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Capacity Development in Healthcare for Disaster Risk Reduction:A Review

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Abstract
India has been urbanizing at a tremendous speed. Its health, well-being, and infrastructure capabilities are changing. Disasters are growing more common, catastrophic, and costly. The steady increase in disasters and the increased vulnerability of people, facilities, built environment, and assets are alarming indicators that disaster preparedness must be strengthened and capacity planning for efficient response and recovery at the emergency level must be in place. In crises, ad hoc and unplanned capacity planning might result in additional losses or intensify the disaster-stricken population. This article examines factors of health capacity in controlling disaster risks from the perspective of a rapidly urbanizing nation.
Keywords: disaster response, public health, disaster risk reduction, hospital safety, developmental risk

1. Introduction

The state of one's health is a critical measure of a country's development. The level of development is a proxy for the health consequences of any event. Developing disaster risk reduction capability has been recognized as a critical component of sustainable development in recent decades and is explicitly stated in international disaster risk reduction frameworks. This is particularly critical for a disaster-prone, resource-scarce, and densely populated country like India, which experiences recurring small and medium-sized calamities. These variables affect both the health infrastructure and the health outcomes. For example, the Hyogo Framework for Action 2005–2015 acknowledged disaster risk reduction as a development issue, and the Sendai Framework for Disaster Risk Reduction 2015–2030 stressed the importance of effective support for developing nations through capacity building.[1,2] The academic literature recognizes a need to increase the capability to protect individuals from threats at various levels.[3-8] While these international frameworks and academic research emphasize the critical nature of capacity development, the issues of progress and an effective methodology persist. Large-scale health system failure is also known to have a detrimental effect on a region's economy.[9-11] The government bears the majority of the expenditures associated with damaged health infrastructure and poor health outcomes. As a result, health care capacity must be organized in such a way that it can respond effectively to crisis cycles. There has been no discernible gain in capacity. One factor is a "lack of understanding of the capacity required" and the appropriate technique.[8] External scholars and practitioners frequently assume they are best equipped to develop capacity for the indigenous community. Thus, a local viewpoint is lacking; yet, the capacities of individuals at this level must be developed based on their perspectives and evaluations of capacity-building initiatives. This study will examine an actual example by identifying areas for capacity development and analyzing methods and methodology for disaster risk reduction capacity strengthening. This article analyses the methods and lessons learned from a real-world capacity-building project in healthcare.

Capacity development in disaster risk reduction

The United Nations General Assembly designated the 1990s as the International Decade for Natural Disaster Reduction (IDNDR), demanding action to mitigate natural disaster losses through capacity building in underdeveloped nations. The Hyogo Framework for Action made a point of emphasizing the term capacity development in disaster risk reduction as a basic approach. The framework places a premium on technical and professional transfer, as well as the development of individuals and communities' capacities in their local contexts1. Additionally, the Sendai Framework for Disaster Risk Reduction recommended that all players,

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including governments and non-state actors, invest in capacity development.[12] Additionally, the Sendai Framework has made a significant contribution to meeting the Sustainable Development Goals, to which 190 world leaders committed at the 2015 United Nations General Assembly. Each of the seventeen goals and indicators is tied to the Sendai Framework.[2,13] There is, however, a lack of universal agreement on capacity development. According to the UNISDR, capacity development is distinct from the more limited idea of capacity building in that it focuses on identifying and enhancing existing capability rather than on developing new capacity.[8] Capacity development is defined differently by each institution.[14-19] In light of their related definitions, capacity development is the method by which sustainable development can be accomplished on multiple levels. The following definition is adopted in this literature study and associated case because it combines the characteristics of multiple definitions and focuses on disaster risk reduction. Capacity building for disaster risk reduction is a process that involves acquiring, strengthening, adapting, and maintaining the capacities of individuals, organizations, and communities to reduce their vulnerability to catastrophe risks, to prevent or mitigate the detrimental effects of hazards.[18] It is critical to understand the local environment when undertaking a capacity development initiative. Regardless of the field or region, the efforts of outsiders to begin project work with an accurate awareness of local reality are critical to implementation. Hagelsteen and Becker underlined the critical nature of comprehending fundamental facts, such as the danger profile and the broader social, economic, and political contexts.[5]

The other critical problem that is inextricably linked to capacity development is ownership.[4-8] The term "ownership" refers to how individuals regard the capacity development process as their own and indicate a willingness to participate in it. Numerous capacity development efforts aimed at reducing disaster risk lack a feeling of local ownership.[15] Local ownership suggests an outsider's role. Chambers demonstrated the detrimental effects of development assistance when a lack of indigenous ownership was apparent and re-examined the role of foreigners.[19] By separating the roles, ownership is retained by the indigenous people whose ability is being enhanced, while outsiders serve as assistance.[1] Additionally, ownership is critical to the project's success both during and after implementation. Sustainability is another critical notion for capacity development since it can serve as a long-term catalyst for catastrophe risk reduction. However, because donor institutions operate on a short timeline, sustainability is frequently not secured in development programs.[6] Despite continuous academic discussions, the concept of capacity building is wide, making it difficult to implement initiatives and assess their impact. The Global Capacity Development Strategy proposes a shift in “direction on a variety of issues—from standardizing terminologies, principles, and concepts to identifying approaches and best practices, and finally to enabling coordination, collaboration, and the sharing of information and lessons learned.” According to the Strategies, the gaps stem from a failure to recognize the capacity that has to be created, as well as the tasks and resources required to undertake capacity development initiatives.[8]

2. India’s health and hazard landscape:

Over half of India's landmass is subject to multiple high-intensity hazards. Between 1970 and 2015, India saw 614 reported catastrophes, including floods, earthquakes, high heat, drought, landslides, and storms. Over half of India's landmass is subject to multiple high-intensity hazards. Between 1970 and 2015, India saw 614 reported disasters, including floods, earthquakes, excessive heat, drought, landslides, and storms, resulting in over 198,000 deaths, affecting over 2 billion people, and causing USD 93 billion in losses. While India has always scored high in terms of mortality caused by natural disasters, economic damages to infrastructure have increased significantly. The recent decade has shown the weakness of India's health systems. Kerala floods of 2018 destroyed a 125-year-old hospital that serviced 350,000 people.[7] This was comparable to the Chennai floods of 2015 when 18 patients died as a result of a power outage or the increased risk of infection associated with Mumbai's yearly urban flooding.[20] A particularly terrible example of a disaster's impact on a health facility was the collapse of a 281-bed civic hospital in Gujarat (2001), which claimed 172 lives. This occurrence resulted in the widespread adoption of base isolation technology for earthquake-resistant building construction. This was eventually incorporated into the amendment of the Indian Seismic Code IS 1893: 2002 for Earthquake Resistant Structures Design Criteria. According to an analysis of the seismic susceptibility of 1.6 lakh public health facilities across India, more than 54% are located in moderate to very high-risk zones.

3. Elements of health and disaster risk management in India

4.1 Resource management

Health response during and after a disaster may be limited by a lack of or inability to get people and equipment resources. To maintain a consolidated resource inventory for disaster response, the Government of India created the India Disaster Resource Network in conjunction with the United Nations Development Program (Disaster Risk Management) (IDRN). IDRN is a web-based inventory that collects and organizes data about available

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resources at the level of a district's line departments (local administrative unit). The website features a country-wide query engine for locating medical equipment, skilled health professionals, and crucial health-related materials at the district level. The National Institute of Disaster Management (NIDM) monitors the site and grants approved access to government authorities such as emergency managers, relief coordinators, district collectors/magistrates, and other officers to submit and access data. Currently, the IDRN contains data for more than 75% of India's districts. To facilitate private sector contribution of equipment, the portal includes a module through which the Confederation of Indian Industry (CII) and Builders Association of India (BAI) can input resource information to the database. Selected states are pioneering the use of this online inventory format through the development of enhanced resource inventories that are compatible with the national interface. Gujarat has taken the initiative by establishing a State Disaster Resource Network that includes information on resources in 97 percent of the state's communities.[21] However, the data's quality and comprehensiveness are always being improved.

4.2 Disease and epidemic surveillance

India's disease control system is ineffective due to a lack of robust surveillance systems, low vaccination coverage, and inadequate sanitation infrastructure. Seasonally elevated vector-borne disease, water-borne disease, and endemic disease occurrences are common. Following the 2001 Bhuj earthquake, WHO established an onsite surveillance system with 620 reporting locations.[22] To systematically detect and monitor illness outbreaks, the Ministry of Health and Family Welfare established the Integrated Disease Surveillance Program (IDSP) in 2004 with financing from the World Bank. The IDSP was preceded by the establishment of the National Surveillance Program for Communicable Diseases (NSPCD) in 1997.

IDSP is critical for assessing the effectiveness of public health interventions and budget allocation decisions. Due to the program's reliance on local data collecting, its effectiveness is contingent upon the quality of local capacity to report and preserve records. The government must continue to invest heavily in rigorous technical capacity development to enhance the quality of surveillance. Selected states are pioneering the use of technology to monitor and respond to specific health concerns.[23] Karnataka has built a computerized database to track the regional and temporal distribution of vector-borne illness mortality and morbidity. Punjab has established an online reporting system for climate-related diseases.

4.3 Mobile medical units and sanitation

Containment of epidemics is an important health component of disaster management. This necessitates the establishment of a system that delivers safe drinking water, sanitation, and encourages excellent hygiene. The NDMA publishes "Guidelines on Minimum Standards of Relief," which address basic service standards for relief and rehabilitation camps, including temporary accommodation, food, water, sanitation, medical coverage, and provisions for vulnerable groups. The Ministry of Health and Family Welfare recently announced Operational Guidelines for Mobile Medical Units, which details the service's nature, quality, monitoring, and finance mechanisms required of such a fleet.[24] The Ministry of Rural Development published a standard operating procedure (SOP) for providing drinking water and sanitation services during natural disasters in 2011.[25]

4.4 Trauma care

Following a disaster, a system must be capable of providing emergency care for physical trauma (falls, injuries, and burns) and maintaining referral networks of facilities capable of responding to a variety of situations. In India, a person dies of trauma every 1.9 minutes, primarily as a result of traffic accidents26, which are estimated to cost up to 3% of GDP.[27] As a result, trauma care research is disproportionately weighted toward motor vehicle accidents. Trauma care is offered in hospitals' emergency and casualty departments. However, existing trauma care facilities and their staff lack a standardized accreditation and training process, resulting in disparities in treatment levels. To reduce mortality, the National Health Policy (2002) called for the construction of a "hub-spoke" trauma treatment network in large urban regions.[28] This was followed by a nationwide capacity-building initiative aimed at establishing trauma care facilities in government hospitals located along major highways.[29]

4.4.1 Training on trauma life support

In 2012, NDMA undertook a Pilot Project on Capacity Building for Advanced Trauma Life Support in India in partnership with the Apex Trauma Center at the All India Institute of Medical Sciences (AIIMS).[30] This was a capacity-building effort for chosen physicians, nurses, and paramedics regarding the many protocols and guidelines for trauma care that are used internationally. The states of Assam, Bihar, and Andhra Pradesh were picked. The training included:

1. Advanced Trauma Life Support
2. Advanced Trauma Care for Nurses

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3. Pre-Hospital Trauma Life Support
4. Rural Trauma Team Development Course
The trained professionals are required to disseminate this knowledge in their respective states.

4.4.2 Emergency Medical Service (EMS)
To enhance health care delivery during disasters, a responsive and time-sensitive Emergency Medical Service is required (EMS). This includes transporting patients and administering Basic and Advanced Life Support before initiating care. India lacks a single agency to oversee Emergency Medical Services activities. Currently, EMS systems are a collection of projects from several states, each with its delivery model and a wide range of dispatch and transportation capabilities. In 2006, it was claimed that just 12% of stroke victims reached an urban metropolis hospital via ambulance.[31] The Emergency Management and Research Institute is responsible for monitoring the existing national program (EMRI). EMRI runs over 2600 ambulances using a public-private partnership approach. Individual states have adopted this system to provide transport, pre-hospital stabilization, referral facilities for healthcare professionals, or a combination of these services. In 2009, the Medical Council of India recognized emergency medicine as a specialty.[32]

4.4.3 Mental health and psychosocial support
Mental health is a critical component of the recovery process for a population that has encountered situations beyond its capacity to cope.[33] Health care facilities are tasked with the responsibility of addressing both the immediate and long-term emotional impacts of disasters. At least one-third of survivors of Odisha's super-cyclone experienced disabling psychological issues.[34] India's reaction to disasters in terms of mental health has developed beyond identifying and treating specific psychiatric problems to enhancing survivors' coping ability.[35] The National Mental Health Programme (NMHP) incorporates disaster preparedness methods for Psychosocial Care and Mental Health Services (PSMHS). The NDMA established rules to assist disaster-stricken communities in rebuilding their lives by providing necessary assistance. The service networks are comprised of psychiatric units within tertiary healthcare facilities and educational institutions, clinical psychologists, social workers, non-governmental organizations (NGOs), paramedical professionals, community-level workers, and volunteers. It includes a "all-hazards" health strategy that addresses the response, relief and rehabilitation aspects of various types of catastrophes.[36]

4.4.4 Heat stress
Temperature trends have been progressively increasing over the last 15 years, with 2016 being the warmest year on record in India.[37] The Ahmedabad Heat Action Plan was established in 2017 to strengthen healthcare systems during heat waves. As the region's first of its kind, one of its primary pillars is committed to capacity building among health professionals and training medical staff to manage heat-related sickness.[38] There are plans to expand this program to further Indian cities.[39]

4.4.5 Social resilience
Grassroots and community-based initiatives actively promote disaster-related health provision. In West Bengal, a flood-prone state, district-level flood microplans have been developed containing information on alternate health service locations in the event of flooding. Municipal governments have developed response procedures to mitigate the risk of outbreaks following flooding. Following the 2005 Mumbai floods, the municipal corporation supplied comprehensive healthcare through the formation of 130 specially formed medical teams. Through outreach camps, over 3,00,000 patients were treated virtually at their homes.[23,40]

Future Recommendations
Despite its large population, India has proved its potential for efficient delivery and advocating for public health services through numerous programs. However, sustaining service quality over extended periods has been a continuous difficulty. The variegated institutional landscape has proven to be both an opportunity for creativity at the local level and difficulty for applying frameworks at the central levels. Evaluation of the performance of central health programs and their effects on health infrastructure, health outcomes, and emergency services need persistent examination. This would provide the space for bigger environmental and societal goals that improve systemic coping capability in the event of a crisis. The following review of the health and catastrophe risk management of India throws up some key concerns that need to be addressed immediately:
• Information infrastructure: Effective decision-making may be associated with more accurate data and analysis. Improved and organized registries for infectious illnesses, trauma treatment, and GIS databases on hospitals must be updated and maintained regularly.
• Capacity building: The gap in healthcare facility capacity and knowledge in specialist areas such as trauma care, mental health, immunization, and emergency medicine must be addressed more comprehensively.

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• Risk assessment: Improved resource management during an emergency, such as the golden hour, necessitates rigorous documenting and evaluation of the situation. Combining data analysis, surveillance, and monitoring across all states is critical for making evidence-based decisions and minimizing resource allocation biases.
• Climate variability: To transition from a post-disaster reactive to an integrated approach, a region's health institutions must adopt an "all-hazard" approach. Climate-sensitive vector-borne and water-borne diseases, such as malaria and diarrheal sickness, are known to be affected by changes in weather factors.[23] As a result, building resilience will necessitate a thorough mapping of climate variability to ascertain its influence on health. Building health system resilience to disasters is a subset of the health system's overall well-being. This is an especially daunting task when a country is still navigating systemic flaws and establishing baseline health indicators. Concentrated and persistent efforts and investments in the medical community, health infrastructure innovation, and society as a whole will be important for the development of resilient health systems that are disaster-ready.

Conclusion

Disaster risks can undoubtedly be mitigated by disseminating relevant and reliable knowledge about the nature, causes, and impacts of such disasters to both disaster management personnel and the general population. By sharing this knowledge, residents will get a better understanding of the hazards they may face and, as a result, will be better prepared to withstand calamities. Preventing or mitigating the effects of disasters, such as those caused by global climate change or pandemics, needs multidisciplinary policies and actions that extend beyond standard public health and emergency services. New and innovative approaches to disaster risk reduction should be pursued through the integration of acquired knowledge and experience, as well as through the gathering of academics, practitioners, and employees of local governments and agencies to discuss common issues from a variety of perspectives.

Declaration of Competing Interest: None.

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