


Integrating Inter-Professional Insights for Enhanced Disaster Response: A Cross-Sectional Analysis in Jubail's Royal Commission Hospital, Saudi Arabia

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Introduction: This study aimed to evaluate disaster preparedness and management among an inter-professional team at the Royal Commission Hospital (RCH) in Jubail, Saudi Arabia.

Methods: Conducted between May and July 2023, this cross-sectional study involved healthcare providers in both patient-facing and non-patient-facing roles. Participants responded to a comprehensive online questionnaire comprising 22 questions across seven sections covering aspects of emergency response, disaster management, and infection control. The study targeted a minimum sample size of 500 participants, successfully garnering responses from 512 individuals.

Results: Of the 512 participants, 59.9% (n=312) were healthcare providers in patient-facing roles, and 40.1% (n=209) were in non-patient-facing roles. The results revealed notable disparities in awareness and preparedness between these two groups. Healthcare providers demonstrated higher awareness levels compared to their non-patient-facing counterparts. For instance, 76.9% of healthcare providers were aware of the hospital's emergency response plan compared to 56.2% of non-healthcare providers ($\chi^2 = 52.165$, $p < 0.001$). Similar disparities were observed in understanding the term "disaster" (86.5% vs 54.1%, $\chi^2 = 27.931$, $p < 0.001$), and awareness of a command center (73.4% vs 45.2%, $\chi^2 = 42.934$, $p < 0.001$).

Discussion: These findings underscore the critical need for enhancing awareness, education, and preparedness within healthcare facilities, emphasizing an integrated approach that includes both healthcare and non-healthcare staff. By addressing these gaps, healthcare facilities can significantly improve their emergency response efficiency, disaster management capabilities, and infection control measures, thereby enhancing the overall safety and quality of patient care.

Keywords: disaster preparedness, emergency response, inter-professional collaboration, healthcare management, infection control, emergency medicine training, patient safety, cross-sectional analysis

Introduction

Disasters present significant challenges to the community's ability to function, often exceeding its capacity to manage without external assistance. They can be caused by natural, man-made, or technological hazards. Factors such as climate change, population displacement, armed conflicts, rapid and unplanned urbanization, technological risks, and public health emergencies are expected to increase the frequency and severity of their impacts.¹ The International Federation of Red Cross Society (IFRC) defines disasters as any unanticipated events that cause a society to become dysfunctional, resulting in extreme economic, infrastructural, and human losses to the point where society is unable to handle the negative effects.²

The frequency of natural disasters has significantly increased over the past few decades, with a discernible increase of about 80% observed between 1980 and 2009.³ Nearly 7000 natural disasters were recorded by the Emergency Events Database (EED) between 1994 and 2013, claiming 1.35 million lives and affecting hundreds of millions more. Nearly

8000 people perished in the years that followed as a result of various natural disasters.⁴ Understanding the spatiotemporal pattern of historical earthquake disasters and the resultant socioeconomic consequences is essential for designing effective disaster risk reduction measures.⁵

More than 80% of natural disaster events in the last century occurred in the Middle East and North Africa, concentrated in just nine countries: Afghanistan, Pakistan, Iran, Sudan, Somalia, Algeria, Morocco, Yemen, and Egypt. Hydrological disasters (flooding and landslides) accounted for 63% of all disasters in 2015, surpassing the previous century.⁶ This dramatic increase highlights the urgency of addressing disaster preparedness, particularly in regions prone to such events, and underscores the importance of our study focused on Jubail, Saudi Arabia.

Jubail Industrial City in the Eastern province on the Arabian Gulf coast of Saudi Arabia is home to the largest industrial city in the world, with a total population of 684,531 as of 2021.⁷ It also houses the Middle East's largest and the world's fourth-largest petrochemical company, SABIC.⁷ The city's advanced industrial infrastructure, high population density, and strategic economic importance make it vulnerable to various disaster risks, including industrial accidents, chemical spills, and potential natural disasters. These factors necessitate a thorough assessment of disaster preparedness in the region.

Inter-professional collaborative practice involves effective communication and decision-making, enabling a seamless blend of knowledge and skills from different professionals. Essential factors for effective teamwork include recognizing the significance of individual roles within the team, maintaining open communication, fostering autonomy, and ensuring equal access to resources.⁸ Conversely, poor inter-professional collaboration can adversely affect disaster management efforts. Ensuring that all employees are familiar with the organization's disaster management plan is crucial. Healthcare facilities are obligated to conduct regular fire and disaster drills to allow staff to practice emergency skills.^{9,10}

Several studies have focused solely on healthcare providers' preparedness for disasters, excluding other professional groups such as administration and engineering. For instance, a 2022 study in the United Arab Emirates found that health professionals had moderate levels of knowledge, positive attitudes, and high readiness to engage in disaster management.¹¹ Similarly, a 2018 study in Riyadh, Saudi Arabia, assessed the knowledge, practices, and attitudes regarding disaster and emergency preparedness among Emergency Department (ED) staff, revealing satisfactory levels of knowledge but neutral attitudes and practices.¹² Another 2022 study aimed to assess disaster preparedness among Saudi Red Crescent Authority (SRCA) medical staff and found a lack of available drills.¹³ A study conducted in the Eastern region of Saudi Arabia concluded that most hospitals had sufficient resources for disaster management; however, the overall effectiveness of hospitals' disaster preparedness was slight to moderate.^{14,15}

Given the significant industrial and economic role of Jubail, there is an urgent need to ascertain the level of preparedness for disasters that could occur without warning. Identifying the degree of hospitals' preparedness in this region can be used to develop effective strategies for managing potential catastrophes. The Royal Commission Jubail (RCJ) is a government agency in Saudi Arabia responsible for the planning, development, and management of Jubail Industrial City.¹⁶ It plays a pivotal role in transforming Jubail into one of the world's largest and most advanced industrial cities, attracting investments, promoting industries, and driving economic diversification efforts in the region.

Understanding the inter-professional preparedness of the staff at the Royal Commission Hospital (RCH) in Jubail is critical for enhancing the hospital's disaster response capabilities. This study aims to evaluate inter-professional disaster preparedness and management at RCH in Jubail, Saudi Arabia. By investigating the preparedness levels across different professional groups, this study aims to provide comprehensive insights into the effectiveness of current disaster management strategies and identify areas for improvement, ultimately contributing to the safety and resilience of Jubail and similar urban-industrial environments.

Materials and Methods

Study Design and Sample

This cross-sectional descriptive study was conducted at the Royal Commission Hospital (RCH) in Jubail, a secondary care facility with a capacity of 206 beds. Since its opening in February 1989, RCH has provided inpatient, outpatient, and emergency services to a diverse population including Royal Commission employees and their families, individuals from Jubail Industrial City, referrals from primary healthcare centers, SABIC company employees and families, and self-paying

patients.¹⁷ The study sample comprised a broad spectrum of hospital staff encompassing healthcare providers in both patient-facing and non-patient-facing roles as well as non-medical personnel. Healthcare providers included doctors, nurses, pharmacists, laboratory technicians, paramedics, and radiology technicians, while non-medical staff included administrative workers, engineers, housekeepers, and security officers. The total sample size was 521 candidates, with healthcare providers constituting 312 (59.9%) and non-healthcare providers 209 (40.1%).

Data Collection and Analysis Plan

Plan Survey Instrument

The survey instrument was adapted from the World Health Organization (WHO) National Health Sector Emergency Preparedness and Response Tool.^{18,19} This comprehensive tool consisted of 22 questions spread across seven sections: emergency response plan, meaning of disaster, command and control, communication, safety and security, triage, and infection control. The questionnaire was designed to assess the awareness and preparedness levels of the hospital staff.

Questionnaire Validity

To ensure the validity of the questionnaire, it was reviewed by a panel of experts in emergency management and healthcare administration. The Cronbach's alpha value for the questionnaire was 0.87, indicating high reliability. The questionnaire was administered in English, the primary language used for professional communication in the hospital.

Data Collection Procedure

Data were collected through an online survey platform, and responses were automatically recorded in Google Sheets for subsequent retrieval and analysis. Participants were assured of confidentiality and were briefed about the study's objectives and their role in it. The survey ensured that participants could not skip any questions, thus minimizing missing data.

Statistical Analysis

Data were analyzed using IBM SPSS software version 23. Descriptive statistics such as frequencies and percentages were employed for qualitative data. The Chi-square test was used to evaluate the significance of associations between categorical variables. Significance was set at the 5% level, and two-tailed probabilities were reported for all tests. Visual aids like charts and figures were created to facilitate data interpretation and comparison.

Ethical Considerations

The study was approved by the Institutional Review Board (IRB) of King Saud University Research and Ethics Committee (Ref No: KSU-HE-23-044). Informed consent was obtained from all participants, and the survey included information about the study's purpose, the voluntary nature of participation, and the strict confidentiality of the data collected.

Results

Demographic Characteristics of the Participants

The study included 521 participants, comprising 312 healthcare providers (59.9%) and 209 non-healthcare providers (40.1%). The gender distribution showed a slightly higher representation of females (54.1%) compared to males (45.9%). The predominant age groups were 31–35 years (38.0%) and 36–40 years (32.8%), indicating that the majority of participants were in the midst of their professional careers. Most participants had 5–10 years of experience (44.0%), providing a range of perspectives from relatively new to highly experienced professionals (Table 1).

Awareness and Preparedness Levels

The Results revealed notable disparities in awareness and preparedness between healthcare and non-healthcare providers. A significantly higher proportion of healthcare providers (76.9%) were aware of the hospital's emergency response plan compared to 56.2% of non-healthcare providers ($\chi^2 = 52.165$, $p < 0.001$). Similarly, 86.5% of healthcare providers understood the meaning of disaster, compared to 54.1% of non-healthcare providers ($\chi^2 = 27.931$, $p < 0.001$). Awareness

Table 1 General Characteristics of the Participants (n=521)

Variables		Frequency	Percent
Gender	Male	239	45.9
	Female	282	54.1
Age	25–30 year	73	14.0
	31–35 year	198	38.0
	36–40 year	171	32.8
	more than 40 years	79	15.2
Qualifications	Healthcare provider ^a	312	59.9
	Non healthcare provider ^b	209	40.1
Years of experience	1–5 years	144	27.6
	5–10 years	229	44.0
	10–20 years	110	21.1
	More than 20 years	38	7.3

Notes: ^a(Doctor/Nurse/Paramedic/pharmacy/Laboratory/radiology). ^b(Administrative/engineering/security/housekeeping).

of the command center for incident meetings was more common among healthcare providers (73.4%) than non-healthcare providers (45.2%) ($\chi^2 = 42.934$, $p < 0.001$). Additionally, healthcare providers showed higher awareness of job description sheets listing the duties of hospital employees (90.1% vs 72.7%, $\chi^2 = 26.927$, $p < 0.001$) (Table 2).

Table 2 Comparison Among Qualifications Groups According to the Awareness Regarding Emergency Response Plan, Meaning of Disaster and Command and Control

Questions	Response	Qualifications			
		Healthcare Provider 312 (59.9%)		Non Healthcare Provider 209 (40.1%)	
		n	%	n	%
Does your hospital have an emergency response plan?	Unknown	70	22.4	32	43.8
	No	2	0.6	0	0.0
	Yes	240	76.9	41	56.2
Chi-square p-value		52.165 0.000**			
Do you know the meaning of disaster?	Unknown	41	13.1	93	44.5
	No	1	0.3	3	1.4
	Yes	270	86.5	113	54.1
Chi-square p-value		27.931 0.000**			
In your hospital, Is there a command center for meeting of commanders in the time of incident?	Unknown	76	24.4	37	50.7
	No	7	2.2	3	4.1
	Yes	229	73.4	33	45.2
Chi-square p-value		42.934 0.000**			
Are there job description sheets that list the duties of hospital employees?	Unknown	28	9.0	50	23.9
	No	3	1.0	7	3.3
	Yes	281	90.1	152	72.7
Chi-square p-value		26.927 0.000**			

Note: **Statistically Significant at 0.05 or less.

Communication Protocols

Regarding communication protocols, 76.9% of healthcare providers were aware of a designated place for setting up press conferences during events, compared to 56.2% of non-healthcare providers ($\chi^2 = 54.304$, $p < 0.001$). A notable majority (86.5%) of healthcare providers were aware of communication protocols with other hospitals for patient transportation when beds were unavailable, while only 54.1% of non-healthcare providers were aware of this ($\chi^2 = 67.825$, $p < 0.001$). Awareness of the code blue team for rapid response was significantly higher among healthcare providers (93.9%) compared to non-healthcare providers (82.8%) ($\chi^2 = 16.599$, $p < 0.001$). Most healthcare providers (89.1%) were aware of communication systems within or outside the hospital, compared to 63.2% of non-healthcare providers ($\chi^2 = 50.440$, $p < 0.001$) (Table 3).

Safety and Security Protocols

The capability to handle chemical incidents was recognized by 79.2% of healthcare providers compared to 58.9% of non-healthcare providers ($\chi^2 = 48.883$, $p < 0.001$). Awareness of areas for radioactive, biological, and chemical decontamination

Table 3 Comparison Among Qualifications Groups According to the Awareness About Communication

Questions	Response	Qualifications			
		Healthcare Provider 312 (59.9%)		Non Healthcare Provider 209 (40.1%)	
		n	%	n	%
Is there a place designed for hospital set up press conferences in the time of event?	Unknown	70	22.4	32	43.8
	No	2	0.6	0	0.0
	Yes	240	76.9	41	56.2
Chi-square p-value		54.304 0.000**			
Is there communication with other hospitals for transportation of patients if no available beds?	Unknown	41	13.1	93	44.5
	No	1	0.3	3	1.4
	Yes	270	86.5	113	54.1
Chi-square p-value		67.825 0.000**			
Is there code blue team in the hospital for rapid response?	Unknown	18	5.8	33	15.8
	No	1	0.3	3	1.4
	Yes	293	93.9	173	82.8
Chi-square p-value		16.599 0.000**			
Are there communication systems in the hospital or outside the hospital?	Unknown	32	10.3	74	35.4
	No	2	0.6	3	1.4
	Yes	278	89.1	132	63.2
Chi-square p-value		50.440 0.000**			
Is there designed information center in hospital to collect information about patients and disease?	Unknown	47	15.1	88	42.1
	No	6	1.9	3	1.4
	Yes	259	83.0	118	56.5
Chi-square p-value		47.688 0.000**			

(Continued)

Table 3 (Continued).

Questions	Response	Qualifications			
		Healthcare Provider 312 (59.9%)		Non Healthcare Provider 209 (40.1%)	
		n	%	n	%
Is there communication with poison center in chemical incidents?	Unknown	78	25.0	113	54.1
	No	4	1.3	4	1.9
	Yes	230	73.7	92	44.0
Chi-square p-value		47.032 0.000**			
Is there activated code blue for rapid recall doctors or any hospital staff from different sites in the hospital?	Unknown	30	9.6	52	24.9
	No	6	1.9	5	2.4
	Yes	276	88.5	152	72.7
Chi-square p-value		22.433 0.000**			

Note: **Significant at 0.05 and 0.01, respectively.

was higher among healthcare providers (70.5%) than non-healthcare providers (42.1%) ($\chi^2 = 48.393$, $p < 0.001$). Awareness of guidance signs at the entrance of the emergency department was reported by 83.3% of healthcare providers and 55.5% of non-healthcare providers ($\chi^2 = 50.188$, $p < 0.001$) (Table 4).

Table 4 Comparison Among Qualifications Groups According to the Awareness About Safety and Security

Questions	Response	Qualifications			
		Healthcare Provider 312 (59.9%)		Non Healthcare Provider 209 (40.1%)	
		n	%	n	%
Can the hospital receive chemical incidents?	Unknown	56	17.9	29	39.7
	No	9	2.9	1	1.4
	Yes	247	79.2	43	58.9
Chi-square p-value		48.883 0.000**			
Are there areas for radioactive, biological, and chemical decontamination?	Unknown	78	25.0	115	55.0
	No	14	4.5	6	2.9
	Yes	220	70.5	88	42.1
Chi-square p-value		48.393 0.000**			
Are there guidance sign at the entrance of emergency department you should know by it any section?	Unknown	45	14.4	87	41.6
	No	7	2.2	6	2.9
	Yes	260	83.3	116	55.5
Chi-square p-value		50.188 0.000**			

Note: **Significant at 0.01 or less.

Triage Procedures

Awareness of the triage area at the emergency department entrance was significantly higher among healthcare providers (87.2%) compared to non-healthcare providers (58.9%) ($\chi^2 = 80.222$, $p < 0.001$). Similarly, healthcare providers were more aware of clearly identified entrance and exit routes (90.1% vs 66.0%, $\chi^2 = 46.105$, $p < 0.001$). Awareness of the trauma resuscitation room was also higher among healthcare providers (82.1%) compared to non-healthcare providers (51.7%) ($\chi^2 = 56.250$, $p < 0.001$). Awareness of a designated area for separated exposure and suturing wounds was 77.9% among healthcare providers, compared to 44.5% among non-healthcare providers ($\chi^2 = 63.287$, $p < 0.001$). Awareness of a designated burn unit was 50.6% among healthcare providers and 34.4% among non-healthcare providers ($\chi^2 = 53.873$, $p < 0.001$) (Table 5).

Infection Control

Awareness of infection control concepts was significantly higher among healthcare providers (93.6%) compared to non-healthcare providers (82.2%) ($\chi^2 = 35.875$, $p < 0.001$). Most healthcare providers (91.7%) were aware of the hospital's infection control program, compared to 61.2% of non-healthcare providers ($\chi^2 = 71.039$, $p < 0.001$). Awareness of infection control training for staff was reported by 91.3% of healthcare providers and 58.9% of non-healthcare providers ($\chi^2 = 79.572$, $p < 0.001$) (Table 6).

Table 5 Comparison Among Qualifications Groups According to the Awareness About Triage

Questions	Response	Qualifications			
		Healthcare Provider 312 (59.9%)		Non Healthcare Provider 209 (40.1%)	
		n	%	n	%
Is there an area of screening patients (triage) at the entrance to emergency department?	Unknown	38	12.2	30	41.1
	No	2	0.6	0	0.0
	Yes	272	87.2	43	58.9
Chi-square p-value		80.222 0.000**			
Are there entrance and exit routes clearly identified?	Unknown	28	9.0	66	31.6
	No	3	1.0	5	2.4
	Yes	281	90.1	138	66.0
Chi-square p-value		46.105 0.000**			
Is there designed trauma resuscitation room?	Unknown	55	17.6	95	45.5
	No	1	0.3	6	2.9
	Yes	256	82.1	108	51.7
Chi-square p-value		56.250 0.000**			
Is there designed separated exposure and suturing wound area?	Unknown	62	19.9	111	53.1
	No	7	2.2	5	2.4
	Yes	243	77.9	93	44.5
Chi-square p-value		63.287 0.000**			
Is there chosen burn unit?	Unknown	56	17.9	100	47.8
	No	98	31.4	37	17.7
	Yes	158	50.6	72	34.4
Chi-square p-value		53.873 0.000**			

Note: **Significant at 0.01.

Table 6 Comparison Among Qualifications Groups According to the Awareness About Infection Control

Questions	Response	Qualifications			
		Healthcare Provider 312 (59.9%)		Non healthcare Provider 209 (40.1%)	
		n	%	n	%
Do you know what infection control is?	Unknown	17	5.4	13	17.8
	No	3	1.0	0	0.0
	Yes	292	93.6	60	82.2
Chi-square p-value		35.875 0.000**			
Does the hospital have an infection control program?	Unknown	24	7.7	76	36.4
	No	2	0.6	5	2.4
	Yes	286	91.7	128	61.2
Chi-square p-value		71.039 0.000**			
Do hospital staff members receive infection control training?	Unknown	22	7.1	79	37.8
	No	5	1.6	7	3.3
	Yes	285	91.3	123	58.9
Chi-square p-value		79.572 0.000**			

Note: **Significant at 0.01.

Discussion

This study aimed to evaluate disaster preparedness and management among an inter-professional team at the Royal Commission Hospital (RCH) in Jubail, Saudi Arabia. The findings revealed a stark contrast in awareness levels regarding emergency response plans, disaster management, and infection control between healthcare and non-healthcare providers. These disparities underscore a critical gap in the preparedness and knowledge framework within healthcare settings. The heightened awareness among healthcare providers is a positive sign, reflecting their direct involvement in patient care and emergency protocols. However, the significantly lower awareness among non-healthcare providers, who play equally pivotal roles in managing hospital operations during disasters, points to a significant shortfall in comprehensive emergency preparedness. This gap hampers effective interdepartmental coordination during emergencies and potentially compromises patient safety and overall hospital responsiveness.^{20,21}

Furthermore, our findings show a notable difference in understanding the concept of disaster itself. Healthcare providers, being at the forefront, are more attuned to the implications and complexities of disasters.²² This disparity might be attributed to the focused training and regular exposure healthcare providers receive, which is often lacking for non-healthcare staff. Bridging this knowledge gap is essential, as every member of the hospital team plays a vital role in disaster response, from logistics and communication to direct patient care.²³

Regarding infection control, while healthcare providers demonstrate a commendable level of awareness, the relatively lower awareness among non-healthcare staff is a concern. Infection control is a critical component of hospital safety, and its importance transcends professional boundaries within a healthcare environment.²⁴ A holistic approach to training and education about infection control protocols is necessary to foster a culture of safety that permeates all levels of the hospital staff.²⁵

To address these challenges, healthcare facilities must adopt a multifaceted approach. This approach should include regular and comprehensive training programs that are tailored to the specific roles and responsibilities of both healthcare and non-healthcare staff. Furthermore, fostering an environment of open communication and regular drills can significantly enhance the understanding and preparedness of all staff members.²⁶ Additionally, employing innovative methods such as simulation training and interactive workshops could further reinforce disaster preparedness and infection control measures.²⁷

The implications of this varied level of awareness extend beyond the immediate response to disasters. In hospitals, where efficient coordination and quick decision-making are crucial, these gaps can lead to delays in response, miscommunication, and ultimately, suboptimal patient care.²⁸ Particularly in scenarios like chemical incidents or infectious disease outbreaks, where non-healthcare staff roles are critical in areas such as logistics, sanitation, and crowd management, their preparedness can greatly influence the overall effectiveness of the hospital's response.²⁹ Thus, ensuring a uniformly high level of awareness and preparedness across all staff categories becomes imperative for maintaining operational efficiency and patient safety.

Recognizing the essential role of non-healthcare providers in disaster scenarios, hospitals should implement targeted educational initiatives. These programs should be designed to address the specific knowledge gaps identified in our study, ensuring that all staff are familiar with emergency protocols and infection control measures.³⁰ Regular involvement of non-healthcare staff in disaster drills and simulations can provide practical experience and build confidence in handling real-world scenarios. Additionally, creating a platform for inter-professional dialogue and learning can promote a deeper understanding of each role's importance in disaster management, fostering a collaborative and well-coordinated response system.³¹

Beyond individual training programs, there is a need for systemic changes in the way hospitals approach disaster preparedness and infection control. This involves integrating these key areas into the core values and operational strategies of healthcare facilities.³² By embedding disaster preparedness and infection control into the organizational culture, hospitals can ensure a consistent and proactive approach to these critical issues. Leadership at all levels must champion this cultural shift, emphasizing the importance of preparedness across all departments and roles.³³

Furthermore, the integration of technology and data-driven insights can play a pivotal role in enhancing disaster preparedness. The use of advanced analytics to monitor and predict potential disaster scenarios, coupled with technology-driven training modules, can significantly augment the preparedness levels of all staff.³⁴ Leveraging these technologies not only streamlines the training process but also provides real-time data and situational awareness, which are crucial during actual disaster events.³⁵

In addition, there is a critical need for regular policy reviews and updates in line with evolving disaster scenarios and infection control challenges.³⁶ Policies should be dynamic and adaptable, allowing for quick modifications in response to emerging threats and new evidence-based practices.^{37,38} Engaging a wide range of stakeholders, including healthcare and non-healthcare staff, in policy formulation and review processes can ensure that these policies are comprehensive and relevant to the needs of all involved.^{39,40}

In summary, our study highlights the pressing need for an integrated and inclusive approach to disaster preparedness and infection control in healthcare settings. While healthcare providers show commendable awareness, the focus must now shift to elevating the understanding and preparedness of non-healthcare staff. By doing so, hospitals can ensure a more robust, cohesive, and efficient response to emergencies, significantly improving patient care and staff safety.

Limitations

While the study offers valuable insights into the comprehension of emergency response plans, disaster management, and infection control among healthcare professionals, several Limitations must be acknowledged. Firstly, the composition of the study's sample might not fully represent the diverse spectrum of professionals spanning different domains, both within healthcare and beyond. A broader and more diverse sample could provide a more comprehensive understanding of the levels of awareness across various roles and departments.

The reliance on self-reported feedback presents another limitation, as it could be susceptible to social desirability bias. Respondents might tailor their answers to align with perceived expectations, potentially diverging from their authentic awareness levels. This aspect might particularly influence the responses of non-healthcare staff, who could feel pressured to demonstrate a higher level of awareness than they actually possess.

Additionally, the study faces the potential issue of selection bias. Those professionals who opted to participate might inherently exhibit a keener interest or greater awareness of emergency response plans, disaster management, and infection control compared to those who did not participate. This could lead to an overestimation of the overall awareness levels within the hospital setting.

Another limitation is the cross-sectional nature of the study, which provides a snapshot at a single point in time. This approach limits the ability to assess changes in awareness or the impact of any interventions over time. Longitudinal studies could offer more insight into the dynamics of awareness and preparedness among hospital staff.

Furthermore, the study did not explore the depth of understanding or the practical application of knowledge regarding emergency response and infection control measures. The assessment of awareness levels did not include evaluations of how this knowledge translates into actual behavior or practice in emergency situations.

Lastly, the geographical and institutional context of the study may limit the generalizability of the findings. The specific characteristics of the healthcare setting in Jubail, Saudi Arabia, might not be applicable to hospitals with different operational structures, resources, or cultural backgrounds.

In light of these limitations, future research should aim to incorporate a more diverse participant pool, adopt longitudinal designs, and include practical assessments of knowledge application in real-world scenarios. Additionally, expanding the research to various geographical and institutional contexts would enhance the generalizability of the findings.

Recommendations

Based on the findings of our study, several key Recommendations emerge to enhance emergency preparedness and response effectiveness. Firstly, it is crucial to develop and implement comprehensive training programs targeted specifically at non-healthcare professionals. These programs should bridge the observed knowledge gap by focusing on emergency response plans and the unique roles non-healthcare staff play during crises. Training initiatives should be thorough, regular, and tailored to the specific needs of non-healthcare staff.

Fostering collaboration between healthcare providers and non-healthcare professionals is essential. This can be achieved through cross-disciplinary knowledge exchange and joint emergency drills, promoting a holistic approach to disaster preparedness, enhancing overall facility readiness.

Ongoing education and professional development are vital for all staff. Continuous learning opportunities should update knowledge, address new challenges, and maintain awareness of evolving strategies and protocols. Topics should include the latest developments in disaster management, innovative response techniques, and emerging global health threats.

Enhancing communication skills is particularly crucial for scenarios such as press conference setups during emergencies. Specialized training in communication techniques will significantly improve coordination and information dissemination during crises.

Incorporating simulation exercises is another critical recommendation. These exercises, mirroring real-world emergency scenarios, allow professionals to practice and refine their roles and responsibilities within emergency response frameworks. Simulations provide a practical and engaging way to enhance understanding and readiness, preparing staff for real-life situations.

These recommendations converge on a central goal: to build and sustain a culture of preparedness within healthcare organizations. This involves an integrated approach, combining training, policy development, regular reviews, and an emphasis on emergency preparedness at an institutional level. A well-prepared, informed, and cohesive workforce, inclusive of both healthcare and non-healthcare professionals, is fundamental to managing emergencies effectively, ensuring the safety and welfare of both patients and staff.

Conclusions

The findings of our study reveal a substantial disparity in awareness and preparedness levels for emergency response and disaster management between healthcare and non-healthcare providers. Healthcare providers generally demonstrated higher awareness levels, reflecting their direct involvement in patient care and emergency protocols. In contrast, non-healthcare providers exhibited significantly lower awareness, highlighting the need for targeted training and comprehensive preparedness programs. Addressing these gaps is essential for maintaining operational efficiency and ensuring patient safety during emergencies. By implementing the recommended strategies, healthcare facilities can significantly improve their emergency response capabilities and overall preparedness.

Institutional Review Board Statement

The Institutional review board (IRB) approval was obtained from the King Saud University Research and Ethics Committee (Ref No: KSU-HE-23-044).

Data Sharing Statement

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Informed Consent Statement

The information included the study's purpose, the voluntary nature of their participation, and strict confidentiality and secure data storage. The survey had anonymous nature and all respondents agreed to participate in the survey. Written consent was obtained from participants who completed the online questionnaire.

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Disclosure

The authors declare no conflicts of interest in this work.

References

1. Perry RW. Defining disaster: an evolving concept. *Handbook of Disaster Research*. 2018;1:3–22.
2. Bhandari AK, Takahashi O. Knowledge, attitude, practice and perceived barriers of natural disaster preparedness among Nepalese immigrants residing in Japan. *BMC Public Health*. 2022;22(1):492. doi:10.1186/s12889-022-12844-3
3. Coles JB, Zhang J, Zhuang J. Bridging the research–practice gap in disaster relief: using the IFRC Code of Conduct to develop an aid model. *Ann Oper Res*. 2022;312(2):1337–1357. doi:10.1007/s10479-017-2488-1
4. Pearson L, Pelling M. The UN Sendai framework for disaster risk reduction 2015–2030: negotiation process and prospects for science and practice. *J of Extr Even*. 2015;2(01):1571001. doi:10.1142/S2345737615710013
5. Chan EY, Man AY, Lam HC. Scientific evidence on natural disasters and health emergency and disaster risk management in Asian rural-based area. *Br Med Bul*. 2019;129(1):91. doi:10.1093/bmb/ldz002
6. Zhou Y, Li N, Wu W, et al. Socioeconomic development and the impact of natural disasters: some empirical evidences from China. *Nat Hazards*. 2014;74(2):541–554. doi:10.1007/s11069-014-1198-0
7. Ghomian Z, Yousefian S. Natural disasters in the middle-east and North Africa with a focus on Iran: 1900 to 2015. *Health Emerg Disastersly*. 2017;2(2):53–62.
8. Goniewicz K, Goniewicz M. Disaster preparedness and professional competence among healthcare providers: pilot study results. *Sustainability*. 2020;12(12):4931. doi:10.3390/su12124931
9. 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
10. Chan NW. Impacts of disasters and disaster risk management in Malaysia: the case of floods. In: Aldrich, D., Oum, S., Sawada, Y. (eds). *Resilience and Recovery in Asian Disasters: Community Ties, Market mechanisms, and Governance*. Tokyo: Springer Japan; 2014:239–265.
11. Shanableh S, Alomar MJ, Palaian S, Al-Ahmad MM, Ibrahim MIM, Khan A. Knowledge, attitude, and readiness towards disaster management: a nationwide survey among healthcare practitioners in United Arab Emirates. *PLoS One*. 2023;18(2):e0278056. doi:10.1371/journal.pone.0278056
12. 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 Med J*. 2018;39(11):1123. doi:10.15537/smj.2018.11.23026
13. Mobrad A, Almorairi HM, Khan AA, Al-Wathinani A, Alotaibi R. Perception and attitude of medical staff in the Saudi Red crescent authority toward their preparedness for disaster management and response. *Disaster Med Public Health Prep*. 2022;16(4):1580–1586. doi:10.1017/dmp.2021.101
14. Alruwaili A, Islam MS, Usher K. Hospitals disaster preparedness and management in the eastern province of the kingdom of Saudi Arabia: a cross-sectional study. *Disaster Med Public Health Prep*. 2022;16(3):1038–1045. doi:10.1017/dmp.2020.484
15. World's largest industrial areas?. WorldAtlas. 2019.
16. RC Jubail - e-Service Portal Available from: <https://rcj.gov.sa/JubailIndustrialCity/Overview/Assets/pdf/papers/Sustainable%20Infrastructure%20though%20Integrated%20Master%20Planning.pdf>. Accessed June 27, 2024.
17. Royal Commission Hospital Saudi Arabia. Available from: <https://www.rchsp.med.sa/ar/Pages/home.aspx>. Accessed June 27, 2024.

18. Hospital emergency response checklist. World Health Organization. Hospital emergency response checklist: an all-hazards tool for hospital administrators and emergency managers Available from: <https://www.who.int/publications-detail-redirect/hospital-emergency-response-checklist>. Accessed June 27, 2024.
19. Global assessment of national health sector emergency preparedness and response. World Health Organization. Available from: <https://www.who.int/publications/item/global-assessment-of-national-health-sector-emergency-preparedness-and-response>. Accessed June 27, 2024.
20. Youn S, Geismar HN, Pinedo M. Planning and scheduling in healthcare for better care coordination: current understanding, trending topics, and future opportunities. *Prod Oper Manage.* 2022;31(12):4407–4423. doi:10.1111/poms.13867
21. Goniewicz K, Goniewicz M, Burkle FM, Khorram-Manesh A. The impact of experience, length of service, and workplace preparedness in physicians' readiness in the response to disasters. *J Clin Med.* 2020;9(10):3328. doi:10.3390/jcm9103328
22. Alston M, Hazeleger T, Hargreaves D. *Social Work and Disasters: A Handbook for Practice.* Routledge; 2019.
23. Eisenstein E, Kopacek C, Cavalcante SS, Neves AC, Fraga GP, Messina LA. Telemedicine: a bridge over knowledge gaps in healthcare. *Curr Pediatr Rep.* 2020;8(3):93–98. doi:10.1007/s40124-020-00221-w
24. Billings C, Bernard H, Caffery L, et al. Advancing the profession: an updated future-oriented competency model for professional development in infection prevention and control. *Am J Infect Control.* 2019;47(6):602–614. doi:10.1016/j.ajic.2019.04.003
25. Rangachari P. Knowledge sharing and organizational learning in the context of hospital infection prevention. *Qual Manage Healthcare.* 2010;19(1):34–46. doi:10.1097/QMH.0b013e3181cbbd1d
26. Goniewicz K, Goniewicz M, Burkle FM, Khorram-Manesh A. Cohort research analysis of disaster experience, preparedness, and competency-based training among nurses. *PLoS One.* 2021;16(1):e0244488. doi:10.1371/journal.pone.0244488
27. Goniewicz K, Goniewicz M, Wloszczak-Szubzda A, et al. The importance of pre-training gap analyses and the identification of competencies and skill requirements of medical personnel for mass casualty incidents and disaster training. *BMC Public Health.* 2021;21(1):1. doi:10.1186/s12889-021-10165-5
28. Kaye DK, Nakimuli A, Kakaire O, Osinde MO, Mbalinda SN, Kakande N. Gaps in continuity of care: patients' perceptions of the quality of care during labor ward handover in mulago hospital, Uganda. *BMC Health Serv Res.* 2015;15:1–6. doi:10.1186/s12913-014-0652-8
29. Rosen MA, DiazGranados D, Dietz AS, et al. Teamwork in healthcare: key discoveries enabling safer, high-quality care. *Am Psychologist.* 2018;73(4):433. doi:10.1037/amp0000298
30. Phattharapornjaroen P, Glantz V, Carlström E, Dahlén Holmqvist L, Sittichanbuncha Y, Khorram-Manesh A. The feasibility of implementing the flexible surge capacity concept in Bangkok: willing participants and educational gaps. *Int J Environ Res Public Health.* 2021;18(15):7793. doi:10.3390/ijerph18157793
31. Althagafi I, Edwards DG, Smith L. Disaster preparedness of health professionals at mass gatherings: a scoping review. *J Paramed Pract.* 2023;15(11):462–471. doi:10.12968/jpar.2023.15.11.462
32. Nuzzo JB, Meyer D, Snyder M, et al. What makes health systems resilient against infectious disease outbreaks and natural hazards? Results from a scoping review. *BMC Public Health.* 2019;19(1):1–9. doi:10.1186/s12889-018-6343-3
33. Hawn MT, Vick CC, Richman J, et al. Surgical site infection prevention: time to move beyond the surgical care improvement program. *Ann Surg.* 2011;254(3):494–501. doi:10.1097/SLA.0b013e31822c6929
34. Snezhana D, Dineva S. Applying artificial intelligence (AI) for mitigation climate change consequences of the natural disasters. *Res J Environ Sci.* 2023;3(1):1–8.
35. Soto-Vergel AJ, Velez JC, Amaya-Mier R, Pardo M. Transforming ground disaster response: recent technological advances, challenges, and future trends for rapid and accurate real-world applications of survivor detection. *Int J Disaster Risk Reduct.* 2023;98:104094. doi:10.1016/j.ijdrr.2023.104094
36. Khorram-Manesh A, Goniewicz K, Burkle FM Jr. Unleashing the global potential of public health: a framework for future pandemic response. *J Infect Public Health.* 2023;17(1):82–95. doi:10.1016/j.jiph.2023.10.038
37. Goniewicz K, Khorram-Manesh A, Burkle FM, Hertelendy AJ, Goniewicz M. The European union's post-pandemic strategies for public health, economic recovery, and social resilience. *Glob Transit.* 2023;5:201–209. doi:10.1016/j.glt.2023.10.003
38. Fagan EJ. Political institutions, punctuated equilibrium theory, and policy disasters. *Policy Stud J.* 2023;51(2):243–263. doi:10.1111/psj.12460
39. Abraham J, Alva J, Vinish V. Assessment of knowledge, readiness, and barriers hindering the performance of first aid measures in emergency situations among non-healthcare professionals of selected organizations of Udipi Taluk. *J Educ Health Promot.* 2023;12(1):359. doi:10.4103/jehp.jehp_1860_22
40. Mani ZA, Goniewicz K. Adapting disaster preparedness strategies to changing climate patterns in Saudi Arabia: a rapid review. *Sustainability.* 2023;15(19):14279. doi:10.3390/su151914279

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