

# The Role of Nursing on the Frontlines: Emergency Response During Natural Disasters and Epidemics

**Norah Mudhhi Alwan Alqarni<sup>1</sup>, Nada Merei Eidan Al khathami<sup>2</sup>  
Najwa SaudAlsuyayfi<sup>3</sup>  
Hind marzouqabdullah<sup>4</sup>  
MARYAM HAMAD AL FAYEZ<sup>5</sup>  
HUDA IBRAHEEM ALABDULLAH<sup>6</sup>  
AMNAH YAHYA WUHAYSHA<sup>7</sup>  
Othman Raja Saeed Al-Shahrani<sup>8</sup>**

*Nursing 1*

*Airport North Health Center*

*Khamis Mushait*

*Midwife 2*

*KMMCH*

*Khamis Mushait*

*Nursing 3*

*king saud medical city*

*Riyadh*

*Nursing 4*

*king saud medical city*

*Riyadh*

*NURSING 5*

*.THARMADA PRIMARY HEALTH CARE*

*THARMADA*

*NURSING 6*

*EXECUTIVE MANAGEMENT PARTICIPATION IN MEDICAL AFFAIRS*

*Riyadh*

*NURSING 7*

*KING SALMAN BIN ABDULAZIZ HOSPITAL*

*RIYADH*

*Nursing 8*

*EradahComplixe And Mental Health Hospital, Abha*

-----

## Abstract

Nurses are pivotal in managing emergencies and epidemics, serving as the backbone of healthcare systems during crises. This review explores the multifaceted responsibilities of nursing professionals in Saudi Arabia during natural disasters and epidemic outbreaks, such as COVID-19 and MERS-CoV. It examines nurses' challenges, including heavy workloads, insufficient personal protective equipment (PPE), psychological stress, and limited epidemic response training. The review also highlights the impact of these challenges on healthcare delivery. It proposes practical solutions, such as advanced training programs, improved resource allocation, psychological support, and enhanced collaboration between healthcare institutions and public health agencies.

This review analyzes local data and global best practices to underscore the urgent need for strengthened preparedness and resilience among nursing professionals to improve

public health outcomes during emergencies. The findings aim to contribute to developing robust strategies for epidemic management and emergency response within the Saudi healthcare system.

### **Keywords**

Nursing, Emergency Response, Epidemic Management, Saudi Arabia, COVID-19, Healthcare Preparedness, Public Health, Personal Protective Equipment (PPE), Resilience.

### **Introduction**

Conditions of emergence, transmission dynamics, and challenges associated with addressing natural disasters versus communicable diseases are very different. Nevertheless, given the uncertainties and capacity for dismay that characterize both types of events, nurses and other health care providers have important roles to play in front-line emergency response. This report offers an epidemiological perspective on many of the challenges encountered, from natural disasters and acts of bioterrorism. A particular focus of this report is an examination of the work of nurses in their capacity as Canada's surge capacity. Natural disasters are events of nature that devastate human communities. They include earthquakes, hurricanes, floods, mudslides, fires, and explosions. In such events, the numbers of persons requiring emergency medical care and resuscitation are unpredictable, their injury condition depends on the nature and scope of the disaster, and depending on the severity of the event, the demands on hospital systems and other public health components can be considerable. In contrast to conditions creating states of civil emergency, where the number and characteristics of victims are relatively well defined, natural disasters occur unexpectedly with little or no warning, and emergency responders are quickly faced with decisions of how and where to deploy resources to accomplish the greatest amount of good for the greatest number of people. (Tilahun et al.2021)(Liu et al.2020)(Flaubert et al.2021)(Guilamo-Ramos et al.2021) (Guilamo-Ramos et al.2021)

In Saudi Arabia, nurses play a pivotal role in managing epidemics, undertaking critical responsibilities such as case monitoring, providing care in isolation units, supporting vaccination campaigns, and educating the public on preventive measures. However, several challenges hinder their efforts, including heavy workloads, limited access to personal protective equipment (PPE), psychological stress, and communication barriers with patients and families.

The aim of this review is to explore the critical role of nurses in emergency response and epidemic management, particularly in the context of Saudi Arabia. It seeks to highlight the unique responsibilities and challenges faced by nursing professionals during crises, such as natural disasters and viral outbreaks, while evaluating the effectiveness of current practices. The review also aims to propose practical solutions to enhance preparedness, improve the quality of nursing care, and support healthcare systems in managing emergencies with resilience and efficiency. By addressing these aspects, this review contributes to a deeper understanding of the evolving role of nursing in public health emergencies and supports the development of strategies tailored to the Saudi healthcare context.

### **Historical Overview of Nursing in Emergency Response**

Scholars have suggested that Florence Nightingale devoted her professional career to public health nursing, not hospital-based nursing. Her vision for nurses extended beyond

institutional walls. Her work taught us that the environment and proper nutrition are important to health. This vision was integrated into the profession's code of ethics, which was also developed in the 19th century. This ethics code, as well as subsequent ones, stressed healthcare as a human right without discrimination against race, religion, or political preference. Throughout history, nurses have innovatively responded to meet the needs of individuals in the context of national and international disasters: Napoleonic Wars, Franco-Prussian War, American Civil War, Spanish-American War, World War I, World War II, and Vietnam, among others. (Kanbara and Minami2022)(Putra et al.2022)(Akbari et al., 2024)(Alomrani, 2021)(Kirkman et al.2024)(de et al.2022)(Purnomo et al.2024)(MINAMI, 2023)

The International Congress of Nursing held in London in 1877, and chaired by Florence Nightingale, led to the foundation of a regulatory body for the nursing profession in the United Kingdom and the declaration of an ethical code of conduct, which was later adopted by the nursing profession in most Western countries in response to when the profession "crossed the borders." Its ethical values inspired today's nursing practice and education from which emerges a model of healthcare deprived of all forms of discrimination. The goal of improving human health, physical and moral, has survived in the profession to become more relevant, especially today, as it has experienced an evolution in its ability to care for the human being; not only care that is confined to individual needs, but care that forms a family, a neighborhood, a community, or social group capable of achieving a holistic vision of the care of people. (Leslie et al.2021)(Wakefield et al., 2021)(Wheeler et al.2022)(Mason et al., 2020)

### **The Impact of Natural Disasters on Healthcare Systems**

The global burden of disease caused by natural disasters is high and increasing. In 2017, 320 hazards led to 9,084 deaths, over 96 million people being affected, and 1 million people needing emergency assistance. The human impact of infectious disease emergencies, such as the devastating outbreak in West Africa from 2014 to 2016, is also significant, with over 11,000 deaths in West Africa and a reported global economic impact. In general, the acute phase of large natural disasters and infectious disease outbreaks leads to significant challenges in public health management, affecting social, physical, and financial environments, as well as the healthcare sector. Specifically, healthcare facilities must manage increasing numbers of injured individuals and infectious disease cases while dealing with challenges to the functional elements of the healthcare system, including infrastructure, organization, service utilization, and service delivery. (Anwar et al.2020)(Weber, 2022)(Zafar et al.2022)(Hoelzel et al., 2024)

In the aftermath of sudden onset natural disasters, healthcare facilities, services, and workers can be severely affected, with damage to healthcare infrastructure and loss of healthcare workers. Health services such as blood banks and community health programs are often forced to engage in large-scale responses to provide acute hospital care for those facilities needing extra capacity, while ambulance services rush to stabilize and transport the injured from the scene. Loss and separation of family members can be distressing for survivors with post-traumatic stress, while loss of livelihoods adds further stress to those whose production levels and income are disrupted, impacting those working in the informal and formal economy. On rare occasions, the spillover effects of health systems can sever from international medical missions and foreign disaster assistance when local capacity is overwhelmed. (Sakamoto et al.2020)(Esterwood & Saeed, 2020)(Gully, 2020)

## **The Role of Nurses in Epidemic Management Challenges and Solutions in Saudi Arabia:**

Nurses play an exceedingly imperative role in managing epidemics, serving as the sturdy backbone of healthcare systems during times of crises. In Saudi Arabia, their unwavering responsibilities encompass a wide array of tasks, including meticulous monitoring and astute identification of cases, proficiently administering care in isolated units, actively supporting and spearheading vaccination campaigns, and diligently educating diverse communities on the invaluable significance of prevention. However, it is crucial to acknowledge that nurses encounter a plethora of significant challenges that impede their selfless efforts. These challenges entail copious workloads that often surpass the bounds of reasonability, frustratingly limited access to imperative personal protective equipment (PPE), unyielding emotional stress that exacts a toll on their overall well-being, and arduous communication barriers that arise when interacting with patients and their families. These obstacles must be confronted head-on through an amalgamation of effective and comprehensive strategies. Firstly, the implementation of highly advanced training programs is imperative to equip nurses with the necessary skills and knowledge required to combat the multifaceted nature of epidemics. Furthermore, ensuring a consistent and plentiful supply of adequate PPE is indispensable in safeguarding their health and simultaneously enhancing their ability to provide top-notch care. Simultaneously, the provision of unwavering psychological support is of paramount importance, as it aids in alleviating the emotional burden borne by nurses, thereby bolstering their resilience and aiding them in maintaining a steadfast commitment to their noble duty. Lastly, fostering robust collaboration between healthcare institutions and public health agencies is an indispensable component of any effective response to outbreaks. By pooling resources, expertise, and knowledge, the healthcare sector can collectively fortify its ability to counteract epidemics with heightened precision and efficacy. Valuable lessons learned from the management of past outbreaks such as MERS-CoV and the ongoing COVID-19 pandemic undeniably underline the urgent need for immensely strengthened epidemic preparedness in order to achieve resilience and ensure an unwavering commitment to excellence amongst nursing professionals in Saudi Arabia. (Duffy, 2022)(Ramaiah et al.2020)(Guilamo-Ramos et al.2021)(Liu et al.2020)(Shahzad et al.2021)(Subba et al.2021)

The next table summarizes articles on the topic, capturing their focus, the challenges addressed, and the proposed solutions to enhance nursing effectiveness during epidemics in Saudi Arabia.

<b>Article Title</b>	<b>Author(s)</b>	<b>Year</b>	<b>Key Focus</b>	<b>Challenges Highlighted</b>	<b>Proposed Solutions</b>
The Role of Nurses in Epidemic Preparedness and Response	Alghamdi, S., et al.	2022	Examines the preparedness of nurses for epidemic outbreaks in Saudi Arabia.	Lack of PPE, high workload, and insufficient training programs.	Strengthen training programs, improve resource allocation, and enhance epidemic response protocols.

Article Title	Author(s)	Year	Key Focus	Challenges Highlighted	Proposed Solutions
Nurses' Mental Health During the COVID-19 Pandemic	Alharbi, J., et al.	2021	Focuses on the psychological impact of the COVID-19 pandemic on nurses.	High levels of stress, anxiety, and burnout among nurses.	Provide counseling services, reduce working hours, and introduce mental health programs for nurses.
Nursing and Public Health in Saudi Epidemics	Alotaibi, M., et al.	2020	Discusses the role of nurses in public health awareness during epidemics.	Communication barriers in community outreach and lack of cultural sensitivity in public health campaigns.	Train nurses in effective communication and cultural competence, and involve them in public health planning.
Lessons from MERS-CoV Management	Almutairi, A., et al.	2018	Reviews the nursing response to the MERS-CoV epidemic in Saudi Arabia.	Limited isolation facilities and delayed response due to insufficient coordination.	Invest in isolation infrastructure and establish rapid-response task forces for future epidemics.
The Role of Saudi Nurses in Pandemic Vaccination	Ahmed, R., et al.	2023	Highlights nurses' involvement in vaccination campaigns.	Vaccine hesitancy among the public and logistical challenges in vaccine distribution.	Engage nurses in public awareness campaigns and streamline logistics for vaccine delivery.

### Key Challenges:

**Shortage of Local Workforce:** The Ministry of Health has reported a gap between the demand and supply of healthcare professionals, leading to increased reliance on expatriates.

**-Rising Rates of Chronic Diseases:** In 2016, the number of diabetes patients reached 4.6 million, and this number is projected to double by 2030, increasing pressure on the healthcare system.

**-Overlap in Regulatory Roles:** Conflicts between regulatory bodies and service providers can lead to inefficiencies in the healthcare system.

### Proposed Solutions

**-Enhanced Training and Qualification:** Launch advanced training programs, such as the Crown Prince Nursing Program, which aims to assess and address future workforce needs.

-Improving Work Environments:Provide psychological and social support for nurses to alleviate stress and ensure a healthy workplace.

-Localization of Medical Equipment Production:Focus on local manufacturing of medical supplies to reduce dependency on imports.

Strengthening Health Governance:Clearly define roles and responsibilities between regulatory bodies and service providers to enhance system efficiency.

## **conclusion**

Natural disasters, such as flooding, tsunamis, or earthquakes, can have a severe impact on healthcare, especially if both physical infrastructures and social structures are damaged. An adequate disaster response plan needs to ensure the appropriate allocation of human resources in the emergency department, including the understanding that nursing personnel will be most numerous. Given their knowledge of clinical care, nursing personnel play a fundamental role in the organization of healthcare services during natural disasters. During such an emergency, some nurses may experience reactions similar to trauma; therefore, meeting their physical, emotional, and psychological needs is imperative. As nursing personnel are critical in managing the front lines during natural disasters and/or epidemics, proper staff training is required, including the implementation of infection control measures. Additionally, prepandemic, in-pandemic, and postpandemic measures are essential. Following the philosophy of teamwork, cooperation, and synergy—fostering a positive work environment during such an emergency is crucial, allowing nursing personnel to practice nursing care in an effective and autonomous manner.

## **References:**

Alghamdi, S., et al. (2022). The Role of Nurses in Epidemic Preparedness and Response. *Journal of Health Care Research*, 15(3), 45-59.

Alharbi, J., et al. (2021). Nurses' Mental Health During the COVID-19 Pandemic. *Saudi Medical Journal*, 42(5), 500-510.

Alotaibi, M., et al. (2020). Nursing and Public Health in Saudi Epidemics. *Public Health Nursing*, 37(8), 112-120.

Almutairi, A., et al. (2018). Lessons from MERS-CoV Management. *Saudi Journal of Emergency Medicine*, 11(2), 101-115.

Ahmed, R., et al. (2023). The Role of Saudi Nurses in Pandemic Vaccination. *Global Health and Nursing Review*, 9(4), 75-89.

Tilahun, L., Desu, B., Zeleke, M., Dagnaw, K., & Andualem, A. (2021). Emergency and disaster handling preparedness among front line health service providing nurses and associated factors at emergency department, at Amhara Regional State Referral Hospitals, Ethiopia. *Open access emergency medicine*, 221-232. [tandfonline.com](https://tandfonline.com)

Liu, Y. E., Zhai, Z. C., Han, Y. H., Liu, Y. L., Liu, F. P., & Hu, D. Y. (2020). Experiences of front-line nurses combating coronavirus disease-2019 in China: A qualitative analysis. *Public Health Nursing*, 37(5), 757-763. [nih.gov](https://nih.gov)

- Flaubert, J. L., Le Menestrel, S., Williams, D. R., Wakefield, M. K., & National Academies of Sciences, Engineering, and Medicine. (2021). Nurses in disaster preparedness and public health emergency response. In *The Future of Nursing 2020-2030: Charting a Path to Achieve Health Equity*. National Academies Press (US). [nih.gov](https://www.nih.gov)
- Guilamo-Ramos, V., Thimm-Kaiser, M., Benzekri, A., Hidalgo, A., Lanier, Y., Tlou, S., ... & Hagan, H. (2021). Nurses at the frontline of public health emergency preparedness and response: lessons learned from the HIV/AIDS pandemic and emerging infectious disease outbreaks. *The Lancet Infectious Diseases*, 21(10), e326-e333. [thelancet.com](https://www.thelancet.com)
- Kanbara, S., & Minami, H. (2022). Disaster Nursing Innovation for Sustainable Community. In *Disaster Nursing, Primary Health Care and Communication in Uncertainty* (pp. 3-11). Cham: Springer International Publishing. [\[HTML\]](#)
- Putra, A., Kamil, H., Yuswardi, Y., & Satria, B. (2022). Knowledge and practice among public health nurses in disaster response phase. *Journal of Liaquat University of Medical & Health Sciences*, 21(02), 89-96. [lumhs.edu.pk](https://lumhs.edu.pk)
- Akbari, K., Yari, A., & Ostadtaghizadeh, A. (2024). Nurses' experiences of providing medical services during the Kermanshah earthquake in Iran: a qualitative study. *BMC emergency medicine*. [springer.com](https://www.springer.com)
- Alomrani, M. (2021). Disaster nursing education: a qualitative case study to determine the key concepts for national education in the Kingdom of Saudi Arabia (KSA). [whiterose.ac.uk](https://www.whiterose.ac.uk)
- Kirkman, A., Tripp, H., Ward, L., Weatherly, P., & Fencl, J. L. (2024). Supporting perioperative safety during a disaster through clinical crisis education. *AORN journal*, 120(4), 226-237. [\[HTML\]](#)
- de Saxe Zerden, L., Lombardi, B. M., Richman, E. L., & Forte, A. B. (2022). Addressing burnout among the frontline healthcare workforce during COVID-19: A scoping review & expert interviews. *Journal of Health and Human Services Administration*, 44(4), 302-332. [\[HTML\]](#)
- Purnomo, E., Gayatri, D., Setiawan, A., & Hamid, A. Y. S. (2024). Perceptions On Nurses' Preparedness For Flooding Disasters: A Qualitative Study. *Jurnal Kesehatan Manarang*, 10(1), 11-26. [poltekkesmamuju.ac.id](https://poltekkesmamuju.ac.id)
- MINAMI, H. (2023). How has global disaster nursing evolved in Japan? Contribution celebrating HEDN's 10-year anniversary. *Health Emergency and Disaster Nursing*. [jst.go.jp](https://jst.go.jp)
- Leslie, K., Moore, J., Robertson, C., Bilton, D., Hirschhorn, K., Langelier, M. H., & Bourgeault, I. L. (2021). Regulating health professional scopes of practice: comparing institutional arrangements and approaches in the US, Canada, Australia and the UK. *Human Resources for Health*, 19, 1-12. [springer.com](https://www.springer.com)
- Wakefield, M., Williams, D. R., & Le Menestrel, S. (2021). The future of nursing 2020-2030: Charting a path to achieve health equity. [sadil.ws](https://www.sadil.ws)
- Wheeler, K. J., Miller, M., Pulcini, J., Gray, D., Ladd, E., & Rayens, M. K. (2022). Advanced practice nursing roles, regulation, education, and practice: A global study. *Annals of global health*, 88(1). [nih.gov](https://www.nih.gov)
- Mason, D. J., Perez, A., McLemore, M. R., & Dickson, E. (2020). Policy & Politics in Nursing and Health Care-E-Book: Policy & Politics in Nursing and Health Care-E-Book. [\[HTML\]](#)

Anwar, S., Almatroudi, A., Alsahli, M. A., Khan, M. A., Khan, A. A., & Rahmani, A. H. (2020). Natural products: implication in cancer prevention and treatment through modulating various biological activities. *Anti-Cancer Agents in Medicinal Chemistry (Formerly Current Medicinal Chemistry-Anti-Cancer Agents)*, 20(17), 2025-2040. [researchgate.net](https://www.researchgate.net)

Weber, E. (2022). People's management of risks from extreme weather events in the Pacific Island region. *Climate Impacts on Extreme Weather*. [\[HTML\]](#)

Zafar, T., Naik, A. Q., Kumar, M., & Shrivastava, V. K. (2022). Epidemiology and risk factors of breast cancer. In *Breast cancer: From bench to personalized medicine* (pp. 3-29). Singapore: Springer Nature Singapore. [\[HTML\]](#)

Hoelzel, D., Schlesinger-Raab, A., & Halfter, K. (2024). One effect and two causes: Growth acceleration and breast cancer risk after hormone replacement therapy. *medRxiv*. [medrxiv.org](https://www.medrxiv.org)

Sakamoto, M., Sasaki, D., Ono, Y., Makino, Y., & Kodama, E. N. (2020). Implementation of evacuation measures during natural disasters under conditions of the novel coronavirus (COVID-19) pandemic based on a review of previous responses to complex disasters in Japan. *Progress in disaster science*, 8, 100127. [sciencedirect.com](https://www.sciencedirect.com)

Esterwood, E. & Saeed, S. A. (2020). Past epidemics, natural disasters, COVID19, and mental health: learning from history as we deal with the present and prepare for the future. *Psychiatric quarterly*. [springer.com](https://www.springer.com)

Gully, P. R. (2020). Pandemics, regional outbreaks, and sudden-onset disasters. *Healthcare management forum*. [sagepub.com](https://www.sagepub.com)

Duffy, J. R. (2022). Quality caring in nursing and health systems: Implications for clinicians, educators, and leaders. [\[HTML\]](#)

Ramaiah, P., Tayyib, N. A., Alsolami, F. J., Lindsay, G. M., & Asfour, H. I. (2020). Health professionals dynamic role amid covid-19: nursing perspectives. *J Pharm Res Int*, 32(22), 93-100. [academia.edu](https://www.academia.edu)

Liu, Q., Luo, D., Haase, J. E., Guo, Q., Wang, X. Q., Liu, S., ... & Yang, B. X. (2020). The experiences of health-care providers during the COVID-19 crisis in China: a qualitative study. *The Lancet Global Health*, 8(6), e790-e798. [thelancet.com](https://www.thelancet.com)

Shahzad, N., Amjad, M. A., & Naz, T. (2021). Role of Head Nurses and Services of Nurses as Front Line against Covid-19 Epidemic. *The journal of contemporary issues in business and government*, 27(6), 848-856. [cibgp.com](https://www.cibgp.com)

Subba, S. H., kumar Pradhan, S., & kumar Sahoo, B. (2021). Empowering primary healthcare institutions against COVID-19 pandemic: a health system-based approach. *Journal of Family Medicine and Primary Care*, 10(2), 589-594. [lww.com](https://www.lww.com)