ORIGINAL RESEARCH

Enhancing Nurses' Disaster Management and Preparedness: Evaluating the Effectiveness of an Online Educational Program Through a Quasi-Experimental Study

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Background: Disaster management is an ongoing international concern, and nurses play essential roles in minimizing negative impacts on the health of communities. However, many nurses have limited knowledge and skills on how to respond to disasters effectively. Therefore, this study was conducted to determine the effectiveness of a newly developed educational program on improving nurses' disaster management and preparedness.

Methods and Design: A quasi-experimental study was conducted on 88 nurses working at a public hospital. The educational program included six modules covering various aspects of disaster management. Pre-and post-tests were administered to evaluate changes in perceptions of disaster management competencies. Independent sample t-test, Pearson coefficient correlation, and One-way ANOVA tests were all run using SPSS.

Results: A significant proportion of nurses (78.4%) reported ongoing training in disaster management, while a smaller percentage (21.6%) expressed a contrary opinion. Nurses also had a moderate level of agreement with the disaster preparedness program (Pretest: 2.26 ± 0.34; post-test: 2.29 ± 0.31). Further, the results showed small improvements in nursing perceptions of the operational plan after the educational program (Pretest: M=2.76, SD=0.63; Post-test: M=2.89, SD=0.44), although the differences between pre-and-post assessments were not significant ($P > 0.05$). The mean values for overall familiarity in the pre-test were 3.16 ± 1.39, while in the post-test, they slightly increased to 3.26 ± 1.18. The findings also showed no statistically significant differences reported in nurses' attitudes and familiarity towards disaster preparedness based on the gender, marital status, nationality, working shifts, and working hours variables ($P > 0.05$).

Conclusion: This study demonstrated the significance of providing nurses with the essential knowledge that helps respond to disasters. Online educational programs can help improve nurses' preparedness to better manage disasters. Future research should investigate additional variables that could enhance nurses' knowledge and skills related to disaster response.

Keywords: disaster management, preparedness, educational program, healthcare, nurses

Introduction

As "disaster" refers to the occurrence of surprising and unfortunate events, its management is an ongoing concern that requires increased attention and collaboration on a global scale. Healthcare professionals, including physicians, pharmacists, and nurses, play essential roles in minimizing negative impacts on the health of communities.[1,2] The decisions made by these employees are paramount in emergency situations as they form a key part of the healthcare workforce.[2] Nursing is emphasized due to its role in providing direct care to patients, extensive healthcare skills, and effective coping

techniques in complex situations. With nurses' expertise and ability to address patients' physical and emotional needs, they are essential frontline responders during emergency situations.[3]

Nursing is always involved in important efforts to prepare for and respond to disasters and recovery efforts.[4] Nursing possesses unique information and competencies that are very important during disasters, including triage, infection control, and appropriate care of patients under difficult conditions.[5] Nursing knowledge, skills, and attitudes in disaster management can also influence response efforts.[6] As an example, the latest COVID-19 pandemic was recognized as a global catastrophe with far-reaching impacts that has caused massive loss of life and severely strained healthcare systems around the world.[7]

As occurred in COVID-19, the world has encountered other natural disasters in recent years, including tsunamis, earthquakes, terrorism and other complex situations that could negatively impact human health and security.[8] Disasters cause high rates of deaths, severe damage to countries' infrastructure, and huge economic losses to countries.[9] Proper disaster management requires a correct and comprehensive system of preparedness, response and recovery phases. Establishing strong coordination methods among different stakeholders is of great importance for successful disaster management.[10] Disaster management plays a crucial role in identifying potential disasters and ensuring the efficient functioning of the workforce to achieve organizational objectives.[11] Additionally, it could aid project owners in making well-informed and optimal decisions that benefit the organization.

Confirming disaster preparedness in healthcare settings is not only a subject of national security but also a major concern. The investment made towards enhancing preparedness in the healthcare sector has proven to be fruitful, yielding positive outcomes.[12] This has been demonstrated in numerous recent disasters. Hospitals and public health departments are currently better prepared than in the past, and collaboration among healthcare settings has improved.[13] The International Council of Nurses published the Core Competencies in Disaster Nursing covering four domains: mitigation, preparedness, Response and Recovery. Clinical competence and the application of practical principles are required for effective nursing practice during any disaster.[14]

Numerous educational programs on disaster preparedness and management have been developed to enhance response among healthcare professionals. For example, researchers implemented an educational program on disaster nursing competency among Korean nursing students, focusing on disaster response knowledge, skills, and attitudes.[10] The program significantly improved participants' disaster knowledge, disaster triage, and disaster readiness. Similarly, other researchers evaluated the effectiveness of an educational program on knowledge, skills, and personal preparedness for disasters among emergency nurses.[11] Significant differences were reported between the pre-post educational intervention for each variable. Further, a nationwide study highlighted the positive impact of disaster management educational programs on nurses' knowledge and attitudes towards disaster response.[15] Such studies demonstrate the importance of educational programs in enhancing disaster management capabilities among nurses.

Saudi Arabia is among the countries susceptible to disasters, such as floods, epidemics, sandstorms, and sporadic occurrences of minor earthquakes.[16] Efforts have been made to enhance disaster management capabilities.[17] The Saudi government has developed comprehensive and actionable plans, implemented robust mechanisms, and supported the healthcare infrastructure across various healthcare settings nationwide. This includes combining disaster management and response training into nursing education curricula to prepare nurses with the needed knowledge and skills.[18] Additionally, ongoing professional development opportunities, such as workshops and drills, are provided to enhance nurses' readiness and ability to handle various disaster scenarios.[5] By effective participation in disaster management initiatives, healthcare professionals including nurses can contribute to the overall resilience and preparedness in the face of emergencies.

The nursing shortage is a global issue, and its impact becomes more pronounced during disasters. Given that disaster preparedness involves multiple agencies and personnel, including nursing, healthcare administrators should prioritize addressing this issue to prevent any physical or psychological challenges.[19] During the outbreak of the COVID-19 pandemic, the government was keen to implement important preventive measures aimed at curbing the spread of the virus and safeguarding the health of individuals and society.[20] These efforts included travel restrictions, quarantine protocols, social distancing guidelines, and the temporary closure of private and public establishments during specific periods. Vaccines were also made available free of charge to both Saudis and non-Saudis with the aim of increasing the vaccination rate within society.[21]

Disaster management is also an important part of the Saudi Arabia's Vision 2030, a national strategic plan aimed at transforming the country's economy and society.[22] Further, disaster management helps protect infrastructure and ensure the continuity of economic activities during emergencies.[23] By investing in disaster preparedness and management, Saudi Arabia can minimize possible impacts of disasters on its economy and maintain a stable and resilient business and work

environment.[24] Saudi Arabia, as other countries, should enhance its rapid response capacity to future emergency situations, prioritizing the safety and well-being of its population. This proactive disaster response strategy will not only safeguard people and infrastructure but also foster comprehensive development and stability across all sectors of the country.[25]

Research on disaster management among nurses is a vital area of study, but the available literature in Saudi Arabia is lacking.[5] While there are studies that describe nurses' roles and contributions during disasters, there remains a gap in knowledge examining specific challenges faced in disaster situations. Further, it is important to remember that the impact of disaster management differed among nations, even though, for instance, the COVID-19 pandemic presented major problems to disaster management systems worldwide. Some areas experienced more successful responses than others. However, there were instances where certain aspects of disaster management were deemed ineffective or faced criticism during the pandemic. Therefore, this study was conducted to determine the impact of a structured education program on nurses' preparedness toward major disaster management. Three specific aims were addressed: 1) to develop an online educational program that enhances disaster preparedness and management, 2) to evaluate nurses' attitude and familiarity toward disaster preparedness and management before and after the online educational program, and 3) to identify potential differences in attitude and familiarity toward disaster preparedness during pre-and-post assessments.

Materials and Methods
Study Design and Setting
This study used a quasi-experimental, one group, pretest–posttest conducted on nurses working at a public hospital in the Riyadh region of Saudi Arabia. Riyadh is the capital city and known for its developed infrastructure. The hospital is managed by the Ministry of Health to provide medical services to the local community and nearby areas. It consists of approximately 200 nurses working in different departments. It is also prepared with equipment and medical technology to offer complete healthcare services to a large number of people, ensuring that people can be served and provided with medical care. The selection of this hospital was based on specific criteria, including its capacity, diverse range of medical cases, convenient accessibility, and the availability of a workshop for the nursing staff. We also aimed at assessing the level of emergency preparedness in accordance with the regulations set by the Saudi Ministry of Health, particularly in light of the significant global repercussions caused by COVID-19.

Participants
A convenience sampling strategy was used on nurses working at the selected hospital. Nurses who were working at the selected hospital during COVID-19 were able to participate. Additionally, nurses had to provide their agreement to complete the educational sessions. Those with lack of interest in participation or with indirect interaction with patients were excluded to ensure that the data collected would be relevant and contribute effectively to achieving the study's purpose. Using the G*Power electronic tool (Heinrich-Heine-Universität, Düsseldorf, Germany), a minimum sample size of 71 was determined. To handle potential missing data, an additional 20% of subjects was added, leading to a new minimum sample size of 85 participants. This would ensure that an adequate number of subjects would be available for analysis despite the possibility of data loss.

Measures
The initial section of the instrument comprised the following demographic variables: age, gender, total years of experience, department, being exposed to a disaster training or not, experience in previous disaster response. We added three additional questions to capture a broader range of practical skills related to disaster preparedness at the hospital. These questions specifically assess disaster drill practice, ongoing training, and the emergency operational plan. They would also help provide more comprehensive details on the preparedness measures implemented.

The second part focused on the use of the Emergency Preparedness Information Questionnaire (EPIQ) to evaluate knowledge and understanding of emergency preparedness.[26] This 5-point Likert-type scale consisted of 44 knowledge-based questions, which were further categorized into subsets. Such subsets included familiarity with emergency preparedness terms and activities (7 items), the incident command system (8 items), ethical issues in triage (4 items), epidemiology and surveillance (4 items), isolation/quarantine (2 items), decontamination (3 items), communication and connectivity (7 items), psychological issues (4 items), special populations (2 items), and accessing critical resources (3

items). The EPIQ scores range from 1 (not familiar) to 5 (very familiar), indicating higher scores for a better level of preparedness. Although a revised version with 18 items exists,[27] we used the original 44-item version. The original version covers a broader range of aspects related to disaster management, offering a more comprehensive assessment of knowledge and understanding in the subject matter.

The third section of the assessment centered around participants' attitudes regarding disaster planning. A checklist was used, including 11 items that participants were asked to respond to using categories such as agree, disagree, or unsure.[17] This checklist aimed to gauge participants' perspectives and opinions on various aspects related to disaster planning. This tool indicates a good reliability of 0.80 (A., Abu-shaheen, personal communication, October 25, 2021). Permission to utilize the two instruments was obtained. Our study specifically focused on assessing the familiarity and attitudes of nurses towards disaster preparedness. This approach allowed us to effectively evaluate their knowledge, preparedness, and willingness to respond in such situations. Additionally, we aimed to gauge their familiarity with existing protocols and understand their attitudes towards disaster preparedness. By obtaining these insights, we can develop effective interventions to promote a positive response among nurses.

Study Intervention

The training program was facilitated by a nurse educator and assistant who possessed substantial experience in disaster management. The course was meticulously designed to encompass all necessary topics, aiming to provide participants, including nurses and other attendees, with current and relevant knowledge in the field. The program took place at the aforementioned public hospital, featuring modern training equipment and multiple auditoriums to accommodate the participants. We focused on enhancing attendees' knowledge and understanding in disaster management while also fostering a positive attitude and familiarity with regards to disaster preparedness and management.

Due to the participants' busy schedules, we modified the program time from a single 10-hour day to two consecutive days, including five hours of training per day. This modification was made to accommodate the participants' availability and ensure they could actively engage in the program without compromising their other commitments. More details about the program content are available in Table 1. A specific part of the program was provided for general discussions to respond to questions and improve participants' knowledge and understanding. This allocated time allowed participants to actively engage in dialogue, share insights, ask questions, and collectively enrich their understanding of the subject matter.

Table 1 The Disaster Management Program Content

Subject	Teaching Strategy	Time/Hours
First Day		
1. Introduction to disaster management 2. Detection and response to disaster	Presentation Lecture Group discussion	2 hours
1. The incident command system in disasters 2. Ethical issues in Triage during disasters	Lecture Group discussion Video show	2 hours
1. Isolation and quarantine	Lecture Case study	1 hour
Second Day		
1. Decontamination 2. Communication during disaster management	Presentation Lecture Group discussion	2 hours
1. Psychological issues during disaster management 2. Caring for special population during disasters	Lecture Case study	2 hours
1. Critical resources during disaster management	Presentation Interactive activities	1 hour
Open Discussion		

Data Collection Procedures

The research announcement was made by sending the link to units' managers and nursing educators, who were entrusted with the task of forwarding it to nurses who displayed an interest in taking part. The recruitment process was also facilitated through some informal strategies, such as word of mouth and personal references. The educational program was designed by drawing upon relevant literature concerning disaster management in the context of nursing. Further, the recent COVID-19 pandemic was considered as an important example to address significant crises and confirm the safety of both patients and healthcare professionals. During Phase 1, we collected baseline data (pretest assessment) by administering an online survey to eligible nurses. During Phase 2, a comprehensive 10-hour educational program was implemented, encompassing various educational strategies to provide participants with in-depth knowledge and understanding of disaster management. To determine changes in nurses' knowledge scores after the educational program, a posttest assessment was conducted in Phase 3.

Data Analysis

Collected data were analyzed using SPSS (V.28, IBM Corp., Armonk, NY, USA). Descriptive analyses including frequencies and percentages were performed. Additionally, the familiarity and attitude towards disaster preparedness were presented using means and standard deviations. Independent sample t-test was conducted on the pre and post-test scores to determine if there were statistically significant differences between nursing attitudes towards disaster management. Pearson coefficient correlation and One-way ANOVA were also run to identify any statistically significant findings. The significance level was set at less than 0.05.

Ethical Approval

The study obtained approval from the IRB committee at King Fahad Medical City (Ref#: 21-535E). Participation was completely voluntary and informed consent was ensured. A clear explanation of the study procedure was provided on the online questionnaire cover, emphasizing that participation in the study was completely voluntary. No personal data or identifiable information was collected. Further, each nurse was provided with a unique code to be used during the pre-and-post assessments to match their responses. Participants received assurances that their data would be kept confidential and accessible only to the research team. They were also given the choice to leave the study at any time without any repercussions or penalties. The contact information of the principal investigator was provided for communication when needed.

Results

Sample Characteristics

Around 88 nurses participated in this study; majority of them (48.9%) aged between 25–30 years. Majority of the participants were female (84.1%), married (63.6%), and working in nursing for almost 5 years (48.9%). Regarding nationality, non-Saudis comprised 83% of the participants, while only 17% were of Saudi nationality. The distribution of nursing staff based on qualifications revealed that 81.1% held a bachelor's degree. In terms of working shifts, the majority (76.1%) confirmed that they were open to work in all shifts. The findings also showed that 47.7% worked for 8 hours, while 52.3% worked for 12 hours (See Table 2).

Practices Toward Disaster Preparedness

The majority of nurses who took part in the study (83%) confirmed that disaster drills were conducted at the hospital. When asked about the types of disaster drills that had been conducted, most nurses reported that fire drills were the most common. A significant proportion of nurses (78.4%) also reported ongoing training in disaster management, while a smaller percentage (21.6%) expressed a contrary opinion. Participants provided varying responses regarding the frequency of training sessions. Moreover, 80.7% of the nurses affirmed that the emergency operational plan for disaster management was regularly updated. More information is presented in Table 3.

Nursing Attitudes Toward Disaster Preparedness

The average value in the pre-test was 2.26 ± 0.34, while in the post-test it was slightly higher (2.29 ± 0.31). This indicated that the nursing staff had a moderate level of agreement with the disaster preparedness program. However, there

Table 2 Sample Characteristics (88)

Demographic Variables	Frequency	Percent
Participants age		
< 30 years	48	54.54
30-to 40 years	19	21.6
> 40 years	21	23.86
Gender		
Male	14	15.9
Female	74	84.1
Nationality		
Saudi	15	17.0
Non-Saudi	73	83.0
Marital status		
Single	32	36.4
Married	56	63.6
Level of Education		
Diploma	14	15.9
Bachelor	74	84.1
Working Experience by years		
< 5 years	46	52.27
5 to 10 years	14	15.9
> 10 years	28	31.81
Working shifts		
Morning shift	21	23.9
All shifts (open to anytime)	67	76.1
Working hours		
8 hours	42	47.7
12 hours	46	52.3

Table 3 Nurses' Perceptions Regarding Whether Disaster Drills, Ongoing Training, and Updating of Operational Disaster Plans are Done at the Hospital

Perception Variables	Response	Frequency	Percent
Disaster drills have been done	Yes	69	78.4%
	No	19	21.6%
Disaster management ongoing training	Yes	69	78.4%
	No	19	21.6%
The emergency operational plan concerning disaster management was updated periodically	Yes	71	80.7%
	No	17	19.3%

was no significant statistical difference found in nursing attitudes toward disaster management between the pre-test and post-test. Regarding the operational plan component, the mean values in the post-test were 2.89 ± 0.44, 2.83 ± 0.53, and 2.80 ± 0.59, as compared to the pre-test means of 2.76 ± 0.63, 2.75 ± 0.61, and 2.73 ± 0.66, respectively. The present results indicated small improvements in nursing perceptions of the operational plan after the educational program, although the differences were not significant (see Table 4).

Disaster Preparedness Familiarity

Table 5 displays the results of the pre-test and post-test, indicating that the mean values for overall familiarity in the pre-test were 3.16 ± 1.39, while in the post-test, they slightly increased to 3.26 ± 1.18. Further, the post-test results showed

Table 4 Nursing Attitudes Regarding Disaster Management in the Pretest, and Post Test

No	Nursing Attitudes	Pretest		Post-Test	
		Mean	SD	Mean	SD
1	Do not need to know about Emergency (disaster) operational plans	1.44	0.81	1.45	0.80
2	Management should be adequately prepared when a disaster occurs.	2.65	0.74	2.73	0.67
3	Disaster management and planning is for a few people in the Hospital	1.40	0.78	1.45	0.83
4	Potential hazards likely to cause disaster should be identified and deal with	2.70	0.67	2.64	0.71
5	Training is necessary for all healthcare worker	2.75	0.61	2.83	0.53
6	Do you think it is necessary to have an Emergency (Disaster) Operational plan?	2.73	0.66	2.80	0.59
7	Emergency (Disaster) Operational Plan need to be regularly updated	2.76	0.63	2.89	0.44
8	Disasters are unlikely to happen in our hospital	1.91	0.92	1.93	0.96
9	Disaster management is for nurses and doctors only	1.31	0.67	1.36	0.75
10	Disaster simulations should occur frequently in the hospital	2.45	0.84	2.41	0.88
11	Drills should be conducted in the hospital	2.77	0.56	2.74	0.60
	Overall mean value	2.26	0.34	2.29	0.31

Table 5 Nursing Perceptions Regarding Familiarity Towards Disaster Preparedness in the Pretest, and Post –Test of Online Educational Program

No	Nursing Familiarity	Post-Test		Pre-Test	
		Mean	SD	Mean	SD
1	Emergency Situation	3.45	1.15	3.45	1.27
2	Responses to the Incident Command System	3.50	1.07	3.22	1.33
3	Responses to Isolation and quarantine	3.59	1.16	3.43	1.38
4	Responses to Ethical Issues in Triage	3.41	1.06	3.34	1.35
5	Responses to Epidemiology and Surveillance	3.59	1.15	3.29	1.27
6	Responses to Decontamination	3.48	1.16	3.48	1.38
7	Responses to Communication/Connectivity	3.44	1.13	3.30	1.24
8	Responses to Psychological Issues	3.21	1.17	3.20	1.41
9	Responses to Special Populations	3.44	1.10	3.15	1.34
10	Responses to Accessing Critical Resources	3.36	1.31	3.55	1.19
	Response to Overall Familiarity	3.26	1.18	3.16	1.39

that the mean values for participants' perceptions towards responses related to isolation and quarantine, epidemiology and surveillance were 3.59 ± 1.16 and 3.59 ± 1.15, respectively, compared to the pre-test mean values of 3.43 ± 1.39 and 3.29 ± 1.27, respectively. Such findings indicate that after the online education program, nurses' familiarity with these aspects of disaster preparedness slightly increased. However, the lowest rating in terms of nursing familiarity towards disaster preparedness was observed in responses to psychological issues. About 3.16 ± 1.16 was reported in the post-test, while 3.18 ± 1.43 was found in the pre-test session.

Demographic Characteristics, Attitudes and Familiarity Towards Disaster Management

The findings showed no statistically significant differences reported in nurses' attitudes and familiarity towards disaster preparedness based on the gender, marital status, nationality, working shifts, and working hours variables ($P > 0.05$). However, a statistically significant difference was observed in nursing perceptions concerning their familiarity with disaster management based on educational level. To determine which educational qualifications showed significant variations, a multiple comparison analysis was conducted, as presented in Table 6. Regarding nursing attitudes towards disaster management, no significant differences were found.

Table 6 Differences in Nursing Familiarity Towards Disaster Management

Education Level	Mean	Diploma	Bachelor	Master
Diploma	2.60		−0.84*	–
Bachelor	3.44	0.84*		–
Master	2.00	–	–	

Note: *P-value < 0.05.

Further, the findings reported no statistically significant correlation available between participants' attitudes towards disaster preparedness and their familiarity with disaster management in healthcare institutions (P > 0.05). This indicates that the level of familiarity with disaster management did not appear to have an impact on nursing attitudes.

Discussion

This study was developed to determine the impact of an online educational structured program on participants' familiarity and attitude towards disaster preparedness and management. The current practices toward disaster preparedness at the selected hospital were also determined. The results indicated that the hospital exhibits a strong commitment and appropriate preparedness for unforeseen emergencies and disasters. This is evident through the implementation of periodic training exercises throughout the year. Additionally, a proactive plan should be established to effectively manage emergency situations and safeguard the well-being of both patients and staff.[28] Proper planning is important to prepare for disaster situations, mitigate potential risks, respond effectively, ensure everyone's safety, and facilitate uninterrupted operations.[11] Hospitals should strive to develop proactive plans to address any risks or potential deadly global epidemics, as occurred by the recent Covid-19 pandemic. This global hazard has resulted in significant loss of life due to many reasons including inadequate preparations of certain global health systems.[29]

The results also indicated that both familiarity and attitude among nurses were at a moderate level both before and after the intervention. No significant difference was also observed between the pre-test and post-test sessions, suggesting that the educational program did not influence the levels of nurses' familiarity and attitude towards disaster preparedness and management. A possible reason for finding such finding could be that the online educational program was not comprehensive or intensive enough to significantly impact nurses' familiarity and attitude towards disaster preparedness. Another reason for reporting not significant differences could be that the sample size may not be large enough to provide meaningful and significant differences.[30] Therefore, future research should re-evaluate and enhance the program on a larger sample to better align with nurses' needs and knowledge gaps and achieve significant improvements in disaster preparedness and management.

Our study's findings contradict the results reported in another study, where authors found that the use of virtual social platforms significantly improved nurses' knowledge and maintained high attitudes towards disaster preparedness and management.[18] Additionally, other researchers demonstrated the effectiveness of online courses in enhancing the knowledge and attitude of interdisciplinary teams regarding disaster management.[19] In contrast, the current study may have lacked variation due to inadequate time allocated for online training and the broad coverage of multiple topics related to disasters. These issues create challenges that could potentially hinder participants' ability to acquire in-depth knowledge and essential skills.[14] Based on the findings, it is recommended to allocate sufficient time for the online education program and focus on specific, targeted topics related to disaster management to potentially achieve significant improvements in nurses' familiarity and attitude.

The results of the present study slightly align with the findings of another study,[2] demonstrating that hospital workers had a moderate-to-low level of attitude towards disaster preparedness. The findings also differ from that reported by prior researchers who showed a positive relationship between their participants' age and experience, as well as between perception of disaster preparedness and management.[31] Based on the similarity with Gillani et al findings,[2] it is suggested to continue promoting the attitude and practice of hospital workers towards disaster preparedness. However, considering

the discrepancy with the other study's findings,[31] further research is needed to explore the factors influencing nurses' perception of disaster preparedness and management, considering variables such as age and experience.

Teaching disaster response through online strategies offers flexibility, accessibility, and personalized learning, resulting in a significant increase in knowledge among undergraduate medical students.[32] However, this improvement is primarily associated with cognitive domains such as recalling and simple decision making. For complex disaster situations that require advanced decision making and psychomotor skills, face-to-face teaching methods are recommended.[33] While combining online and face-to-face approaches can enhance nurses' competency in disaster preparedness and management, there is still a gap in determining the most effective approaches to cover the full spectrum of disaster management in emergency nursing practice over a longer duration.[34,35] Thus, it is suggested to apply a blended approach that includes online and face-to-face teaching strategies to effectively improve disaster preparedness and management levels, addressing both cognitive and psychomotor skills.

Study Limitations

Though important findings were obtained, there are some limitations to be noted. First, the absence of a comparison group may have served as a negative point for determining the educational program's efficacy. Second, the study included nurses working at a specific hospital, which could make the findings to be limited to the target population. Another limitation encountered during the study process was the difficulty in accessing statistical data on disaster preparedness at the selected hospital. Further, because the findings were solely focused on nurses, they might not be transferable to other healthcare professions. The controlled setting of experimental studies may make the applicability of the results to real-world scenarios to be difficult. We suggested that future research should take these limitations into account to help obtain more effective findings on disaster preparedness.

Study Implications

The study's findings suggest that nursing education should assess nurses' current competency in disaster preparedness and management to identify educational needs. This will enable the development of tailored continuous education programs that enhance nurses' ability to respond effectively in disaster situations. Nursing faculty members can also play a crucial role by implementing comprehensive curricula that cover all phases of disaster and its management, preparing nursing students to be proficient in disaster preparedness.[36] Future research is also warranted to determine the effectiveness of using other educational strategies on nurses' knowledge, skills, and attitude towards disaster preparedness. The study's implications should be disseminated widely among nurses and nursing educators to raise awareness and improve the profession's capacity and competency through disaster management training and educational initiatives.

Conclusion

In summary, the study provided a foundation for developing an online educational program in disaster preparedness and management in Saudi Arabia, highlighting the importance of raising awareness and enhancing nurses' capabilities through training and educational programs. Further research should assess the effectiveness of such programs on nurses' familiarity and attitude towards disaster preparedness on other healthcare providers. It is also recommended to continue supporting and developing diverse education and training programs on effective disaster management. This is crucial to ensure that all nurses possess the necessary knowledge and skills for prompt disaster response and successful management. Further, it is suggested that future research should investigate additional variables that could enhance knowledge and skills related to disaster response. This would support the understanding of the various factors that contribute to better disaster preparedness and response at hospitals.

Data Sharing Statement

Data are not shared due to privacy and ethical restrictions.

Informed Consent Statement

Informed consent was obtained from all participants.

Institutional Review Board Statement

The study obtained approval from the IRB committee at King Fahad Medical City (Ref#: 21-535E).

Disclosure

The authors report no conflicts of interest in this work.

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