Doi: 10.32592/jorar.2023.15.1.8

Exercises: A Way to a World Ready to Face Radiation and Nuclear Emergencies

Mahmoudreza Peyravi[1, 2], Ali Asghar Peyvandi[3], Milad Ahmadi Marzaleh[4]

Date of submission: 12 May 2021 *Date of acceptance: 20 Oct. 2021*

Letter to the Editor

Abstract

Keywords: Disaster; Exercise; Management; Nuclear incident; Nuclear power plant; Radiation.

How to cite this article: Peyravi MR, Peyvandi AA, Ahmadi Marzaleh M. Exercises: **A Way to a World Ready to Face Radiation and Nuclear Emergencies**. Sci J Rescue Relief 2023; 15(1):76-77.

Dear Editor

We live in a world where the occurrence of radiation incidents, the explosion of nuclear power plants, and terrorist attacks are not unexpected. In the past, we witnessed irreparable catastrophes, such as the Chernobyl disaster, the Three Mile Island accident, and Fukushima Daiichi nuclear disaster, which negatively affected humans, facilities, and the environment. No country across the globe can claim that it is entirely immune from radiation and nuclear incidents. Numerous countries have operational or research nuclear power plants and some others have nuclear weapons and bombs; therefore, the world is surrounded by radiation. Radioactive material easily crosses geographical boundaries and can be detected in a few days, depending on the type and amount of radioactive substance.

Radiation, which is induced by the decomposition of radioactive isotopes, produces certain elements and compounds. Radiation can be in the form of alpha, beta, or gamma. These materials are colorless and odorless and can only be detected by radiation detectors. Another danger is the dust contaminated with radioactive substances. For first responders, it is essential to prevent the inhalation of dust contaminated with radioactive substances (1). Preparedness is an important component in the management of these incidents, and one of the most important components of preparedness is doing exercises.

Exercises refer to the activities performed to train and exercise the core capabilities and competencies of prevention and mitigation of effects, reduction of vulnerability, response, and recovery in an environment safe for contributors (2). Tabletop exercises are the least costly and the most precise types of exercises, while real exercises are costly, and people realistically respond to hypothetical incidents (3, 4). Computerized exercises can be effective in part of this process (5). Exercises are conducted with the following aims: making a higher response preparedness, identifying weaknesses of programs, improving inter-organizational coordination, ensuring project execution capabilities, testing projects and management systems, strengthening inter-organizational cooperation, as well as demonstrating the application of comprehensive crisis and disaster management systems.

Conducting nuclear and radiation incident exercises will help to better prepare for these incidents. The radiation and nuclear exercise scenario should be written with the participation of all stakeholders, including people, healthcare personnel, nuclear power plant personnel, military staff, various organizations, including the environmental organization, passive defense, Red Crescent, and universities of medical sciences. In the exercises related to nuclear and radiation incidents, various aspects, such as radiation detectors, triage and decontamination, unit management and command, area isolation,

1.Assistant Professor, Department of Health in Disasters and Emergencies, Health Human Resources Research Center, School of Management and Medical Informatics, Shiraz University of Medical Sciences, Shiraz, Iran
2. Research Center for Emergency and Disaster Resilience, Red Recent Society of the Islamic Republic of Iran, Tehran, Iran
3. MD. Hearing Disorders Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran
4. PhD Candidate of Health in Disasters and Emergencies, Student Research Committee, Department of Health in Disasters and Emergencies, Health Human Resources Research Center, School of Management and Medical Informatics, Shiraz University of Medical Sciences, Shiraz, Iran
Correspondence to: Milad Ahmadi Marzaleh, Email: miladahmadimarzaleh@yahoo.com

[Downloaded from jorar.ir on 2026-11-24]

[DOI: 10.32592/jorar.2023.15.1.8]

zoning, evacuation of the affected area and parts of the city, health care protocols and instructions, waste management, incident command system, how to use personal protective equipment, psychological support, provision of security, intra- and inter-organizational communication, and environmental monitoring should be tested and exercised. Responding to nuclear and radiation incidents requires coherence in various organizations since a wide range of organizations are involved.

In these exercises, all stakeholders must be active. Nuclear and radiation exercise that is completely "correct" or completely "incomplete" is treated as a significant failure. The ultimate goal of these exercises is to learn and recognize weaknesses and strengths. These exercises should be conducted at regular intervals, both inter-organizationally and intra-organizationally. Furthermore, international exercises, with the participation of different countries, will also contribute to comprehensive emergency response preparedness.

Conclusion

National and international organizations should consider logical rules in the development of nuclear and radiation technologies. These laws and protocols are set at all local, regional, national, and international levels. Moreover, all countries must be required to conduct radiation and nuclear exercises. These incidents can threaten the entire life on Earth. The government's commitment to doing exercises and developing them rationally, with a comprehensive look at human health and the protection of the environment can reduce concerns about these incidents.

Acknowledgments

The authors would like to thank Dr. Hajiani, the executive manager of the Red Crescent Society of Bushehr province, for providing the required information. Thanks also go to Ms. A. Keivanshekouh at the Research Improvement Center of Shiraz University of Medical Sciences for improving the use of English in the manuscript.

References

1. Heyer RJ. Introduction to NBC terrorism: an awareness primer and preparedness guide for emergency responders. Disaster Preparedness and Emergency Response Association. 2001.
2. Norige A, Yenson S, Elkin G, Mapar J, Legary J. Homeland security exercise and evaluation program-enterprise platform (HSEEP-EP): an innovative service oriented architecture approach. IEEE Conference on Technologies for Homeland Security (HST). 2012.
3. Lim HCS, Ng KS, Tan HH, Leong KWG. Hospital preparedness for radiation emergencies and medical management of multiple combined radiation injury victims. Proc Singapore Healthc. 2011; 20(3): 197-207.
4. Moore BL, Geller RJ, Clark C. Hospital preparedness for chemical and radiological disasters. Emerg Med Clin North Am. 2015; 33(1): 37-49.
5. Kako M, Hammad K, Mitani S, Arbon P. Existing approaches to chemical, biological, radiological, and nuclear (CBRN) education and training for health professionals: findings from an integrative literature review. Prehosp Disaster Med. 2018; 33(2): 182-90.

[Downloaded from jorar.ir on 2026-11-24]

[DOI: 10.32592/jorar.2023.15.1.8]

http://jorar.ir