubts that other nurses would get to the hospital, as well.

Table 3. Nursing tasks during disasters for different groups of nurses

Groups of nurses	Nursing tasks and characteristics
Nurses in general	Be on call for duty during a disaster Perform delegated medical tasks Support each other and work together High flexibility Ready to work for extended periods of time
Emergency nurses	Triage Emergency care dependent on triage section
Clinical nurses	Expansion of capacity by discharging patients Assurance of the availability of supplies Assurance of the availability of medicines and medical equipment Professional care for present and additional patients
Head nurses	Ensure readiness of nurses Organisation and decision-making Deploy nurses according to their qualifications

A specific part of the participants considered debriefing and giving feedback to the team after a disaster important in order to identify needs of colleagues. In addition, the evaluation of the disaster response and the processing of problems were considered important. The following professional impacts of a disaster were described: disaster experience, improving skills and knowledge as well as identification with the team and as a nurse. The following personal impacts of a disaster were described: strengthening personality, achievement of success, gratitude for life, nevertheless, also not wanting to experience another disaster anymore.

Discussion

Participants of the study were able to find definitions of disasters corresponding to the definition of Centre for Research on the Epidemiology of Disasters (22). Both definitions emphasized unpredictability, the sudden onset and the great personal and material damage. It is noteworthy that participants of the

current study mentioned that disasters are challenging local capacity, but not overwhelming it. Another study about nurses' perception of disaster identified similar attributes to disasters as the current study (e.g. being unpredictable, sudden, unexpected or unpreventable) (1).

Existing disaster nursing curricula set other priorities for education and training than the participants of the current study (23,24). Those curricula did not address the topics duty to work and hospital structures. However, there is strong consent in the need for disaster nursing undergraduate nursing education and continuing education programs among the current study and international studies (1,25-28). In the literature, regular and mandatory disaster drills were demanded (29,30), as they were expected to improve emergency response capabilities (31-33).

According to international studies, requirements for disaster preparedness were pre-registering in a disaster registry, having experience in disaster nursing and continuingly taking part in trainings and drills (1,31,33-37). Indeed, those requirements were in line with requirements stated in the current study. The requirements for personal disaster preparedness, however, deviated largely. In the literature, for instance, the following requirements were described: having a go-pack containing essential personal supplies, preparing and protecting the family and having a personal plan for times of disaster (31,32,34,37-40).

However, the majority of the nurses who participated in the current study did not feel personally prepared. And those who did, thought they were personally prepared, if they merely informed their families about their role in hospital during a disaster. For personal and professional preparedness and in order to raise willingness to respond, nurses need to pack their essential personal supplies standing by for emergencies, need to know that their families are protected and need to be registered in a disaster registry as well as know their relevant disaster plan. A personal disaster plan will help to arrange personal matters when responding to a disaster.

In contrast to the responses of the participants of current study, it has been occasionally described in international studies that nurses will definitely be assigned medical tasks (34,41). Furthermore, different roles special roles during a pandemic influenza, such as contact tracing, engaging in surveillance and reporting, collecting specimens or administering immunizations, were described elsewhere (32).

The disaster experiences described, for instance the descriptions of the (potential) work environment during a disaster, were in line with descriptions from other studies (33,42,43). However, potentially hazardous work environments due to inferred security or potentially lethal situations were not described by any participant of the current study (33). No other study did describe feelings potentially experienced during a disaster, as the current study did. One study described guilt when taking leave, concern about causing pain to patients, being overwhelmed by the tragedy, disgust and distress as feelings of nurses experienced during a disaster. Other studies described fear, stress and confusion (34), uncertainty, hopelessness, abandonment (44) and vulnerability (45) as feelings of nurses experienced during a disaster.

The participants of the current study described disgusting conditions as a dominant domain of burdens and stressors during a disaster. In the literature, however, excessive demands (e.g., due to lack of satisfaction of basic needs, due to decline of infrastructure) were the dominantly represented domain of

burdens and stressors during a disaster (33,44-49). In the aftermath of a disaster, both, positive and negative consequences of disaster experiences, such as improvement of professional competency and rethinking of the commitment to nursing, play an important role in the current study as well as in the international literature (50).

Limitations of the study

First, the gathering of qualitative data and the analysis of their content were based on texts in its original language to best describe and interpret their content. Translation of descriptions and interpretations of the content might have leaded to a distortion or transformation of their true meaning. Second, this study is not representative of the German nursing population, but it explored the field of the role, experience and knowledge in national disaster preparedness and emergency response. The results of this study may not be representative for healthcare systems and educational systems in other countries. Last, different from expectation, a majority of nurses who participated in the study were male. It is possible that experiences of women were not adequately reflected. Furthermore, participant characteristics have to be distinguished for its overly large number of nursing specialists in emergency care and intensive care.

Conclusion

The results of this exploratory qualitative study implied similarities but also differences in the knowledge, role and experience in national disaster preparedness and emergency response of German nurses, compared to other countries. There is a need of further research in order to further explore the knowledge, role and experience in a broader sample of nurses in Germany. The results of this explorative qualitative study can be used to design a national survey with representative samples in order to expand and validate its findings. Nurses need to get involved in all aspects of disaster management and need to receive proper education and training. It is imperative that nurses know about their duties and their roles, especially within the execution of medical tasks, before and during disasters and epidemics. Hospitals and federal states of Germany need to organize regular and mandatory disaster drills for nurses. Nurses themselves need to get informed about their possibilities for personal and professional disaster preparedness.

Close attention is needed on ethical aspects and the assumption of responsibility by nurses during disasters.

It is necessary that nurses know about feelings which can be created during disasters and have coping strategies for stressful and burdensome situations, which are applicable in exceptional circumstances and in the aftermath, as well. Hospitals and the Federal State Offices for Civil Protection and Disaster Control need to be aware that not every nurse will anticipate getting to the hospital and having longer working hours during a disaster for self-evident.

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