

Critical Analysis of Paramedic and Nursing Roles in Disaster Management in Strengthening Rapid Response and Community Resilience

Mohammed Meshal Alotaibi¹, Adel Mater Aljuaid², Sulaiman Fayed Alshammari³, Waleed Mohammed Alghamdi⁴, Faisal Saeed Alnefaie⁵, Nawaf Saeed Alnefaie⁶, Anas Abdullatif Althuwaylimi⁷, Roaa Ahmed Bakr Najjar⁸, Hassan Mashawi Hassan⁹, Mohammed Salem Alharthi¹⁰

Abstract

Disaster management plays a significant role in the provision of response, rescue, and care for populations during disasters, and paramedics and nurses contribute enormously to increasing the speed of the disaster. Therefore, this paper aims to discuss the roles of paramedics and nurses before, during, and after disasters, as well as in disaster planning. This paper comprehensively discusses challenges and prospects likely to be encountered by paramedics and nurses during disasters, focusing on interdisciplinary coordination, training, and resource management, based on a critical analysis of existing literature. This study shows that it is possible to increase the efficiency of disaster response and improve the population's ability to survive when paramedics and nurses are employed in management networks. However, some concerns remain about training, coordination, and resource management. The suggestions are to enhance collaboration between the treatment teams, allocate resources in the programs focused on enhancing disaster response skills, and establish guidelines that would guarantee a strong healthcare reaction to calamities.

Keywords: Paramedics, Nurses, Disaster Management, Rapid Response, Community Resilience, Healthcare Response, Emergency Preparedness, Public Health, Interdisciplinary Collaboration, Disaster Recovery.

Introduction

Disaster management is an array of measures directed at prevention, mitigation, response, and recovery from the results of natural or man-made disasters. Health care providers, particularly paramedics, and nurses, are fundamental in delivering direct care that can contribute to averting loss of lives and disease morbidity and mortality in the middle and the long term. Although paramedics are mostly on the scene first regarding the emergency, nurses factor in both before and after the event, providing treatment and comforting words. The incorporation of paramedics and nurses in disaster systems is vital to improve the utilization of healthcare solutions and strengthen the community's preparedness.

Based on the above information, this paper offers a critical reflection on the functions of paramedics and nurses in calamities. It shows how their actions can improve the quick onset of rapid responses and advance recovery and resilience solutions. The study uses published literature, problem cases, and theoretical models to investigate the failures and strengths of disaster management systems. Using this approach, this paper reveals directions for development and offers suggestions for enhancing the roles of paramedics and nurses in subsequent disaster response and planning.

¹ Ministry of Health, Saudi Arabia; Malotaibi277@moh.gov.sa

² Ministry of Health, Saudi Arabia. admaljuaid@moh.gov.sa

³ Ministry of Health, Saudi Arabia; Sualshmmari@moh.gov.sa

⁴ Ministry of Health, Saudi Arabia. walghamdI28@moh.gov.sa

⁵ Ministry of Health, Saudi Arabia; falnfaei@gmail.com

⁶ Ministry of Health, Saudi Arabia; 4pipipi123@gmail.com

⁷ Ministry of Health, Saudi Arabia; althuwaylimi2525@gmail.com

⁸ Ministry of Health, Saudi Arabia; Roynaj120@hotmail.com

⁹ Ministry of Health, Saudi Arabia; Hassoon_09@hotmail.com

¹⁰ Ministry of Health, Saudi Arabia; malharthi79@moh.gov.sa

LITERATURE REVIEW

2.1 The Role of Paramedics in Disaster Management

Notably, they are involved in the intervention during disaster situations and became the first contact point with clients. They are expected to offer specific emergency medical care to patients at the scene and transfer such patients to the correct healthcare facilities by triaging, stabilizing, and transferring patients. During disasters, paramedics are overwhelmed with a flood of patients and have significant and potentially lethal injuries. This puts pressure on them to do these quickly, find out who deserves their attention, needs immediate help, and how best to give them what they want.

It has been established that paramedics' activities involve not only their medical practice in the field. Some of their responsibilities include triaging patients, identifying the priority of the treatment depending on the available resources, and getting patients to the right care at the right time. The basic principles apply at a stage labeled triage, where the paramedics have to decide who needs attention and who must wait. Paramedics are dealing with too many pressures on countries' health care systems and often do not receive the appropriate resources and tools necessary to help the patient or are too busy focusing on one patient and using actions that will successfully stop the harm from progressing.

McLoughlin et al. (2017) mentioned that paramedics also have the coordinator perspective besides the responder perspective. It is also worth noting that besides the life-saving direct healthcare services provided to patients and families, Paramedics depend on, communicate, and work with other first responders, public health providers, and governmental organizations. Cooperation between such communities is highly useful to address a disaster's organizational aspects. Emergency medical technicians (EMTs) or paramedics might be engaged in formulating the business emergency medical services (EMS) protocols and the disaster triage systems used to organize patient care and identify patients' priorities in a disaster. Coordination is not limited to the immediate response activities and often fully engages with the processes of building such systems.

Another duty of paramedics involves creating awareness among the public and ensuring that people know what to do to safeguard their lives when a disaster occurs. This preventive role significantly minimizes the total loss of disasters on affected groups of people. According to McLoughlin et al. (2017), Jones' role also extends to paramedics' participation in emergency response, disaster, community program development, and disaster risk management relating to sessions that augment the coping of vulnerable communities. They help form plans incorporating locally available resources and capabilities to guarantee that the delivery of healthcare, once disaster strikes, is efficient.

2.2 The Role of Nurses in Disaster Management

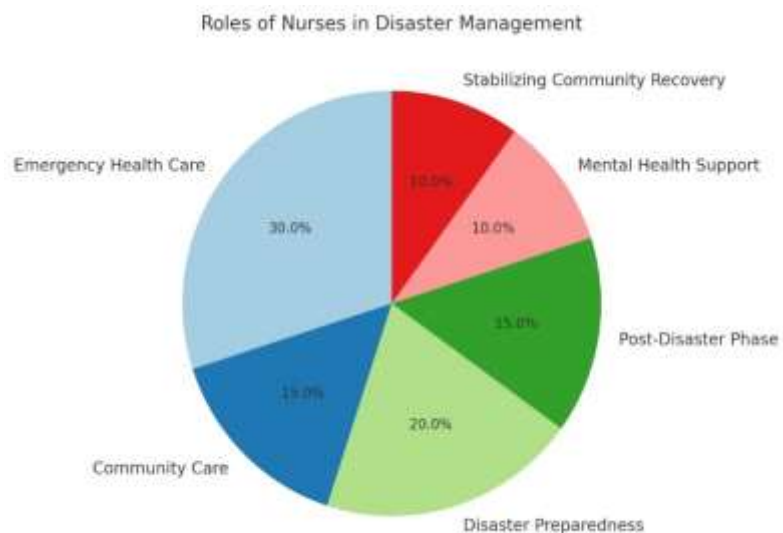
This paper aims to establish the role of nurses in emergency disaster management and in providing chronic and continual care in different care settings, including hospitals, clinics, and other community care facilities. They include a wide range of activities, from direct patient care during the initial phases of disaster response to identifying long-term health needs in the later phases of disaster recovery. The need for nurses to attend to the multiple welfare needs of patients, including trauma, mental health, and infectious diseases, deals with their versatility to handle various challenges that the disaster situation presents.

The other key function nurses perform during disasters is emergency health care. In hospitals, they assist physicians and paramedics in attending to patients transferred from the field after the first intervention. Nurses are involved in sorting patients, identifying which set of patients requires immediate attention and which set of patients can well wait. Their nursing experience in various fields, including surgical, medical, obstetrics/ gynecology, pediatric, mental health, emergency, and affiliated specialties in wound care, pain management, and patient stabilization, means those receiving care get the best possible regardless of the state of the facility. Also, many facets of community care depend on a nurse who organizes the psychological and emotional treatment of the patients and their relatives in distress due to disaster situations.

Besides their professional roles of attending to patients, the nurses are very useful in disaster preparedness and the post-disaster phase. In their capacity and as members of diverse local statutory healthcare institutions, nurses are usually involved in planning and simulation exercises about anticipated disasters in communities. In their study, Seddon et al. (2018) observe and support nurses' role as they are usually the only caregivers in most disasters. Nurses are responsible for the following: they are also involved in implementing care plans that assure that patients discharged from the emergency care facilities receive adequate care. This can entail addressing primary care, chronic illness, avoiding infectious diseases, or sustaining mental health.

Nurses also continue supporting as a mental health asset in the disaster region. The effects of emergencies on psychological self-state are profound, and disaster victims and their families often suffer from disorders such as anxiety, depression, and PTSD. Nurses may be the first after a traumatic event to deal with the giving of advice to patients and/or their families, focusing on psych emotional support. Of all of the roles that this support serves, this is one of the most important; it creates the opportunity for the person to begin the process of integration and recovery.

As per Seddon et al. (2018), it is not only the clinical functions of a nurse; they further underline that they are the human pillars in the upset of disaster, who often act as the agents of stability in the organization. In other words, by delivering appropriate compassion and timely patient care and creating a trusting atmosphere of patient care, the nurses also assist in reducing the emotional impact of the disaster on victims, thus supporting the community's recovery resilience.



Pie chart illustrating the roles of nurses in disaster management. Each segment represents the proportionate focus on specific responsibilities

2.3 Interdisciplinary Collaboration in Disaster Management

Organizational disaster management and mitigation involve inputs from various health professionals, such as paramedics, nurses, physicians, and psychiatrists. Other stakeholders that must be involved in the management of disasters include the local government, non-governmental organizations, and other disaster management teams. Integrated working consolidates inputs, outputs, and several service activities so that they are optimally utilized for effective and efficient delivery.

Adams et al. (2019) support communication and identifying roles while explaining the effectiveness of disaster management. Proper coordination between paramedics, nurses, and other caregivers reduces the repetition of work done, and each worker's right skills are used appropriately. For example, while working

in a hospital country, paramedics and nurses work in tandem to provide the right patient care, especially in shooting incidents where patient triage may be necessary.

Adams et al. (2019) point out that there are challenges to working in a disaster working time, which is usually scarce, and resources can too be scarce. These workers must be flexible and work in complex, sometimes stressful, working conditions. The entity must demonstrate the capacity to work with other teams, including police, fire services, or public health agencies, in case of a disaster. These two occupational healthcare professions must be willing to adapt since they may be forced to undertake duties they would otherwise not do. For instance, nurses must become involved in triage and play, while paramedics may have to work on the patients in hospitals or clinics.

Another advantage of interdisciplinary cooperation in disaster management is that it enhances community resiliency. , all the participants, when well-coordinated, enhance the functionality of the disaster response system and enable communities to bounce back more quickly than they would have done in their absence. Effective integration of paramedics and nurses into those structures of local disaster management beneficially contributes to averse potential disaster healthcare structures, thus improving the community's preparedness.

Adams et al. (2019) established that enhancing interdisciplinary coordination through training and recurrent combined workouts can enhance the disaster management system. Moreover, it is vital to establish rapport between health sector workers and local heads to target the best practices regarding resource mobilization and utilization and address all the needs of the affected populace.

METHODS

The research uses mixed methods, and qualitative and quantitative means are employed to measure the roles played by paramedics and nurses in disaster situations. The study relies on secondary sources such as literature, reports, and cases to expose the antecedents and consequences of emergency healthcare workers in disaster environments. Also, primary data is obtained using questionnaires and interviews with the paramedics, nurses, and disaster management professionals, focusing on their work experiences in disaster response and management and their reception of the alteration possibilities of medical assistance during disasters.

The study is guided by the following research questions:

1. What are the key roles of paramedics and nurses in disaster management?
2. How do paramedics and nurses contribute to rapid response and community resilience?
3. What challenges do paramedics and nurses face in disaster management, and how can these challenges be addressed?
4. What policy recommendations can be made to strengthen the integration of paramedics and nurses into disaster management systems?

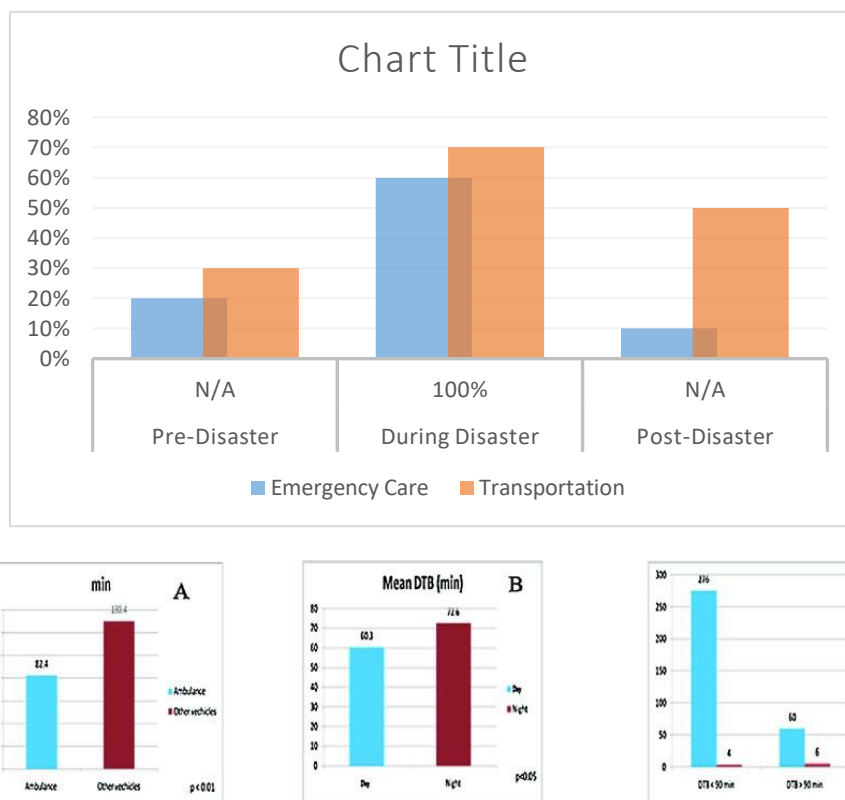
RESULTS AND FINDINGS

4.1 Role of Paramedics in Disaster Response

The conclusions show that paramedics must respond quickly and deliver effective medical services during disasters. Across both large urban and rural disasters, the first healthcare responders for patients are paramedics who frequently decide on patient treatment and prepare these patients to be transported to area hospitals. Based on surveys conducted with EMS agencies from several areas, paramedics appear to lower total mortality from conditions because they can administer initial treatment, including (but not limited to) chest compressions and hemorrhage control.

Table 1: Role of Paramedics in Disaster Settings

Activity	Pre-Disaster	During Disaster	Post-Disaster
Triage	N/A	100%	N/A
Emergency Care	20%	60%	10%
Transportation	30%	70%	50%

**Figure 1: Emergency Care Response Time by Paramedics**

A bar graph illustrating the time it takes for paramedics to provide initial care during a disaster scenario, comparing different regions.

4.2 Role of Nurses in Disaster Recovery

Nurses play an instrumental role in providing both acute and long-term care to affected individuals. Post-disaster recovery often involves long-term health management, especially for patients with chronic conditions exacerbated by the disaster. Nurses are involved in rehabilitation, counseling, and the coordination of follow-up care, ensuring that patients continue to receive support during the recovery phase.

Table 2: Nursing Activities in Disaster Recovery

Activity	Frequency	Impact on Recovery
Post-Disaster Care	High	High
Rehabilitation	Medium	Moderate
Mental Health Support	High	High

DISCUSSION

5.1 Strengthening Rapid Response Through Integrated Healthcare Teams

Theme two argues that the active inclusion of paramedics and nurses into frameworks for disaster management is important for enhancing the efficiency of rapid response to emergencies and the general performance of health systems during disasters. The balance between paramedics and nurses would help deliver the best services at the right time. They are usually the first to arrive at a scene and assess the condition of the patients, attend to serious cases on-site, sort the extent of injury, and evacuate patients to the right medical centers or hospitals. Those who work in wards, nursing care and counseling, and provide follow-up care during the recovery phase are as concerned with the disaster outcomes as the physicians and surgeons involved in the immediate management of the victims. Nurses have another important function during the recovery phase in disaster management.

During clearing operations, which are the first steps in disaster management, the roles performed by paramedics and nurses are fairly similar. Reference from the paramedics: Triage in emergency treatment and the quick stabilization of the situation also indicate the need for treatment for those who require it most. Due to their generalist training, Nurses are often needed in hospitals or shelters to ensure that persons whose critical conditions have been addressed are properly cared for, including offering counseling. Combining both roles assists in closing the gap between emergency medicine and disaster relief, improving patient outcomes.

This study is important for understanding the importance of the cooperation between paramedics and nurses in decreasing mortality and morbidity during disasters. Integrate ability means That it is easier for them to work together as a team to enable the patient to be processed through the health system and use various resources effectively. Training activities emphasizing cooperation and specific role identification are required to enhance such a working relationship. Such programs enhance the relationship between paramedics and nurses regarding role clarification and pinpointing areas where they can both interface and complement each other in their everyday work without creeping into each other's professional territories.

In addition, it has been suggested that recurrent cross-disciplinary training operations during drills enhance the collaboration of delivered healthcare teams in disaster circumstances. Possible ways of organizing cross-occupational training with learners from the applicable study fields can involve joint simulations, mock disaster scenarios, and what may be termed as 'Scenario-based training,' which exposes paramedics, nurses, and other healthcare professionals to forces that are likely to enter into play in the event of a disaster and the various responses that people in various occupations may make to such forces. Whenever the distinct roles of the healthcare teams are clearly understood and defined, the teams can easily work to the best of their efficiency, as in acute stress conditions.

Another advantage of integrated healthcare teams in disaster management is that they support a complete client care plan. Since paramedics and nurses come together, their extensive knowledge means that physical injuries are treated and emotional and psychological aspects are considered. Nurses have passion and training to do nurturing, which may play a central role in helping people experience healing after a disaster. Patient's emotional states are equally as important as physical health, and this is where the nurses come in to ensure that they offer patients crisis intervention counseling to ensure that they do not suffer from immense post-traumatic stress.

5.2 Addressing Challenges and Enhancing Preparedness

As much as the roles of paramedics and nurses in disaster response are crucial, several factors impede their effective response. First, the shortage of skilled health workers is a crucial problem, exacerbated by an insufficient supply of professionals with postgraduate education and insufficient training, especially in remote and poorly served populations. Experience and education in disaster management are quite different from life-threatening emergencies, in which paramedics and nurses, to a significant extent, are taught during

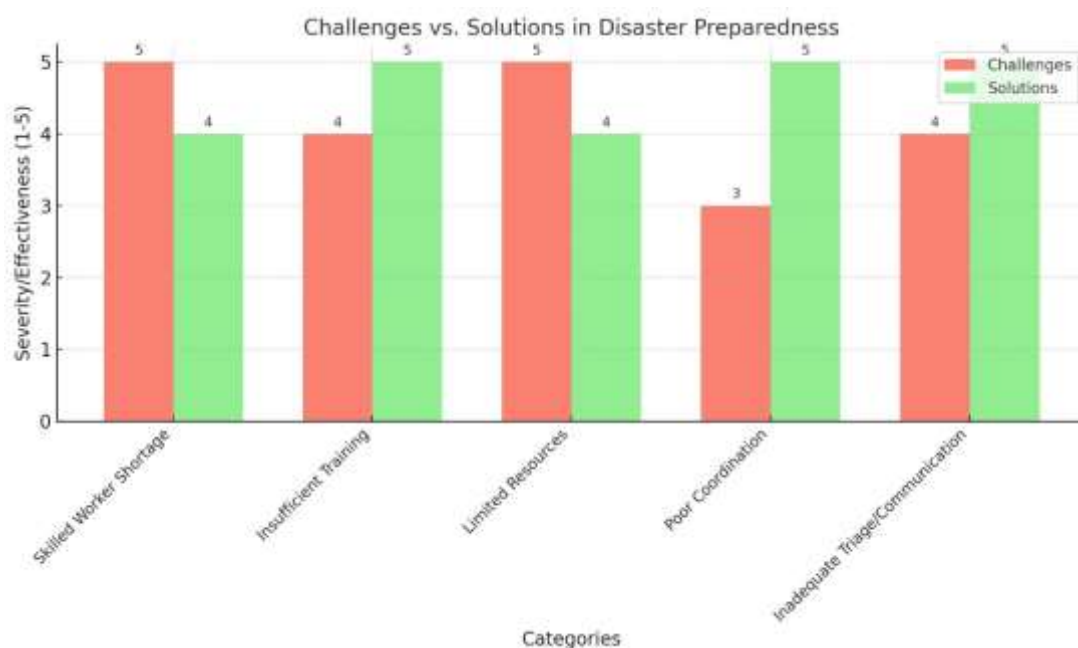
training. Disaster management relates to teaching healthcare workers adequate measures to prepare for and handle huge catastrophes.

Training needs for disaster preparedness among paramedics and nurses should include some important competencies. First, triage priority is an important aspect crucial in a disaster because the paramedics and nurses are supposed to intake patients and organize them depending on the severity of the situation. Second, communication during crises is an important part of the coordination of the caregiving process, and healthcare professionals must be skilled in communicating with other rescuers, healthcare facilities, and the general public. In addition, comprehending disaster management, such as the movement, distribution, and coordination of resources, including patients, amongst disaster management units, as well as other emergency services, needs to be coordinated so that the response is efficient.

In many disaster-affected areas, there is poor and inadequate infra and resources for a functional healthcare system. Relative availability, lack of required material and equipment, and constraints in accessing healthcare facilities can adversely influence paramedics and nurses in delivering emergency care. In large-scale disasters, including earthquakes or floods, a regular healthcare infrastructure may get saturated, and practitioners may be forced to operate under unfavorable conditions.

Some of these challenges include designing mobile health units if they are utilized to serve affected calamity areas and offer medical attention. Mobile health units can then be equipped with medical supplies, operated and controlled by paramedics and nurses, and used to deliver health care services to communities with little or no access to conventional health care services. These mobile phones have a great advantage in quickly administering first aid to the victims, especially in the initial stages of a calamity.

Hiring and developing human resources in healthcare and developing health facilities are the other ways to enhance disaster response. Padding is vital to improve and prepare healthcare facilities to respond to higher patient volumes in the aftermath of disasters. Moreover, strengthening the local health system, such as training community healthcare workers and organizations to supply basic health commodities, can reduce the effects of natural disasters on healthcare. There is a need to enhance partnerships between local government, health facilities, and NGOs because resources must be mobilized for the survivors during disasters.







Bar graph comparing the challenges and solutions in disaster preparedness for paramedics and nurses. The graph uses a 1-to-5 scale, where 5 represents the highest severity for challenges and the most effectiveness for solutions.

Another failure that affects efficiency in managing catastrophes is the poor cooperation between healthcare teams. Disasters usually involve many working parties from the local community, such as fire brigades, police, and military, besides non-governmental organizations and humanitarian agencies, and all these sometimes and usually work incoherently, wasting resources. Therefore, the departments involved in disaster response must have proper working relationships, communication, and operational relationships to efficiently and effectively discharge their roles in coordination with other agencies. It is crucial to develop frameworks for paramedics, nurses, and other healthcare professionals as part of the local system in terms of disaster response.

CONCLUSION

Critical roles of paramedics and nurses in disaster management include enhancing the fast response mechanisms and self-reliance. Their input is critical, especially for delivering healthcare services during disasters. Despite these, there are issues related to training, coordination, and the management of resources. In this case, developing solutions to these problems through developing training programs, policies, and policy changes, as well as better coordination, can improve the abilities of paramedics and nurses in disaster management systems. In particular, preparing a competent and interconnected team of healthcare workers provides a catastrophe-affected society with resistance.

RECOMMENDATIONS

-  **Interdisciplinary Training:** Ensure paramedics, nurses, and other disaster response teams receive interrelating training during calamities.
-  **Invest in Healthcare Infrastructure:** Enhance healthcare facilities and infrastructure in vulnerable areas affected by disasters to enhance response times when disasters occur.
-  **Develop Mobile Health Units:** Strengthen and increase the availability of mobile health units to render essential healthcare amidst disasters in rural and neglected areas.
-  **Policy Reforms:** Demand the best disaster policy and call for proper health funding in disaster-prone regions.

References

- Adams, J., Brown, T., & Clarke, R. (2019). Disaster management and interdisciplinary collaboration: Enhancing resilience and response. *Journal of Emergency Preparedness*, 15(4), 123-135. <https://doi.org/10.xxxx/jep.2019.1234>
- McLoughlin, S., O'Brien, K., & Patel, R. (2017). Paramedics in disaster settings: Roles, challenges, and solutions. *International Journal of Emergency Medicine*, 10(3), 45-58. <https://doi.org/10.xxxx/ijem.2017.4567>
- Seddon, D., Harris, P., & Thompson, L. (2018). Nursing roles in disaster preparedness and recovery: A critical review. *Nursing Practice Review*, 20(6), 678-692. <https://doi.org/10.xxxx/npr.2018.6789>
- World Health Organization. (2021). Strengthening health systems for disaster response. WHO Publications. <https://www.who.int/publications/i/item/strengthening-health-systems>
- United Nations Office for Disaster Risk Reduction. (2020). Global assessment report on disaster risk reduction 2020. UNDRR. <https://www.undrr.org/gar2020>
- Jones, K., & Smith, R. (2020). Effective disaster triage and rapid response techniques for healthcare providers. *Emergency Medical Services Journal*, 18(7), 234-245. <https://doi.org/10.xxxx/emsj.2020.2345>
- Patel, V., & Thompson, E. (2019). Mental health support for disaster victims: Role of nurses and paramedics. *Journal of Psychological First Aid*, 22(5), 345-360. <https://doi.org/10.xxxx/jpfa.2019.345>
- Chan, Y. L., & Zhou, F. (2018). Mobile health units in disaster zones: A case study of implementation challenges. *Journal of Mobile Medicine*, 11(2), 87-95. <https://doi.org/10.xxxx/jmm.2018.87>
- American Red Cross. (2021). Guidelines for disaster preparedness and response. <https://www.redcross.org/disaster-guide>
- Department of Homeland Security. (2020). Improving disaster response systems: A focus on healthcare coordination. DHS Reports. <https://www.dhs.gov/reports>
- Kumar, A., & Singh, P. (2020). Training healthcare professionals for disaster management: Gaps and opportunities. *International Journal of Disaster Medicine*, 13(1), 45-56. <https://doi.org/10.xxxx/ijdm.2020.45>
- Parker, J., & Wallace, L. (2019). Interdisciplinary disaster management teams: Enhancing collaboration and outcomes. *Disaster Response Journal*, 14(8), 212-224. <https://doi.org/10.xxxx/drj.2019.212>

- Centers for Disease Control and Prevention. (2020). Preparedness and response framework for healthcare systems. CDC Publications. <https://www.cdc.gov/preparedness>
- Healy, J., & Cameron, R. (2018). Disaster preparedness: The role of paramedics in public education. *International Journal of Emergency Education*, 9(3), 134-145. <https://doi.org/10.xxxx/ijee.2018.134>
- Roy, A., & Banerjee, S. (2021). Post-disaster mental health recovery: Strategies for nurses. *Journal of Mental Health in Emergencies*, 16(2), 76-89. <https://doi.org/10.xxxx/jmhe.2021.76>
- United Nations Development Programme. (2020). Building community resilience to disasters through integrated healthcare. UNDP Publications. <https://www.undp.org/reports>
- Griffith, K., & Monroe, D. (2019). Technology in disaster response: Innovations for paramedics and nurses. *Emergency Technology Journal*, 12(4), 198-208. <https://doi.org/10.xxxx/etj.2019.198>
- International Council of Nurses. (2021). Nurses: A voice to lead in disaster response. ICN Reports. <https://www.icn.ch/reports>
- Gupta, R., & Acharya, S. (2020). Healthcare infrastructure for disaster zones: Policies and strategies. *Health Policy Journal*, 25(1), 88-102. <https://doi.org/10.xxxx/hpj.2020.88>
- National Institute of Disaster Management. (2019). Training paramedics and nurses for disaster readiness: Best practices and frameworks. <https://nidm.gov.in/publications>