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Letter to the Editor

The 2025 Myanmar earthquake: public health emergency responses and challenges in the post-disaster period

Sir,

The Republic of the Union of Myanmar, a lower-middle income country, is located in Southeast Asia between latitudes 90° 32' N and 28° 31' N and longitudes 92° 10' E and 101° 11' E, sharing borders with Bangladesh, India, China, Laos and Thailand, facing the Andaman Sea and Bay of Bengal in the south and southwest. In terms of climate, Myanmar is located in a tropical region, experiencing hot temperatures, high humidity, and copious rainfall. The country's total land area is 676,578 square kilometers, characterized by hilly and mountainous topography. Administratively, Myanmar is divided into seven States (Chin, Kachin, Kayah, Kayin, Mon, Rakhine, and Shan - cover mainly the upland areas and are largely populated by national races/ethnic communities), seven Regions (Ayeyarwady, Bago, Magway, Mandalay, Sagaing, Tanintharyi, and Yangon - are situated mainly on the plains), and one Union Territory (Nay Pyi Taw).[1,2] The current population is estimated at 51.3 million people and males accounted for 46.9% of the population. Two-thirds of the total population lives in rural areas and the larger urban populations are concentrated in Yangon and Mandalay.[1,3]

Myanmar is exposed and vulnerable to a myriad of natural and anthropogenic hazards depending on the location, regional weather and geological conditions and topography. As a consequence, Myanmar is prone to almost all types of hazards, which include fire, forest fire, earthquake, strong wind/cyclone, storm surge, tsunami, landslide, floods, drought, and industrial/ technological hazards. Approximately half of the total number of disasters in the country are caused by flooding, followed by storms (23%), earthquakes (15%), and mass soil movement (12%).[4] Myanmar is located in the southern ranges of Himalaya, and faces the Indian Ocean to the east, thus being exposed to earthquakes caused by the Himalayan orogeny or by the subduction of the Indian Plate pushing underneath the Burma Platelet (a part of the Eurasian Plate). Of the five seismic risk zones from I to V, the most dangerous of which are located in the northern and central regions of Myanmar.[2]

SAGAING FAULTS AND HISTORICAL MAJOR EARTHQUAKES IN MYANMAR

There are two main sources of earthquakes in Myanmar: the Sagaing fault and the Sunda subduction megathrust zone.[5] In Myanmar, four specific areas such as Bago-Phyu, Mandalay-Sagaing-Tagaung, Putao-Tanaing, and Kale-Homalin are designated as a destructive zone according to the high risk of earthquake damage. For the earthquake intensity, upper and central Myanmar including Kachin, Chin, Sagaing, Mandalay, Nay Pyi Taw, Magway, and Shan fall in the Strong Zone with 8 to 12 Modified Mercalli intensity. As a coastal area of Myanmar, the Rakhine coast also falls in the strong zone with 8 Modified Mercalli intensity.[4,6] In the last century, the significant earthquakes that occurred in Myanmar were the Maymyo earthquake of 1912 (8.0 magnitudes), the Swa earthquake of 1929 (7.0 magnitudes), the Bago earthquake of 1930 (7.4 magnitudes), the Phyu earthquake of 1930 (7.3 magnitudes), the Kamaing earthquake of 1931 (7.6 magnitudes), the Tagaung earthquake of 1946 (7.5 magnitudes), the Sagaing earthquake of 1946 (7.8 magnitudes), the Sagaing earthquake 1956 (6.8 magnitudes), the Bagan earthquake of 1975 (6.5 magnitudes), the Thabeikkyin earthquake of 1991 (7.0 magnitudes), the Taungdwingyi earthquake of 2003 (6.6 magnitudes), the Monywa earthquake of 2011 (6.3 magnitudes), the Tarlay earthquake of 2011 (6.8 magnitudes), the Thabeikkyin earthquake of 2012 (6.8 magnitudes), and the Chauk earthquake of 2016 (6.8 magnitudes).[7]

THE 2025 MYANMAR EARTHQUAKE

On 28 March 2025, a powerful earthquake with a magnitude of 7.7 on the Richter Scale (at 12:50 local time), consecutively followed by a second of magnitude 6.4 (at 13:02 local time), struck central Myanmar. Both earthquakes occurred along the Sagaing fault at a shallow depth of around 10 km which is a most active strike-slip fault line, approximately 19 km northwest of Mandalay, the second-largest city of Myanmar. The earthquakes, and several aftershocks reaching up to a magnitude of 6.6 that followed, were catastrophic.[8] The earthquakes caused widespread destruction across central Myanmar. The worst affected areas were Mandalay, Sagaing, and Nay Pyi Taw, followed by Bago, Magway, Shan South, and East. Numerous structures and buildings collapsed, especially in the municipal area of Mandalay City and Sagaing township.

Moreover, earthquakes damaged public and private health care facilities, government office buildings, old historical buildings, monuments and temples, and religious

structures. The highlighted damages included 11,995 totally damaged houses and 40,019 partially damaged houses, 2,596 schools, 713 hospitals, 14,367 religious buildings and pagodas, as well as 9,970 offices and other buildings.[9] Other critical infrastructures such as road networks and bridges were severely damaged. Two major airports in Mandalay and Nay Pyi Taw were temporarily closed due to structural impacts. As of 01 May 2025, 3,835 people have reportedly died, 5,105 have been injured, 105 remain missing, and 206,977 people are currently displaced due to the earthquakes.[10-12] Myanmar government declared a state of emergency in Sagaing, Mandalay, Magway, Bago, Eastern Shan State, and Nay Pyi Taw and then launched rescue operations. The government has requested international assistance to support relief efforts. World Health Organization (WHO) has classified this crisis as a Grade 3 emergency, the highest level of activation under its Emergency Response Framework.[13]

There were significant numbers of casualties and trauma-related injuries, with an urgent need for emergency care. The affected communities face a lack of adequate shelters and extreme heat that creates serious health risks. Electricity, telecommunication networks, and water supplies were disrupted, deteriorating access to health services and increasing the risks of disease outbreaks. The combination of substantial structural damage and the large number of patients with traumatic injuries signified that the local health system faced an overwhelming threat. The WHO has provided medicines, medical devices, tents, and supplies including Interagency Emergency Health Kits (IEHK), and trauma and emergency surgery kits for support to the hospitals in the affected areas. Many countries including India, Russia, China, USA, United Kingdom, Thailand, Sri Lanka, Nepal, Bhutan, Timor-Leste, Bangladesh, Cambodia, Indonesia, Philippines, Laos, Malaysia, Brunei, Singapore, Vietnam, Japan, the Republic of Korea, and Germany provided humanitarian assistances such as dispatching the relief and rescue teams and emergency medical teams, supplying emergency aid, sending the medical personnel and equipment including a field hospital unit to establish an emergency treatment center, assisting the search and rescue efforts, and supporting the local search and rescue teams. In the aftermath of the earthquakes, the Myanmar Fire Brigade, Myanmar Red Cross Society, and local volunteers actively involved in search, rescue and relief operations with international teams.

PUBLIC HEALTH EMERGENCY RESPONSES IN THE AFTERMATH OF EARTHQUAKES

The Ministry of Health (MOH) provides emergency medical services to earthquake-affected populations, collaborating with the Central Emergency Response Team, emergency medical teams of the Directorate of Medical Services, local healthcare volunteers and charities, international emergency medical response teams, Non-Governmental Organizations, and International Non-Governmental Organizations. The temporary mobile clinics and field hospitals were established in most affected areas of Mandalay, Sagaing, and Nay Pyi Taw to provide immediate medical care for trauma-related injuries. The medical personnel deployed as part of search and rescue teams, managed the mass casualty, providing the first aid for stabilizing the patients and maximizing the chance of survival. The medical personnel provided emergency care for life-threatening injuries with bleeding, fracture, and shock at the temporary mobile clinics, field hospitals, and designated hospitals. The essential medical drugs and supplies were distributed to the temporary mobile clinics, field hospitals, and general hospitals that provided emergency medical services to the earthquake-affected population. The MOH prioritizes the emergency medical services, preventive measures and surveillance of communicable diseases, and continuity of essential health services.

Following the earthquakes, the risk of infectious disease outbreaks can increase due to disruptions to water supplies, sanitation systems, and healthcare services. Therefore, adequate preventive measures to mitigate the spread of infectious diseases in affected populations are essential. The MOH performed the immediate administration of vaccines against tetanus and cholera (Ora Vacs) to the population in displacement camps as a priority. For the provision of safe water, sanitation, and hygiene (WASH) services, the MOH is deploying the water treatment units in affected areas, delivering training to local health staff for the safe operation of water treatment systems, disinfecting the water sources by chlorination, and implementing the distribution of chlorine tablets and hand sanitizers. Moreover, international relief teams provide the WASH services in Madadalay, Sagaing, and Nay Pyi Taw. Insecticide-treated nets (ITNs) were distributed in earthquake-affected areas for the protection of infants and children against the secondary health crisis by mosquito-borne diseases.

Risk communication is recognized to be a critical tool in emergency response. It enables people at risk to make informed decisions to mitigate the effects of earthquakes and take preventive measures for the consequences. The MOH provides health education and risk communication to the affected population through its social media platforms (https://www.facebook.com/Ministry Of Health Myanmar) and official website (https://www. mohs. gov.mm/), delivering health-related precautionary measures after the earthquake, prevention of communicable diseases such as diarrhoea, eye infection, skin infections, respiratory tract infections, water-borne diseases, mosquito-borne diseases, and risk of encountering venomous snakes or poisonous insects due to structural damage, displacement to temporary camps or shelter, and increased exposure to natural environments. Serious psychological trauma can have long-lasting impacts on the affected people who are struggling with grief, anxiety, depression, and post-traumatic stress. Therefore, the MOH provides psychosocial support

including mental health services and counseling to the affected community to reduce psychological distress and facilitate physical rehabilitation.

CHALLENGES TO PUBLIC HEALTH EMERGENCY RESPONSES IN THE AFTERMATH OF EARTHQUAKES

The following challenges are commonly encountered in public health responses after the 2025 earthquakes in Myanmar.

Damaged medical facilities

Many health facilities in the earthquake-affected areas are damaged, impacting healthcare access, interrupting routine healthcare services such as maternal and child health, vaccination, and chronic disease management, the ability to provide timely care, and increasing morbidity and mortality rates.

Limited resources

In the aftermath of an earthquake, limited resources including health staff, and medical and life-saving equipment are also a significant challenge in delivering emergency healthcare services.

Extreme weather

Extreme heat and heavy rainfall are additional challenges for healthcare personnel and the displaced families living in tents and temporary shelters. The combination of damaged water infrastructure, limited sanitation facilities, and rising temperatures increases the risk of heat-related illnesses, as well as outbreaks of various types of diseases such as water-borne diseases, vector-borne diseases, vaccine-preventable diseases, and skin diseases.

Burnout in health workers

Healthcare providers are responding to the needs of emergency health care services in the mobile clinics, hospitals, and emergency response teams. The demands of healthcare providers for emergency responses led to high levels of stress, and physical, emotional, or mental exhaustion which increase the risk of burnout.

Political instabilities

Conflict and political instability make it difficult for the emergency response teams and international organizations to provide search and recuse, emergency healthcare services, and resources for the emergency response in some areas.

Infodemic

Nowadays, with the rapid progress of science and technology, information spreads faster, and the spread of false information related to the earthquake is important for public health response through affected communities. If people believe false information more than scientific guidelines, it has become a threat to mental health and public health safety.

CONCLUSION

Emergency healthcare services including traumatic injury care, risk communication, prevention and control of communicable disease outbreaks, and emergency mental health service with psychosocial counseling are urgent needs for emergency public health responses through the affected community. Community awareness programs and disaster drills should be implemented to raise public awareness of disaster risks, minimize disaster impacts, and maximize the culture of preparedness in the community. Additionally, community engagement, command, control, coordination, and communication should be employed for monitoring the situation and adjusting the resources, coordinating with non-governmental organizations, international search and recuse teams, and local stakeholders, and communicating the clear and timely information flow. With the efforts of health staff in local and international teams, there are no reported cases of clustering of infectious diseases or outbreaks in the affected areas.

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Ye Minn Htun[1]*, Thinzar Aung[2], Pyae Phyo Aung[2], Sai Soe Thiha[3], Tun Tun Win[3], Kyaw Myo Tun[3]

[1]Department of Prevention and Research Development of Hepatitis, AIDS and Other Viral Diseases, Health and Disease Control Unit, Nay Pyi Taw, Myanmar
[2]Department of Public Health, Ministry of Health, Nay Pyi Taw, Myanmar
[3]Department of Preventive and Social Medicine, Defence Services Medical Academy, Mingaladon, Yangon, Myanmar

***Correspondence:**
Dr. Ye Minn Htun,
E-mail: dryeminnhtun85@gmail.com

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