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REVIEW

A Scoping Review of Nurses' Knowledge and Preparedness in Disaster Management in Saudi Arabia

Una revisión sobre conocimiento y la preparación de las enfermeras en la gestión de desastres en Arabia Saudita

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ABSTRACT

Nurses are the front-line responders to disasters. Providing them with sufficient knowledge, training, and preparedness is essential. Saudi Arabia, a country prone to numerous disasters, needs to enhance the training and preparedness of nurses and first responders to effectively respond to emergencies and minimize the impact on lives and the economy. The aim of this scoping review is to evaluate the preparedness of nurses and identify emerging trends in disaster nursing in Saudi Arabia. This review will serve as a foundation for future rigorous studies. A comprehensive search strategy was developed and implemented, sourcing studies from various online databases. Each study was evaluated for inclusion, followed by a critical appraisal. The key characteristics of the 13 included studies were charted, and the studies were then mapped onto the ICN framework. The key themes and patterns emerging from the appraisal were analyzed using the PAGER framework. In the discussion, the PAGER framework was expanded, incorporating insights from existing literature to identify gaps and develop avenues for future research. The implications of this research include recommendations to focus on experimental studies that investigate the most effective strategies for improving disaster preparedness among nurses.

Keywords: Disaster Management; Nurses' Knowledge; Nurses' Preparedness; Saudi Arabia; Scoping Review.

RESUMEN

Las enfermeras son las personas que responden en primera línea a los desastres. Es esencial brindarles los conocimientos, la capacitación y la preparación suficientes. Arabia Saudita, un país propenso a numerosos desastres, necesita mejorar la capacitación y la preparación de las enfermeras y los primeros intervinientes para responder de manera efectiva a las emergencias y minimizar el impacto en las vidas y la economía. El objetivo de esta revisión de alcance es evaluar la preparación de las enfermeras e identificar las tendencias emergentes en la enfermería de desastres en Arabia Saudita. Esta revisión servirá como base para futuros estudios rigurosos. Se desarrolló e implementó una estrategia de búsqueda integral, obteniendo estudios de varias bases de datos en línea. Cada estudio se evaluó para su inclusión, seguido de una evaluación crítica. Se trazaron las características clave de los 13 estudios incluidos y luego se mapearon los estudios en el marco del CIE. Los temas y patrones clave que surgieron de la evaluación se analizaron utilizando el marco PAGER. En el debate, se amplió el marco PAGER, incorporando conocimientos de la literatura existente para identificar lagunas y desarrollar vías para futuras investigaciones. Las implicaciones de esta investigación incluyen recomendaciones para centrarse en estudios experimentales que investiguen las estrategias más efectivas para mejorar la preparación ante desastres entre las enfermeras.

Palabras clave: Gestión de Desastres; Conocimiento de las Enfermeras; Preparación de las Enfermeras; Arabia Saudita; Revisión del Alcance.

INTRODUCTION

Most individuals have encountered the effects of various disasters, whether directly or indirectly. These include storms, earthquakes, wildfires, hurricanes, volcanic eruptions, cyclones, floods, tsunamis, terrorist attacks, stampedes, mass shootings, landslides, droughts, nuclear accidents, oil spills, chemical accidents, aviation disasters, or pandemics. Such events are often sudden and unpredictable, resulting in significant damage to the environment and suffering for affected populations.[1] In these critical situations, multidisciplinary teams are essential to address the challenges that arise. Healthcare professionals play a vital role during disasters, as their timely response can save lives and reduce mortality, particularly in scenarios that pose public health risks.[2,3] Nurses, in particular, are typically among the first responders to provide care to injured individuals.[3] They actively engage in relief planning, response, and recovery efforts during disasters.[4] Their key responsibilities encompass delivering first aid, administering lifesaving medications, triaging patients, allocating resources, and monitoring both the physical and mental health of victims—crucial tasks for minimizing life-threatening risks.[5] Although other emergency teams are also important, nurses are indispensable frontline healthcare workers whose contributions extend beyond clinical settings to disaster zones.

Disaster management is a complex process that requires more than mere presence at the scene to achieve positive outcomes. As frontline healthcare providers involved in disaster management alongside other stakeholders, nurses must possess adequate knowledge, training, and preparedness to respond effectively.[6] Understanding disaster management principles is essential for nurses, allowing them to assess the situation, provide mitigative services, triage patients, and facilitate inter-professional collaboration.[7] Insufficient knowledge and preparedness can lead to chaotic and ineffective responses.[8] Therefore, evaluating nurses' levels of knowledge and preparedness is crucial for effective disaster management.

Saudi Arabia has faced numerous disasters, resulting in high mortality rates and billions of dollars in economic losses. One notable incident, known as "Black Wednesday," occurred on November 25, 2009, in Jeddah, affecting over 25 000 people and leading to 125 fatalities, with damages exceeding $3 billion.[9] A post-event analysis revealed poor management and an inability to identify significant risks and hazards. Unfortunately, there is limited literature on disaster management in the Middle East, underscoring the need for a scoping review to establish a foundation for future studies within the Saudi Arabian context.

The review question—what does the existing literature reveal about nurses' knowledge and preparedness in managing disasters in Saudi Arabia? —is well-suited for a scoping review approach. This review aims to achieve three objectives: 1) to serve as a precursor to a systematic review, 2) to identify the types of available evidence regarding nurses' roles in disaster management, and 3) to pinpoint and analyze existing knowledge gaps in this area.[10]

The review employs the Population, Concept, and Context (PCC) framework to shape the topic and research question. The population (P) consists of nurses in Saudi Arabia, a relevant focus given that many nurses in the country lack adequate training and preparedness for managing disasters.[9,11] Since nurses are crucial healthcare providers in disaster scenarios, understanding their required competencies is essential. The review question encompasses two concepts (C): nurses' knowledge and preparedness, highlighting the importance of evaluating their capabilities in responding to disasters.[12] Geographically, the context (C) of the review is Saudi Arabia, as it pertains specifically to the population of interest, focusing on disaster management.

Aims

This scoping review seeks to identify emerging trends in disaster nursing within Saudi Arabia and to assess nurses' knowledge and preparedness in disaster management. The evidence gathered from the literature search will be critically evaluated, using the International Council of Nurses (ICN) framework for disaster nursing to highlight key themes and research gaps.[13] The review will analyze these patterns and advancements, while also offering implications and recommendations for future research.

METHOD

A predetermined set of eligibility criteria was established to define the characteristics of the sources included in this scoping review. To qualify for inclusion, the evidence must meet the following criteria:

- Publication Date: Only articles published within the last ten years (2013–2023) were considered

to ensure that the review reflects the most current evidence relevant to contemporary disaster management practices.

- Peer Review: Only peer-reviewed articles and published papers were included to ensure a comprehensive understanding of the literature from credible sources.
- Language: All sources were restricted to those published in English, facilitating universal access and comprehension without the need for translation.
- Content: Only complete papers were considered (abstracts were excluded) to provide a thorough context from all sections of the documents.
- Geographic Focus: Articles specifically addressing the Saudi context were included, as the target population consists of nurses practicing in Saudi Arabia.
- Study Type: Reviews were excluded to maintain focus on primary studies.

Online databases served as the primary sources of information for the scoping review. The key databases searched for evidence included MEDLINE (Medical Literature Analysis and Retrieval System Online), PubMed, CINAHL (Cumulative Index to Nursing and Allied Health Literature), and EMBASE (Excerpta Medica Database). These databases were prioritized due to their prominence in medical research.[14,15] The most recent search was conducted on September 2, 2023, and no additional contacts were made with authors to seek further sources. The reference lists of the retrieved studies were sufficient for conducting a secondary search to verify compliance with the eligibility criteria.

The search strategy for the literature was systematically developed to be as comprehensive as possible, considering time and resource constraints. This comprehensive approach aimed to identify both published and unpublished literature (white and grey literature) on the review topic, ensuring that all relevant information was captured.

The first step in the evidence search involved developing key search terms. Initial keywords were derived from the research topic, including "nurses," "knowledge," "preparedness," "disaster management," and "Saudi Arabia." MeSH terms were employed to expand these keywords, and a combination of terms was constructed using Boolean operators 'AND' and 'OR' as follows:

['Nurse' OR 'Nurses' OR 'Nursing'] AND ['Knowledge' OR 'Awareness' OR 'Level of Knowledge'] AND ['Preparedness' OR 'Readiness'] AND ['Disasters' OR 'Disaster Nursing' OR 'Mass Casualty Incidents' OR 'Natural Disasters' OR 'Disaster Planning' OR 'Crisis' OR 'Catastrophe'] AND ['Saudi Arabia' OR 'Arabia' OR 'Kingdom of Saudi Arabia' OR 'KSA'].

The search parameters included English language, Saudi context, publication dates (2013–2023), and full-text articles. The search strategy was implemented in four steps across all databases:

An initial search using the keywords was conducted on each database to retrieve relevant sources.

The search results were validated and peer-reviewed to ensure compliance with the eligibility criteria.

The reference lists of the retrieved articles were progressively reviewed to identify additional relevant sources.

The evidence selection process, illustrated in the PRISMA flow diagram in the results section, involved screening to eliminate sources that did not meet the inclusion criteria. This screening was conducted independently, starting with titles, followed by abstracts, and finally the full texts. This approach ensured that duplicates were removed, and only relevant titles were included. The next step involved verifying that the eligibility criteria were met before proceeding to data charting.

Data charting was performed to create a logical and descriptive summary of the findings from the included sources. Due to time constraints, a new charting form could not be developed, and instead, the form used was adapted from Arksey, O'Malley.[16] Key information for charting included authors, publication year, study location (all studies focused on Saudi Arabia), intervention, study population, research aims, methodology, and significant results.[16] Since all included studies employed a cross-sectional design, the chart was modified to exclude intervention/comparators/duration and outcome measures. The data charting process was conducted independently without duplication, and as the data were directly retrieved from the articles, no confirmation from the authors was necessary.

Specific variables relevant to the research topic guided the data collection. The first variable was nurses' knowledge of disaster management, encompassing their understanding of mitigation strategies and their ability to engage in disaster response and recovery. This knowledge is expected to be gained through nursing education, practical drills, training in disaster management, and overall experience in the field, all aimed at minimizing life-threatening risks for disaster victims.[5] The second variable was nurses' preparedness for disaster situations, which refers to their capacity to respond effectively to disasters and includes building confidence and commitment to actions taken before a disaster occurs to mitigate negative outcomes.[17]

A critical appraisal of the included sources was conducted to address issues related to validity, ethics, reporting, and applicability.[18] The JBI critical appraisal checklist for analytical cross-sectional studies was utilized for evaluating the included articles. The outcomes of this appraisal are vital for the evidence

synthesis stage, as the quality of the included studies will inform the conclusions drawn by the reviewer.

RESULTS

The search conducted on the four databases (MEDLINE, PubMed, CINAHL and EMBASE) led to the retrieval of multiple articles associated with the key words. These sources of evidence were assessed, screened, checked for eligibility, others excluded, and a final list of articles meeting the inclusion criteria included. See the PRISMA flow diagram (figure 1) outlining the selection procedure.

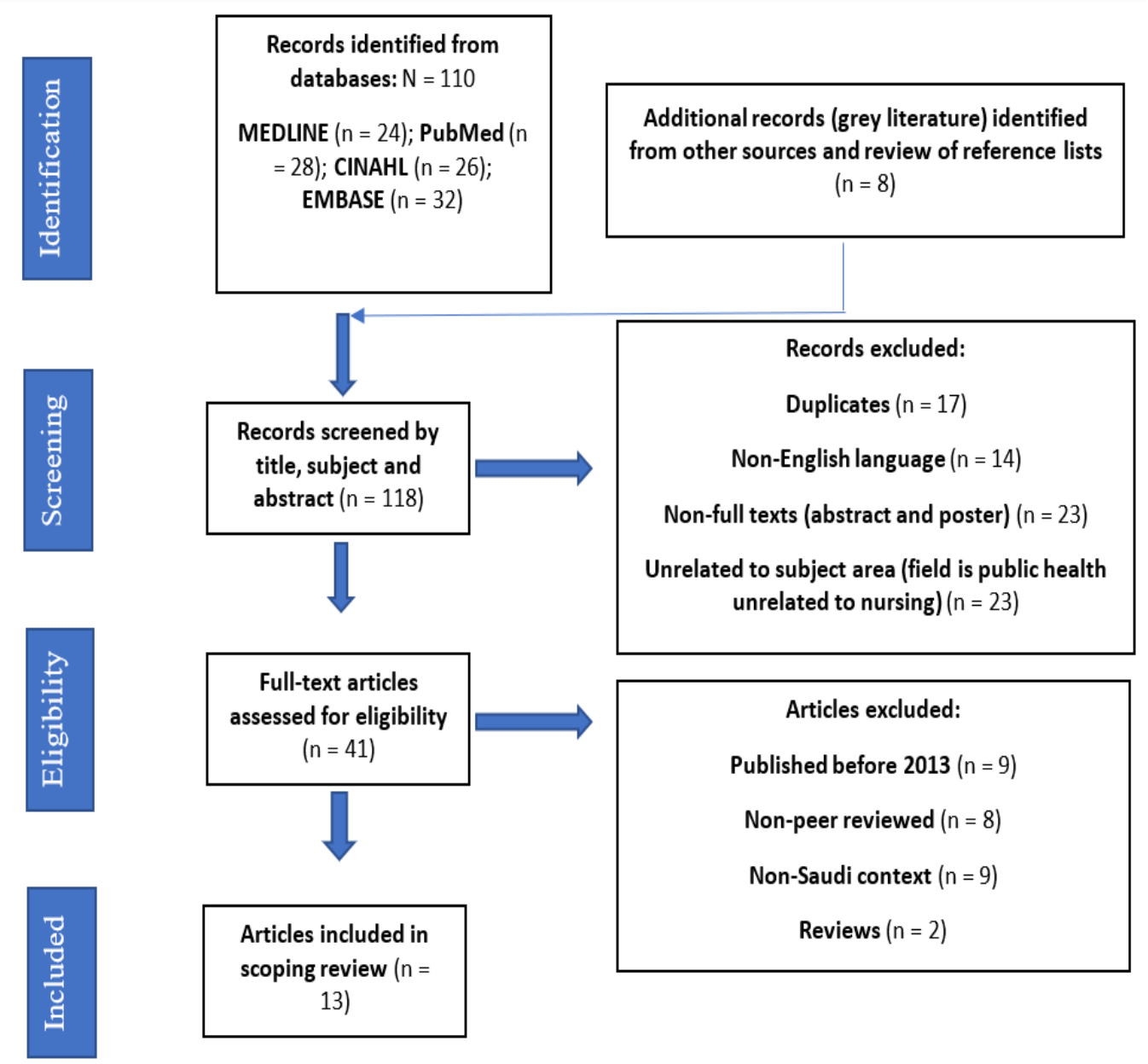

Figure 1. PRISMA-ScR flow diagram for evidence selected

The evidence identification process (figure 1) led to the inclusion of thirteen studies (n = 13), which met the eligibility criteria.[9,11,19-29] Table 1 summarizes the evidence in five columns including authors/year, aims/purpose, population and sample size, methodology/methods, and important results, respectively.

The 13 sources of evidence were appraised using the JBI critical appraisal checklist for analytical cross-sectional studies (table 2). There were several similarities in the results for all the 13 articles. For instance, all studies clearly defined the criteria for inclusion in the sample, study subjects and settings were always described, and appropriate statistical analysis was used in all cases. Confounding factors and strategies to deal with them were not stated. Finally, measurement of exposure and outcomes were evaluated for validity and reliability by assessing if any external or internal validation strategies were implemented.

Table 1. Results Summary

	Author(s), year	Aims/purpose	Population and sample size	Methodology/methods	Key Study Measures	Important results
1	Abuadas and Albikawi (2022) [19]	To evaluate the perception of nurse's level of preparedness, skills and knowledge and to examine the effectiveness of a multivariate prediction model of factors influencing disaster preparedness	Population: Convenience sampling of all registered nurses from two government hospitals in southern KSA Sample size: 370 RNs	Cross-sectional design Data collected by using valid and reliable self-reported of questionnaires	Intrinsic Motivation - Perceived - Competence - Autonomy - Relatedness Extrinsic Motivation - Individual Differences Nurses' perception of disaster preparedness	Preparedness of disaster by nurses was influenced by disaster experience, disaster training, skills and knowledge among nurses, workplace participation and leadership ability and support. Organizational factors also play a hidden role in disaster preparedness of nurses.
2	Al Harthi et al. (2021) [11]	To determine the strategies that can be adopted in Saudi Arabia to improve disaster nursing	Population: Nurses in four hospitals in Taif governance, who were first-line responders to the current pandemic Sample size: 569 nurses	Cross-sectional design with principal component analysis (PCA)	Strategies for improving disaster nursing in Saudi Arabia	Actions for disaster preparedness include creating specific legislation, conducting drills for nurses, providing adequate equipment and clear communication
3	Al Thobaity et al. (2019) [9]	To explore the level of knowledge, sources of knowledge and skills of disaster management among military and civilian nurses	Population: All RNs from critical care, emergency departments and surgical units with at least 12 months of experience Sample size: 396 nurses	Quantitative, non-experimental descriptive design. Disaster Preparedness Evaluation Tool was used to collecting the data	The perceptions of nursing stuffs regarding preparedness for disaster of management and eight demo- graphic questions.	Nurses had moderate knowledge of disaster management with nurses in military hospitals being more knowledgeable than nurses in government hospitals.
4	Alshehri (2016) [20]	To establish the emergency nurses' level of preparedness in Saudi Arabia	72 emergency nurses from two government hospitals in Riyadh. Nurses had at least one year of work, experience in the ED and could read and write English.	Descriptive cross-sectional design using two survey tools from research literature	Saudi Arabian emergency nurses' preparedness for disasters.	The participants had minimal experience with disasters and did not have much confidence after encountering real experience
5	Alzahrani and Kyratsis (2017) [21]	To assess the role awareness, self-reported knowledge and skills of emergency nurses in response to disaster	106 RNs in emergency departments of four public hospitals in Mecca; non-probabilistic purposive sampling	Cross-sectional study, online survey	Knowledge, Awareness, skills and perceptions of emergency nurses in Mecca with regard to mass gathering disaster preparedness. Alzahrani and Kyratsis (2017)	Although nurses had high role awareness in disaster response, they portrayed limited awareness and knowledge of wider disaster preparedness plans
6	Asiri et al. (2022) [22]	To investigate the emergency nurses' level of disaster preparedness in the Aseer region	152 emergency department nurses	Descriptive facility-based study design Data collected through standardized, close-ended questionnaire through direct interview	Disaster preparedness, emergency nurses, continuous education	The nurses' level of disaster preparedness was below the set standard

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Table 1. Results Summary

	Author(s), year	Aims/purpose	Population and sample size	Methodology/methods	Key Study Measures	Important results
7	Ghazi Baker (2021) [23]	To assess the level of preparedness of nurses regarding disaster management based on their knowledge	Five government hospitals in Medina. 330 full-time nurses	Cross sectional study Data collected using Emergency Preparedness Information Questionnaire (EPIQ)	Nurses' preparedness for disaster management	The level of nurses' disaster preparedness was average. Training enhanced the level of disaster preparedness among the nurses
8	Baker (2022) [24]	To evaluate nurses' self-perceived competence and familiarity in disaster preparedness at personal and professional levels.	350 nurses from government hospitals in Medina	Cross-sectional exploratory design and emergency Preparedness Information Questionnaire (EPIQ) used for data collection	The self-perceived competence and familiarity of nurses in disaster preparedness	There was a perception of inadequate preparedness among nurses. Nurses' competence in disaster preparedness was impacted by being female, years of experience and being non-Saudi
9	Baker et al. (2019) [25]	To analyse Saudi nurses' disaster preparedness	350 nurses from government hospitals in Medina	Quantitative descriptive design; self-regulation survey	Age, gender, level of nursing of degree education, years of experience, received training of disaster management and participation in actual disaster event.	Nurses reported a satisfactory level of knowledge in disaster preparedness, while there was a neutral level of involvement and commitment.
10	Brinjee et al. (2021) [26]	To evaluate the most significant aspects of education and training needs concerning emergency preparedness among nurses in Taif hospitals	Population: Nurses working in ED in a public hospital in Taif Sample size: 210 ED nurses	The Cross-sectional survey used for data collection; data analysed using PCA of Quantitative, non-experimental, descriptive research design.	Nurses' most important training and education needs	The level of ED nurses' experiences impacted their knowledge of disaster preparedness concepts including disaster drills, disaster triage and incident management systems
11	Farghaly Abdelaliem et al. (2022) [27]	To assess and compare the level of knowledge of disaster management preparedness between physicians and nurses	636 nurses and 257 physicians from one hospital in Saudi Arabia	Cross-sectional study. Data collected using self-administered, online questionnaires.	Disaster management knowledge. Participants' socio-demographic data.	Participants were more knowledgeable on disaster preparedness compared to mitigation and recovery stages. Advanced disaster training is needed.
12	Ibrahim (2014) [28]	To investigate the knowledge, attitudes, practices and familiarity of nurses in relation to disaster and emergency preparedness.	252 of two (2) registered batches of bridging nursing students	Cross-sectional descriptive study	Demographic data, questionnaire for knowledge, attitude and practice to measure the preparedness of disasters and the familiarity of nurse's emergency information of questionnaire.	Significant difference found in attitude and practice involving disaster preparedness and familiarity with emergency preparedness. Low knowledge was reported among the participants in relation to disaster preparedness.
13	Nofal et al. (2018) [29]	To assess the ED staff's practices, knowledge and attitudes toward disaster and emergency preparedness	Population: ED staff at Tertiary health care hospital in central Riyadh Sample size: 189 (36 physicians and 162 nurses)	Cross sectional design and used a self-administered survey for data collection	ED doctors and nurses' level of knowledge, attitude as well as level of familiarity on disaster management.	The level of knowledge was satisfactory for doctors and nurses with neutral attitude and familiarity. Participants with at least 5 years of work experience demonstrated high levels of disaster and emergency preparedness.

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The International Council of Nurses, recognizing the important of nurses in the frontline of disasters, and the need to accelerate efforts to build the capabilities of nurses at all levels to be effective in disasters developed a disaster nursing competencies framework.[13] The framework describes eight domains that a nurse, at various experience levels, must be competent in. These domains include:

- Preparation and planning: actions that increase readiness and confidence in tasks to be carried out during a disaster.
- Communication: communicating effectively with different stakeholders
- Incident management systems: knowledge and practice of using multi-disciplinary structured disaster response teams.
- Safety and security: safe and secure practices during a disaster response.
- Assessment: gathering response and feedback on actions during a disaster.
- Intervention: actions towards patients and other stakeholders within the incident management of the disaster event.
- Recovery: actions taken to resume pre-event organizations and activities after a disaster.
- Law and ethics: legal and ethical frameworks for disaster nursing.

These competencies can be used as a framework for educational programs, to develop specific knowledge and skills, to evaluate employment-specific scenarios, as well as on an individual level to evaluate competencies of each nurse.[13] In this section, the ICN framework will be used to critically evaluate the papers, analyzing which domains are addressed by each paper. This can either be in the data collected, discussion or recommendations provided by each paper. The rationale for this is to identify domains of strength as well as domains that need further research or studies to improve disaster nursing in Saudi Arabia.

Table 2. Summarizes of the key domains according to the ICN framework for each paper

Paper/Domain	Preparation and Planning	Communication	Incident Management Systems	Safety and Security	Assessment	Intervention	Recovery	Law and ethics
Abuadas and Albikawi (2022) [19]	X	X						
Al Harthi et al. (2021) [11]	X	X		X	X			X
Al Thobaity et al. (2019) [9]	X		X			X		
Alshehri (2016) [20]	X					X		
Alzahrani and Kyratsis (2017) [21]	X		X			X		
Asiri et al. (2022) [22]	X	X	X	X		X		
Ghazi Baker (2021) [23]	X	X	X	X		X		
Baker (2022) [24]	X	X	X	X		X		
Baker et al. (2019) [25]	X							
Brinjee et al. (2021) [26]	X	X		X	X	X		
Farghaly Abdelaliem et al. (2022) [27]	X					X	X	
Ibrahim (2014) [28]	X	X		X				
Nofal et al. (2018) [29]	X	X			X			

The mapping of the studies makes it evident that all studies focused on preparedness and planning. The domain of law and ethics was only addressed by one study, who asked respondents if ethical knowledge of disaster preparedness should be a part of the education.[11] Similarly, only one study examined the importance of recovery after a disaster.[27] Communication, use of incident management systems, and interventions were the key domains addressed by the studies. By critically combining the domains, key results and appraisal, key themes emerge from the selected studies – the level of knowledge among nurses, the preparedness or perception of preparedness of the nurses, the strategies that can be used to improve disaster preparedness in nurses, as well as key gaps – attitudes and familiarity, and knowledge of disaster recovery, law and ethics.

Results of Individual Sources of Evidence

Level of knowledge Among Nurses

The review question seeks to understand the level of knowledge and preparedness among nurses in Saudi Arabia in the context of disaster management. Regarding the level of knowledge among nurses, Al Thobaity et al.[9] found that nurses had moderate knowledge of disaster management with nurses in military hospitals

being more knowledgeable than nurses in government hospitals. Baker et al. (2019) corroborated this finding by stating that nurses depicted satisfactory level of knowledge in disaster preparedness. Additionally, Farghaly Abdelaliem et al.[27] found that the participants were more knowledgeable on disaster preparedness as compared to the mitigation and recovery stages. However, on the contrary, some studies found that the participants demonstrated low knowledge of disaster preparedness.[21,28]

Preparedness of Nurses

On the aspect of preparedness, the reviewed evidence indicates low levels of preparedness among Saudi Arabian nurses on the practice of disaster management. According to Baker[24] nurses reported that their self-perceived level of preparedness to respond to a disaster was inadequate. Corroboratively, Asiri et al.[22] found that the nurses' level of disaster preparedness was below the set standard. In contrast, Ghazi Baker [23] asserted that the level of nurses' disaster preparedness was average among student nurses. The low level of preparedness among the nurses was influenced by different factors including work experience,[29] disaster preparedness concepts including disaster drills, disaster triage and incident management systems,[26] and years of experience, being female, and non-Saudi.[24]

Strategies to Improve Disaster Preparedness in Nursing

Most importantly, remedies were recommended to address the low level of knowledge and preparedness in disaster management among nurses in Saudi Arabia. Disaster experience, disaster training, skills and knowledge among nurses, workplace participation and leadership ability and support were recommended by Abuadas, Albikawi.[19] Al Harthi et al.[11] recommended creating specific legislation, conducting drills for nurses and clear communication.[11] Nevertheless, Alshehri[20] recommended reading the disaster plan and development of confidence as enablers of disaster management. These findings are essential for informing the next step to be undertaken to enhance the nurses' knowledge and preparedness in dealing with disasters in Saudi Arabia.

Key Gaps

Only one paper examined the attitudes and familiarity of nurses towards disaster preparedness.[29] Similarly, one source of evidence had disaster recovery, a key domain of disaster nursing, as one of the questions in the questionnaire.[27] Law and ethics, another key domain, only formed a minor part of one paper.[11]

Synthesis of Results

The PAGER framework was considered in the analysis and reporting of the charted data.[30] This section discusses the included evidence in terms of patterns, advances, gaps, evidence for practice, and research recommendations.[30]

Table 3. PAGER framework analysis and reporting of the charted data.[30]

Patterns	Advances	Gaps	Evidence for practice	Research recommendations
Nurses' self-perception of disaster preparedness	Studies show inadequate to moderate self-perceived competence in disaster preparedness. Several factors play a role in impacting self-perception, including level of experience, hospital type, gender, and cultural factors.[24]	There are inadequate studies showing causal relationships between factors such as level of experience, gender, and cultural factors and self-perception of disaster preparedness.	Experienced nurses from Saudi Arabian ethnicity may report the highest level of self-perceived disaster preparedness. Male nurses report lower self-perception compared to females.[24]	Interventional studies and studies with better methodological design (larger sample sizes) are needed to establish causal relationships between factors influencing self-perception and knowledge of disaster preparedness.
Nurses' knowledge and level of disaster preparedness	The knowledge of disaster preparedness is low to satisfactory in nurses, while the level of preparedness is below standard.[22, 24] Both knowledge and level of preparedness are influenced by experience.	Practical interventions that improve knowledge of disaster preparedness need to be studied and tested to show increase in knowledge levels empirically	Experienced nurses may have higher levels of knowledge and implementation practice of disaster preparedness.	Research that objectively demonstrates improved knowledge via interventions is needed.
Strategies to improve disaster preparedness in nursing	Disaster preparedness in Saudi Arabian nursing can be improved by improving education, equipment, communication skills and conducting disaster drills.[11,19]	There is a gap in understanding which strategy works better in the different demographics of nurses.	Number of strategies and policies can be used to improve disaster preparedness in nurses in Saudi Arabia.	Demographic-stratified studies which investigate the impact of various interventions such as drills, education, communication workshops and simulation scenarios are required to address the gap in understanding which strategies are most effective for each demographic.

Attitudes and familiarity with disaster preparedness	There is a discrepancy between familiarity with disaster preparedness and attitude towards disaster preparedness.[29]	The current literature does not show whether attitude and familiarity can be modified by interventions or whether there are any strategies to target attitude towards disaster preparedness.	Evidence to emerge from future research	Further research needs to be conducted to establish a relationship between attitude and knowledge, as well as stronger relationships between attitude and familiarity of disaster preparedness. Interventional studies need to be conducted to explore whether attitude can be modulated.
Knowledge of disaster recovery; and law and ethics	Knowledge of recovery after a disaster; as well as law and ethics pertaining to disaster management are not well understood [11, 27]	The recovery aspect after disasters is overlooked in current literature. Ethical aspects, such as utilitarianism also need to be studied more.	Evidence to emerge from future research	Further research needs to investigate the knowledge, level of preparedness, and involvement of nurses in recovery efforts. Studies also need to evaluate the knowledge of nurses surrounding law and ethics pertaining to disaster management

DISCUSSION

The objective of this scoping review was to assess the existing research on the knowledge and preparedness of nurses in Saudi Arabia regarding disaster management. All studies reviewed were conducted within the Saudi context and utilized a cross-sectional design. The synthesized themes from these studies include knowledge of disaster management, disaster preparedness, factors influencing preparedness and knowledge, and interventions aimed at enhancing nurses' disaster management skills (table 1). While some studies indicated that participating nurses possessed adequate knowledge and preparedness,[9,25,27] the majority revealed a concerning lack of both knowledge and preparedness among nurses in Saudi Arabia.[21,22,23,24] Work experience emerged as a significant factor affecting these levels of knowledge and preparedness.

All included studies employed quantitative methods, followed a cross-sectional methodology, and were published in the Saudi Arabian context. The emerging themes are consistent across the 13 studies and align with the review's objectives. These themes encompass knowledge of disaster management, disaster preparedness, factors influencing preparedness and knowledge, attitudes toward disaster preparedness, understanding of disaster recovery, relevant laws and ethics, and interventions to improve disaster management knowledge and preparedness among nurses (table 1).

Global dynamics are constantly shifting in response to emergencies caused by disasters around the world. Nurses have traditionally played a frontline role in disaster management, addressing the mental, physical, and emotional needs of affected populations.[31] Knowledge of disaster management and effective preparedness are critical for mitigating the negative impacts of disasters. For example, the COVID-19 pandemic highlighted significant weaknesses in global health systems, as many countries lacked the capacity to respond effectively to the crisis and implement necessary mitigation measures.[32] This underscores the importance of being prepared for such disasters to reduce associated morbidity and mortality.[33]

It is crucial for Saudi Arabian health systems to enhance their preparedness for potential disasters. While the country may not frequently experience multiple disasters, major incidents can occur, especially during events like Hajj. Consequently, health systems and all relevant practitioners, including nurses, must be equipped to respond effectively in such situations. Despite this need, evidence regarding the competency and preparedness of nurses in Saudi Arabia for disaster management remains limited (table 1). The articles included in this scoping review represent only a small fraction of the knowledge developed in this field over time. Nevertheless, the findings indicate low levels of knowledge and preparedness among nurses in Saudi Arabia, highlighting the need for further methodological advancements. Notably, all included studies utilized a cross-sectional design, suggesting a need for more diverse methodologies to expand the knowledge base in this area.

The limited number of published studies in this field indicates significant knowledge gaps that have persisted in recent years. Although the topic has received some attention, including the studies reviewed, various aspects remain underexplored. For instance, the factors affecting nurses' knowledge and preparedness for disaster management in Saudi Arabia have not been thoroughly investigated empirically. The lack of interventional studies and randomized controlled trials further emphasizes this gap. Additionally, there is insufficient understanding of the practical interventions necessary to enhance nurses' knowledge and preparedness in disaster management within the country. Future research should adopt more rigorous empirical designs capable of establishing causal relationships among variables, as cross-sectional studies cannot achieve this.

The review highlights the need for further studies to explore the root causes of the low levels of knowledge and preparedness among nurses regarding disaster management. It is recommended that future research utilize

diverse methodological approaches, including mixed methods and experimental designs. Overall, the findings contribute valuable insights to the body of knowledge in disaster management, revealing significant challenges and their underlying causes. Furthermore, the scoping review identifies research gaps essential for guiding future focus areas and methodological designs in this field.

Limitations

The review reveals critical insights into the preparedness of nurses in disaster management, but it is not without its limitations. One significant challenge is the generalizability of the findings, primarily due to the small number of hospitals sampled in each study. This limitation is compounded by the use of cross-sectional designs, which often lack follow-up data. As a result, it becomes difficult to assess long-term outcomes or establish clear cause-and-effect relationships between nurses' characteristics and their level of disaster management knowledge and preparedness.

Despite these challenges, the findings are valuable for a range of stakeholders, including nurses, disaster management agencies, hospital administrators, policymakers, and educators. They highlight the urgent need for nurses to enhance their knowledge and preparedness to effectively respond to disasters. This calls for the integration of disaster management training into nursing curricula and the promotion of effective drills and educational programs.

However, several limitations deserve attention. First, the use of small sample sizes limits the broader applicability of the results. Additionally, the predominance of non-probability sampling methods introduces selection bias, which can skew the findings. Some studies did not clearly define their sampling strategies, further complicating assessments of bias.

Moreover, the varied measurement tools employed across studies necessitate standardization to improve data reliability and validity. Finally, the reliance on self-reported data collection methods raises concerns about information bias, as participants may provide responses that do not accurately reflect their true knowledge or preparedness.

Addressing these limitations in future research could significantly enhance the robustness and applicability of findings in disaster management, ultimately leading to better preparedness among nurses and improved outcomes during emergencies.

Implications

Evidence from the reviewed studies indicate that there is low level of knowledge and preparedness among nurses in Saudi Arabia in relation to disaster management. This finding presents implications for disaster preparedness research in Saudi Arabia. The future research should address the existing methodological limitations (e.g., small sample sizes and use of cross-sectional studies) and adopt interventional designs. For practice, the implication is that there is the need to include disaster management in nursing education to prepare nursing students for practice. Additionally, relevant policies should be established within the healthcare system promoting drills and resource provision to advance nurses' knowledge and confidence in addressing disaster situations.

CONCLUSIONS

To improve the low levels of knowledge and preparedness in disaster management, several interventions are recommended, including conducting disaster drills, providing disaster training, enhancing communication, building confidence, and developing disaster management legislation. These findings highlight the crucial role of nursing practitioners in disaster management. A key concern is that nurses in Saudi Arabia need additional training in disaster management to better equip them for future emergencies. However, methodological advancements in this field appear to be progressing slowly. Notably, all the included studies employed a cross-sectional design, suggesting a need for more diverse methodological approaches to enhance the knowledge base in this area of research.

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REFERENCES

1. Azizpour I, Mehri S, Soola AH. Disaster preparedness knowledge and its relationship with triage decision-making among hospital and pre-hospital emergency nurses - Ardabil, Iran. BMC health services research. 2022;22(1):934. doi: 10.1186/s12913-022-08311-9.

2. Amberson T, Wells C, Gossman S. Increasing Disaster Preparedness in Emergency Nurses: A Quality Improvement Initiative. Journal of emergency nursing. 2020;46(5):654-65.e21. doi: 10.1016/j.jen.2020.05.001.

3. Rizqillah AF, Suna J. Indonesian emergency nurses' preparedness to respond to disaster: A descriptive survey. Australasian emergency care. 2018;21(2):64-8. doi: 10.1016/j.auec.2018.04.001.

4. Xue CL, Shu YS, Hayter M, Lee A. Experiences of nurses involved in natural disaster relief: A meta-synthesis of qualitative literature. Journal of clinical nursing. 2020;29(23-24):4514-31. doi: 10.1111/jocn.15476.

5. Firouzkouhi M, Kako M, Abdollahimohammad A, Balouchi A, Farzi J. Nurses' Roles in Nursing Disaster Model: A Systematic Scoping Review. Iranian journal of public health. 2021;50(5):879-87. doi: 10.18502/ijph.v50i5.6105.

6. Hasan MK, Younos TB, Farid Z. Nurses' knowledge, skills and preparedness for disaster management of a Megapolis: Implications for nursing disaster education. Nurse education today. 2021;107:105122. doi: 10.1016/j.nedt.2021.105122.

7. Emaliyawati E, Ibrahim K, Trisyani Y, Mirwanti R, Ilhami FM, Arifin H. Determinants of Nurse Preparedness in Disaster Management: A Cross-Sectional Study Among the Community Health Nurses in Coastal Areas. Open access emergency medicine : OAEM. 2021;13:373-9. doi: 10.2147/oaem.s323168.

8. Al Harthi M, Al Thobaity A, Al Ahmari W, Almalki M. Challenges for Nurses in Disaster Management: A Scoping Review. Risk management and healthcare policy. 2020;13:2627-34. doi: 10.2147/rmhp.s279513.

9. Al Thobaity A, Alamri S, Plummer V, Williams B. Exploring the necessary disaster plan components in Saudi Arabian hospitals. International Journal of Disaster Risk Reduction. 2019;41:101316. doi: https://doi.org/10.1016/j.ijdrr.2019.101316.

10. Mak S, Thomas A. Steps for Conducting a Scoping Review. Journal of graduate medical education. 2022;14(5):565-7. doi: 10.4300/jgme-d-22-00621.1.

11. Al Harthi M, Al Thobaity A, Almalki M, Al Ahmari W. Improving Disaster Readiness and the Response of Nurses in Saudi Arabia. Risk management and healthcare policy. 2021;14:4537-44. doi: 10.2147/rmhp.s325074.

12. Al Thobaity A, Plummer V, Innes K, Copnell B. Perceptions of knowledge of disaster management among military and civilian nurses in Saudi Arabia. Australasian emergency nursing journal : AENJ. 2015;18(3):156-64. doi: 10.1016/j.aenj.2015.03.001.

13. ICN: Core competencies in disaster nursing version 2 -International Council Of Nurses. https://www.icn.ch/sites/default/files/inline-files/ICN_Disaster-Comp-Report_WEB.pdf (2023). Accessed.

14. Gottlieb M, Haas MRC, Daniel M, Chan TM. The scoping review: A flexible, inclusive, and iterative approach to knowledge synthesis. AEM education and training. 2021;5(3):e10609. doi: 10.1002/aet2.10609.

15. Tittlemier BJ, Cooper J, Steliga D, Woodgate RL, Sibley KM. A scoping review to identify and describe the characteristics of theories, models and frameworks of health research partnerships. Health research policy and systems. 2022;20(1):69. doi: 10.1186/s12961-022-00877-4.

16. Arksey H, O'Malley L. Scoping studies: towards a methodological framework. International Journal of Social Research Methodology. 2005;8(1):19-32. doi: 10.1080/1364557032000119616.

17. Kimin A, Nurachmah E, Lestari F, Gayatri D. Factors affecting nurses' ability to provide effective care in a disaster response: a review. Journal of public health research. 2021;11(2). doi: 10.4081/jphr.2021.2732.

18. Goldstein A, Venker E, Weng C. Evidence appraisal: a scoping review, conceptual framework, and research agenda. Journal of the American Medical Informatics Association : JAMIA. 2017;24(6):1192-203. doi: 10.1093/jamia/ocx050.

19. Abuadas MH, Albikawi ZF. Predictors of disaster preparedness among registered nurses in Saudi Arabia:

A structural equation modelling analysis. Australasian emergency care. 2022;25(2):132-9. doi: 10.1016/j.auec.2021.07.004.

20. Alshehri B. Emergency nurses' preparedness for disaster in the Kingdom of Saudi Arabia. Journal of Nursing Education and Practice. 2016;7(3):101-14. doi: 10.5430/jnep.v7n3p101.

21. Alzahrani F, Kyratsis Y. Emergency nurse disaster preparedness during mass gatherings: a cross-sectional survey of emergency nurses' perceptions in hospitals in Mecca, Saudi Arabia. BMJ open. 2017;7(4):e013563. doi: 10.1136/bmjopen-2016-013563.

22. Asiri M, Sayed S, Almalki M, Alfaki M, Assiri A. Level of disaster preparedness among emergency nurses in Aseer Region, KSA. Journal of Research in Medical and Dental Science. 2022;10(3):1-9.

23. Ghazi Baker O. Preparedness assessment for managing disasters among nurses in an international setting: Implications for nurses. International emergency nursing. 2021;56:100993. doi: 10.1016/j.ienj.2021.100993.

24. Baker OG. Factors Affecting the Level of Perceived Competence in Disaster Preparedness among Nurses Based on their Personal and Work-related Characteristics: An Explanatory Study. Nigerian journal of clinical practice. 2022;25(1):27-32. doi: 10.4103/njcp.njcp_468_20.

25. Baker OG, Alamri AA, Aboshaiqah AE. A descriptive study to analyse the disaster preparedness among Saudi nurses through self-regulation survey. Journal of nursing management. 2019;27(7):1479-84. doi: 10.1111/jonm.12833.

26. Brinjee D, Al Thobaity A, Almalki M, Alahmari W. Identify the Disaster Nursing Training and Education Needs for Nurses in Taif City, Saudi Arabia. Risk management and healthcare policy. 2021;14:2301-10. doi: 10.2147/rmhp.s312940.

27. Farghaly Abdelaliem SM, Baghdadi NA, Al Anizi AS. A Cross-sectional Study About Nurses' and Physicians' Experience of Disaster Management Preparedness Throughout COVID-19. Disaster medicine and public health preparedness. 2022;17:e125. doi: 10.1017/dmp.2022.34.

28. Ibrahim FAA. Nurses Knowledge, Attitudes, Practices and Familiarity Regarding Disaster and Emergency Preparedness – Saudi Arabia. American Journal of Nursing Science. 2014;3(2):18-25. doi: 10.11648/j.ajns.20140302.12.

29. Nofal A, Alfayyad I, Khan A, Al Aseri Z, Abu-Shaheen A. Knowledge, attitudes, and practices of emergency department staff towards disaster and emergency preparedness at tertiary health care hospital in central Saudi Arabia. Saudi medical journal. 2018;39(11):1123-9. doi: 10.15537/smj.2018.11.23026.

30. Bradbury-Jones C, Aveyard H, Herber OR, Isham L, Taylor J, O'Malley L. Scoping reviews: the PAGER framework for improving the quality of reporting. International Journal of Social Research Methodology. 2022;25(4):457-70. doi: 10.1080/13645579.2021.1899596.

31. Isangula KG, Lyimo M, Ndungile Y, Robert E. Nurses' preparedness for disaster response in rural and urban primary healthcare settings in Tanzania. Rural and remote health. 2023;23(2):7547. doi: 10.22605/rrh7547.

32. Songwathana P, Timalsina R. Disaster preparedness among nurses of developing countries: An integrative review. International emergency nursing. 2021;55:100955. doi: 10.1016/j.ienj.2020.100955.

33. Yamashita M, Kudo C. How differently we should prepare for the next disaster? Nursing & health sciences. 2014;16(1):56-9. doi: 10.1111/nhs.12131.

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