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Strengthening Disaster Response Capacity Through Simulation-Based Rescue and Relief Training Structures: An Evidence-Informed and Scenario-Oriented Approach

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Letter to Editor

Abstract

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Dear Editor,

Rescue and relief operations are inherently characterized by high levels of technical complexity, uncertainty, and rapidly evolving conditions that require the simultaneous application of diverse skills, tools, and decision-making strategies. Preparing rescue and relief personnel for such environments necessitates training approaches that go beyond theoretical instruction and enable experiential learning under conditions that closely approximate real-world emergencies. In this context, specialized rescue training must integrate technical proficiency, operational coordination, decision-making under pressure, and adaptive responses to hazardous environments.

Disasters do not follow predictable patterns; rather, they are shaped by uncertainty, nonlinearity, and dynamic interactions between multiple risk factors (1). Nevertheless, systematic post-incident analysis and the application of lessons learned frameworks allow for the identification of recurring empirical patterns and operational insights (2). These insights contribute to the development of standardized procedures and evidence-informed guidelines that enhance coordination, reduce operational errors, and improve response effectiveness (3). Such standards are typically grounded in a combination of individual competencies, technical expertise, appropriate use of equipment, and coherent operational strategies (4).

A growing body of evidence highlights simulation-based training as a cornerstone of effective disaster preparedness. Simulation provides a safe yet realistic environment in which complex skills can be practiced without exposing trainees to actual risk (5,6). Recent systematic reviews confirm that simulation-based education significantly improves decision-making, technical performance, and crisis management capabilities, while also enhancing learners' ability to cope with stress in emergency situations (6,7). Furthermore, simulation-based and scenario-driven training has been shown to strengthen team coordination, communication, and collective performance in high-risk operational settings (8).

In addition to individual skill development, simulated environments enable structured evaluation of both individual and team performance, facilitating the identification of strengths and gaps, and supporting continuous improvement processes (2,5). These environments also enhance role clarity and foster greater confidence among aid workers, ultimately contributing to more efficient and coordinated field operations (8).

In line with global efforts to strengthen disaster preparedness and build specialized human resource capacity, the Iranian Red Crescent Society (IRCS) implemented a national initiative between 2009 and 2011 to design and develop

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five simulator-based rescue and relief training complexes. This project aimed to establish modern, practice-oriented training infrastructures capable of enhancing aid workers' operational readiness in responding to emergencies and disasters.

These simulator structures were developed using integrated engineering and architectural designs to replicate a wide range of crisis scenarios within controlled settings. Such infrastructures enable immersive, scenario-based training that reflects the complexity and unpredictability of real incidents. Evidence suggests that repeated exposure to simulated scenarios enhances experiential learning, supports skill retention, and improves operational performance in real-world emergencies (5–7).

Moreover, these facilities provide opportunities for iterative training, performance assessment, and refinement of operational strategies. This continuous learning cycle is essential for improving the effectiveness, adaptability, and resilience of disaster response systems (2,7).

International organizations have increasingly emphasized the importance of simulation-based and scenario-oriented training, particularly in resource-constrained settings. The World Health Organization identifies simulation exercises as a key strategy for strengthening emergency workforce capacity, improving response quality, and enhancing the resilience of health systems (9).

Accordingly, the design and implementation of simulator-based rescue and relief training structures represent a transformative step toward modernizing disaster education and training systems. By supporting a shift toward evidence-informed, scenario-driven, and practice-oriented approaches, such initiatives can significantly enhance the effectiveness, coordination, and resilience of disaster response operations.

References

1. Comfort LK. Crisis management in hindsight: cognition, communication, coordination, and control. Public Adm Rev. 2007;67(Suppl 1):189-197. https://doi.org/10.1111/j.1540-6210.2007.00827.x.
2. Skryabina E, Reedy G, Amlôt R, Jaye P, Riley P. What is the value of health emergency preparedness exercises? A scoping review study. Int J Disaster Risk Reduct. 2017;21:274-283. https://doi.org/ 10.1016/j.ijdrr.2016.12.010.
3. Perry RW, Lindell MK. Preparedness for emergency response: guidelines for the emergency planning process. Disasters. 2003;27(4):336-350. https://doi.org/10.1111/j.0361-3666.2003.00237.x.
4. Lateef F. Simulation-based learning: just like the real thing. J Emerg Trauma Shock. 2010;3(4):348-352. https://doi.org/10.4103/0974-2700.70743.
5. Issenberg SB, McGaghie WC, Petrusa ER, Gordon DL, Scalese RJ. Features and uses of high-fidelity medical simulations that lead to effective learning: a BEME systematic review. Med Teach. 2005;27(1):10-28. https://doi.org/10.1080/01421590500046924.
6. Cook DA, Hatala R, Brydges R, Zendejas B, Szostek JH, Wang AT, et al. Technology-enhanced simulation for health professions education: a systematic review and meta-analysis. JAMA. 2011;306(9):978-988. https://doi.org/10.1001/jama.2011.1234.
7. McGaghie WC, Issenberg SB, Barsuk JH, Wayne DB. A critical review of simulation-based mastery learning with translational outcomes. Med Educ. 2014;48(4):375-385. https://doi.org/10.1111/medu.12391.
8. Salas E, DiazGranados D, Klein C, Burke CS, Stagl KC, Goodwin GF, et al. Does team training improve team performance? A meta-analysis. Hum Factors. 2008; 50(6):903-933. https://doi.org/10.1518/001872008X 375009.
9. World Health Organization. Strengthening health emergency prevention, preparedness, response and resilience: report by the Director-General. Geneva: World Health Organization; 2023. Available from: https://cdn.who.int/media/docs/default-source/emergency-preparedness/who_hepr_wha2023-21051248b.pdf

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