World Journal of Advanced Research and Reviews
eISSN: 2581-9615 CODEN (USA): WJARAI
Cross Ref DOI: 10.30574/wjarr
Journal homepage: https://wjarr.com/

(REVIEW ARTICLE)

Check for updates

The effectiveness of emergency preparedness and disaster response plans in mitigating health and environmental risks

Kelvin Achi Mobosi *

Independent Researcher, Nigeria.

World Journal of Advanced Research and Reviews, 2025, 25(03), 745-748

Publication history: Received on 27 January 2025; revised on 05 March 2025; accepted on 07 March 2025

Article DOI: https://doi.org/10.30574/wjarr.2025.25.3.0710

Abstract

Disasters, whether natural or anthropogenic, are posing rising threats to both public health and the environment. It is equally important to mitigate these threats through effective emergency preparedness and disaster response plans (EPDRPs). This study reviews the elements, execution strategies, and outcomes of EPDRPs, focusing on health and environmental safety. Through case studies, empirical evidence, and scholarly literature reviews, best practices and systemic constraints limiting the effective implementation of the plans are examined. The findings justify the need for sustained improvement and flexibility in the face of emerging threats.

Keywords: Emergency Preparedness; Disaster Response; Health Risks; Environmental Risks; Disaster Management; Public Health

1. Introduction

Emergencies and disasters, including earthquakes, floods, industrial accidents, and pandemics, have devastating impacts upon communities and disproportionately affect vulnerable populations (Cutter et al., 2018). The integrity of health systems and environmental sustainability are particularly under threat during such events, hence the necessity for strong preparedness and response plans aimed at protecting human health and reducing environmental insult (UNDRR, 2022). The paper evaluates the efficacy of EPDRPs, their cardinal components, and procedural considerations for their development and implementation pertaining to disaster health and environmental risk mitigation.

2. Methodology

To thoroughly evaluate the efficiency of EPDRPs, the analysis deployed a mixed-methods approach, integrating both qualitative and quantitative approaches. Main methodologies include:

- An extensive review of the literature on peer-reviewed articles, government reports, and international guidelines regarding emergency preparedness and disaster response.
- Case Studies: In-depth analyses of major historical disasters, such as Hurricane Katrina, the 2004 Indian Ocean tsunami, and the COVID-19 pandemic, to learn lessons from disaster management toward the enhancement of future responses (Patterson et al., 2020).
- Surveys and Interviews: Qualitative feedback from practitioners in emergency management, health care professionals, and environmental scientists in order to bring different views to bear on existing plans and assess their effectiveness.
- Data Analysis: Also, the statistical analyses of health effects, environmental recovery indicators, and socio-economic effects of disaster situations ensuing from the EPDRPs' implementation (Aitsi-Selmi et al., 2016)

* Corresponding author: Kelvin Achi Mobosi

3. Key Components of Emergency Preparedness and Disaster Response Plans

The following essential elements form the foundation of effective EPDRPs that enable success in risk mitigation activities:

- Risk Assessment: A thorough identification of possible hazards, assessments of vulnerability, and prioritization of target populations at risk. The critical step that enables targeted intervention (Fischer et al., 2019).
- Resource Allocation: Timely availabilities of necessary medical supplies, personnel, and communication tools essential for effective response during emergencies.
- Training and Education: Conducting regular drills, exercises, and raising public awareness designed to enhance community resilience and creating a culture of preparedness (Weinkle et al., 2020).
- Policy and Governance: Precise frameworks spelling out roles and responsibilities of the multiple agencies and stakeholders involved in disaster management to ensure coordinated action (McLeman et al., 2020).
- Technology Integration: Deployment of ICT, including GIS, forward warning systems, and real-time data sharing, to enhance situational awareness and response levels (Jones et al., 2021).

4. Findings and Analysis

4.1. Health Risk Mitigation

The implementation of robust emergency preparedness plans has been shown to significantly reduce morbidity and mortality rates in disaster scenarios. Effective evacuation procedures during natural disasters, such as cyclones, have been directly correlated with decreased loss of life (Baker et al., 2019). Additionally, strengthening healthcare infrastructure during health crises, exemplified during the COVID-19 pandemic, improved patient management and containment measures, resulting in better health outcomes (Dyer et al., 2021).

4.2. Environmental Risk Mitigation

Environmental degradation—including water contamination, deforestation, and air pollution—often results from disasters. Proactive measures such as establishing buffer zones, conducting environmental impact assessments, and deploying rapid response teams for hazardous material containment have proven effective in minimizing these impacts (Hanna et al., 2022). Moreover, the integration of environmental planning into disaster management strategies is essential for promoting sustainability and resilience (McLeman et al., 2020).

4.3. Challenges and Gaps

4.3.1. Despite the critical importance of EPDRPs, several challenges hinder their effectiveness, including:

- **Lack of Funding:** Insufficient funding for disaster management agencies often delays response efforts and limits preparedness initiatives (Roberts et al., 2020).
- **Coordination Failures:** Fragmented communication and poor coordination among various agencies can lead to duplicated efforts or ineffective responses, ultimately compounding the disaster's impacts (Lochhead et al., 2021).
- **Community Engagement:** Low public awareness and insufficient community involvement often undermine preparedness efforts, revealing the need for innovative outreach programs (Hastings et al., 2021).
- **Climate Change:** The growing unpredictability of weather patterns exacerbates risks and complicates the formulation of accurate risk assessments (Stefanakis et al., 2023).

5. Recommendations

to enhance the effectiveness of emergency preparedness and disaster response plans, the following recommendations are proposed:

- **Increase Funding:** Allocating adequate resources to disaster management agencies is essential for sustaining preparedness efforts and enabling timely responses to crises (Landrigan et al., 2018).
- **Enhance Coordination:** Establishing centralized command centers can streamline communication among agencies and foster collaboration in disaster management.
- **Promote Public Awareness:** Conducting regular training and educational campaigns to increase community engagement in preparedness initiatives is vital for building resilience (You & Fekete, 2021).

- **Adopt Advanced Technologies:** Integrating advanced technologies—including Artificial Intelligence (AI), the Internet of Things (IoT), and predictive analytics—into disaster management processes can enhance real-time decision-making and situational awareness (Connolly et al., 2021).
- **Integrate Climate Adaptation Measures:** Regularly updating risk assessments to include climate variability considerations will ensure that preparedness plans remain relevant and effective in addressing evolving risks (Stefanakis et al., 2023)

6. Conclusion

Emergency preparedness and disaster response plans are indispensable tools for mitigating health and environmental risks in the face of increasingly frequent and severe disasters. While progress has been made, ongoing challenges highlight the necessity for continuous improvement and adaptation in disaster management frameworks. By addressing identified gaps and harnessing technological advancements, communities can significantly enhance their resilience against future disasters and protect the well-being of populations and ecosystems.

Compliance with ethical standards

Disclosure of conflict of interest

The author declares that there are no conflicts of interest in connection with this research.

References

[1] Aitsi-Selmi, A., Egawa, S., Sasaki, H., & Barlow, M. (2016). The Sendai Framework for Disaster Risk Reduction: Renewing the global commitment to disaster risk reduction. Natural Hazards, 82(1), 127-143.

[2] Baker, E. J., & West, L. (2019). Reducing casualties with timely evacuations: Lessons from Hurricane Katrina. Disasters, 43(1), 40-59.

[3] Connolly, M., He, J., & Moore, D. (2021). The role of artificial intelligence in emergency response direction. International Journal of Disaster Risk Reduction, 61, 102232.

[4] Cutter, S. L., Ash, K. D., & Emrich, C. T. (2018). The geographies of disaster recovery: A review of key issues and policy recommendations. Environmental Hazards, 17(4), 326-341.

[5] Dyer, J. C., Crall, A., & Loro, N. (2021). Healthcare assessments during pandemics: The role of preparedness plans. Disaster Medicine and Public Health Preparedness, 15(3), 354-361.

[6] Fischer, M. M., & Johnson, G. (2019). Risk assessment and vulnerability mapping: The cornerstone of disaster response. Natural Hazards Review, 20(4), 04019031.

[7] Fritz, H. M., & O'Brien, J. (2021). Tsunami preparedness in the Indian Ocean region: Progress after the 2004 disaster. Journal of Ocean and Coastal Economics, 7(2), 1-18.

[8] Hanna, J. C., Siegel, J. A., & Wang, S. (2022). Climate change implications for disaster risk reduction strategies. Sustainability, 14(3), 1572.

[9] Hastings, R., & Garcia, C. (2021). Engaging the public in disaster preparedness: Challenges and strategies. Emergency Management Journal, 18(4), 297-310.

[10] Landrigan, P. J., & Cantalupo, N. (2018). The need for increased funding for disaster preparedness and response. Environmental Health Perspectives, 126(9), 094003.

[11] Lee, S. H., & Jung, H. R. (2021). Lessons learned from South Korea's COVID-19 preparedness and response: A case study. BMC Public Health, 21, 1351.

[12] Lochhead, K., & Kotos, A. (2021). Optimizing public health emergency responses: A framework for interagency coordination. Journal of Public Health Management and Practice, 27(4), 400-409.

[13] McLeman, R., & Smit, B. (2020). Responding to environmental degradation: Strategies and challenges. Climate Change, 156(5), 537-556.

[14] Nations, U., & Mooney, M. (2021). The future of disaster risk reduction strategies: A global perspective. International Journal of Disaster Risk Reduction, 14(2), 18–25.

[15] Patterson, S. C., & Roussos, K. (2020). Emergency management lessons from Katrina: Prioritizing community engagement. Journal of Homeland Security and Emergency Management, 17(3), 1-14.

[16] Roberts, M. S., & Zetter, R. (2020). Funding emergency management during crises: A necessary investment. Disaster Management Review, 78(2), 198-206.

[17] Stefanakis, E., & Tsikritsis, N. (2023). Climate variability impacts on disaster preparedness: A multi-dimensional assessment. Environmental Science & Policy, 132, 12-23.

[18] Weinkle, J. K., & Chang, K. (2020). The importance of public education in disaster preparedness. Journal of Disaster Education, 26(3), 113-119.

[19] UNDRR. (2022). Global Assessment Report on Disaster Risk Reduction. United Nations Office for Disaster Risk Reduction.

[20] You, H., & Fekete, A. (2021). Public awareness and engagement in disaster preparedness. Natural Hazards and Earth System Sciences, 21(6), 825-841