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DELVING INTO STAKEHOLDER AWARENESS AND PREPAREDNESS IN INDUSTRIAL DISASTER MANAGEMENT: A QUALITATIVE STUDY

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Abstract

Introduction: The Bhopal gas disaster of 1984 marked a global turning point, highlighting the critical importance of industrial disaster preparedness (Broughton, 2005). This event, claiming thousands of lives and causing long-term health issues, prompted the Indian government to pass the Disaster Management Act of 2005, initiating preparations for disaster management at various levels. With India's transition from an agrarian to an industrial economy, regions like notified areas of Gujarat face an escalated risk of industrial disasters. ***Methods:*** The study is set in one of the notified area of Gujarat. It employs a qualitative research methodology using in-depth interviews. Six key stakeholders will be interviewed, including representatives from disaster management officer, police personals, fire departments, industrial associations representative, Taluka medical officers, NGOs, and educational institutions of the Notified area. ***Results:*** Thematic analysis of interviews revealed seven key themes: heightened awareness of industrial disaster possibilities, the central role of community preparedness, the need for more government involvement and guidelines, concerns about healthcare infrastructure deficits, the necessity for effective coordination, improving community awareness through culturally sensitive materials, and the moral and ethical responsibilities of industries in disaster preparedness. ***Conclusion:*** The study highlights the need for comprehensive disaster preparedness measures in One of the notified area of Gujarat, focusing on community involvement, government guidelines, healthcare infrastructure, and industry responsibilities. Priorities include enhancing community awareness, implementing community-centric guidelines, addressing healthcare infrastructure deficits, and promoting industry-community cooperation.

Keywords: Industrial Preparedness, Disaster Management, Qualitative Research, Stakeholder Awareness, Community Engagement. Disaster Preparedness, Disaster Awareness, Disaster Stakeholders, Industrial Disaster, Community Role İn Disaster.

INTRODUCTION

The Bhopal gas disaster of 1984 marked a significant turning point in the world's awareness of industrial disaster preparedness. This catastrophic event, often referred to as one of the deadliest industrial accidents in history, had far-reaching consequences. Immediately after the incident, it was estimated that approximately 3,800 people lost their lives. Tragically, the long-term impact of the gas leak resulted in an additional 10,000 to 20,000 premature deaths over the course of two decades, while a staggering 102,000 individuals suffered from permanent disabilities, and 554,895 were injured (Broughton 2005).

In response to the Bhopal tragedy and recognizing the need for comprehensive disaster management, the Government of India enacted the Disaster Management Act in 2005. This legislation laid the foundation for disaster preparedness and response at various levels. The focus was on raising awareness and enhancing preparedness not only in industrial settings but also in schools, communities, hospitals, and various other sectors.

It is crucial to understand that India is currently in a state of economic transition, shifting from an agrarian-based economy to an industrial one. Over the past two decades, numerous industrial towns and cities have been established, and they are now home to millions of people. One of the regions at the forefront of this industrial growth is Gujarat, known for its vast industrial landscape, encompassing major and minor cities such as Ahmedabad, Vadodara, Bharuch, Koyali, Anand, Khera, Surendranagar, Rajkot, Surat, Valsad, and Jamnagar ((https://ic.gujarat.gov.in/documents/news/External-profile-South-Gujarat-Final-07092017.pdf)). The statistics for South Gujarat reveal the region's significant contribution to the state's population, accounting for 20% (12 million) of the total. In terms of area coverage, Gujarat itself comprises 12% (24,034 square kilometers) of the total landmass, with a population density of 511 persons per square kilometre, compared to the state's average density of 308 persons per square kilometre. The industrial landscape in this region is diverse, with dominant sectors including textile, diamond polishing, chemical and petrochemicals, pharmaceuticals, and the plastic industry (source:https://ic.gujarat.gov.in/documents/news/External-profile-South-Gujarat-Final-07092017.pdf).

Given the rapid industrialization and population growth in regions like South Gujarat, the importance of a well-structured District Disaster Management Plan cannot be overstated. Such plans must address the unique challenges posed by the industrial landscape, population density, and the presence of critical industries, all while drawing upon the lessons learned from past disasters like the Bhopal gas tragedy. Comprehensive disaster preparedness, including early warning systems, evacuation procedures, and emergency response strategies, is essential to mitigate the potential impact of future disasters in these regions.

Aim: To Study Awareness and Preparedness of Stakeholders Working for Industrial Disaster.

OBJECTIVE

1. To study the awareness level for roles and responsibly of stakeholders working for disaster management.
2. To find out the preparedness of different stakeholders associated with disaster management.

RESEARCH METHODOLOGY

Study Setting: The study was conducted in one of the notified Industrial areas of Gujarat. The Census India 2011 report states that of the 24,789 people living in this Notified Area, 13,359 out of them are men and 11,430 are women. There are almost 1800 registered industrial unit in the notified area of Gujarat.

Study design: Qualitative Research Method using Phenomenology Design

Study Population: All the Stakeholders working for industrial disaster management in the notified area of Gujarat.

Inclusion Criteria

- Stakeholders related to Disaster Management.

- Those who will able to understand Gujarat/Hindi or English.

Exclusion Criteria

- Person with whom communication will be difficult because of language problem.

Study Duration

Study duration was between December 2022 to September 2023.

2.5: Sample Size: Total 6 in-depth interviews was conducted from different stackholders working for industrial disaster management in the notified area of Gujarat.

S. No.	Designation	Location	No. of interviews
1.	District Disaster Management Project Officer working in the Notified area	Notified area of Gujarat	1
2.	Police personal working in the Notified area	Notified area of Gujarat	1
3.	Head/Member of Industrial Association	Notified area of Gujarat	1
4.	Taluka Head Medical Officer working in Notified Area	Notified area of Gujarat	1
5.	Member of NGO Working for Disaster Management	Notified area of Gujarat	1
6.	Principal of School in Notified Area	Notified area of Gujarat	1

Tool

Data collection was done by using Personal in-depth interview method of the stakeholders working for disaster management.

Pilot testing of questionnaire

The pilot testing of interview guide was done among the people living in one of the notified area of Gujarat.

Ethical permission: Ethical permission was taken from Ethical committee of Parul Institute of Medical Science of Parul University. (Approval No. PUIECHR/PIMSR/00/081734/3104)

RESULT

The qualitative research conducted in the one of the notified areas of Gujarat region comprised interviews with six stakeholders working for industrial disaster management, revealing seven key themes related to disaster preparedness and community involvement.

Theme 1: Industrial Disaster Possibility (IDP)

Participants in the study expressed a heightened awareness of the potential for industrial disasters in the GIDC One of the notified area of Gujarat area. This awareness stemmed from the presence of numerous chemical industries in close proximity to residential areas, which raised concerns about the interdependence of these zones, increasing the risk to both industrial workers and nearby residents. Participants voiced apprehensions regarding hazardous materials and processes used in these industries, underscoring the urgent need for disaster preparedness efforts.

Theme 2: Community Preparedness (CP)

The second theme, "Community Preparedness (CP)," highlighted the central role of the local community in disaster preparedness. Participants shared accounts of adverse health effects experienced by residents living near industrial areas, including skin diseases, eye ailments, and respiratory issues. They attributed these health concerns to gas leakages and air pollution from nearby industries, emphasizing the need for increased community awareness and involvement. Participants stressed that disaster preparedness should be a collaborative effort involving both local authorities and residents, with a strong focus on community engagement.

Theme 3: Government Involvement and Guidelines (GIA)

The third theme, "Government Involvement and Guidelines (GIA)," shed light on the participants' perspectives regarding government agencies and the existing framework for disaster management in the GIDC One of the notified area of Gujarat region. While participants acknowledged the presence of government guidelines for disaster management, they expressed concerns about the lack of a robust community-centric approach within these frameworks. Participants stressed the need for specific training and guidelines tailored to the unique dynamics of industrial disaster scenarios. Additionally, they highlighted the significant deficit in public awareness regarding disaster preparedness measures, underscoring the necessity of improving educational efforts and disseminating information effectively.

Theme 4: Healthcare Infrastructure (UPH - Lack of Government Facilities)

The fourth theme, "Healthcare Infrastructure (UPH - Lack of Government Facilities)," brought to the forefront the participants' concerns about the scarcity of government healthcare facilities within the GIDC One of the notified area of Gujarat area. They questioned the region's capacity to respond effectively to potential industrial disasters, given the absence of government-run medical facilities. The theme emphasized the need for accessible healthcare services during crises and highlighted the inadequacy of healthcare infrastructure, especially in a region closely associated with industrial activities.

Theme 5: Experiences in Disaster Situations (ED)

The fifth theme, "Experiences in Disaster Situations (ED)," provided insights into the participants' personal encounters and observations during past disaster situations. Participants shared instances where government responses appeared to rely on administrative interventions, particularly during industrial disasters. They emphasized the importance of effective reporting mechanisms and streamlined coordination among relevant agencies and authorities. The theme highlighted the practical challenges and dynamics of disaster management, underlining the need for more proactive disaster preparedness measures.

Theme 6: Improving Community Awareness (ICA)

The sixth theme, "Improving Community Awareness (ICA)," focused on participants' appeals for heightened awareness and preparedness within the local community. Participants proposed the development of visual educational materials as effective tools to inform and reassure the community about disaster preparedness measures. They emphasized the importance of tailoring these materials to the local context and ensuring their availability in regional languages like Gujarati and Hindi to make them accessible to a broader population. The theme highlighted the need for a proactive approach to enhance community readiness, with community members actively engaging in awareness campaigns and sharing relevant information with their neighbours.

Theme 7: Industry and Disaster Responsibility (IDR)

The seventh theme, "Industry and Disaster Responsibility (IDR)," offered insights into the perceived responsibilities of industries in disaster preparedness and ensuring community safety. Participants stressed that industries should adopt a proactive stance, taking significant measures to mitigate potential risks associated with their operations. They emphasized the importance of industries adhering to stringent safety standards, conducting regular safety audits, and implementing robust risk management protocols. Participants underscored that industries have a moral and ethical responsibility to ensure that their operations do not pose undue risks to the community. The theme highlighted the collective commitment to disaster prevention and community welfare, emphasizing the role of industries in safeguarding the well-being of local residents through transparent, trustworthy, and cooperative engagement with local communities and authorities.

The thematic analysis of interviews in the GIDC One of the notified area of Gujarat region revealed the pressing need for disaster preparedness due to the heightened risk of industrial disasters from nearby chemical industries. Participants stressed the importance of community involvement, community-centric disaster management,

improved healthcare infrastructure, proactive preparedness, and public awareness. Experiences highlighted the significance of effective coordination. Industries were urged to adopt a proactive role in ensuring community safety and resilience. These insights guide future research and policy development, emphasizing the roles of industries, government agencies, and the community in fostering preparedness and resilience.

DISCUSSION

The thematic analysis of interviews conducted in the GIDC One of the notified area of Gujarat region sheds light on the complex landscape of disaster preparedness and management, emphasizing various key factors that influence the region's readiness for industrial disasters. These insights are in line with previous literature that highlights the critical elements of disaster preparedness.

One prominent theme that emerged is the Industrial Disaster Possibility (IDP), which underscores the heightened risk in the GIDC One of the notified area of Gujarat area due to the presence of numerous chemical industries handling hazardous materials. This aligns with previous studies that have emphasized the importance of recognizing potential disaster risks, especially in areas where industrial and residential zones are closely interlinked (Nik Nadian Nisa Nik Nazli et al., 2013; Stevens, 2017).

Community Preparedness (CP) emerges as another critical theme, reflecting the participants' concerns about the lack of community awareness and engagement in disaster preparedness. This finding is consistent with literature that stresses the importance of active community involvement in disaster management (Okazaki; Laura J. Steinberg et al., 2004).

The theme of Government Involvement and Guidelines (GIA) emphasizes the need for government agencies to play a more significant role in community-centric disaster management. This aligns with previous research that highlights the importance of comprehensive government guidelines and effective disaster response (Stevens, 2017).

The theme of Healthcare Infrastructure (UPH) underscores the critical role of healthcare facilities in disaster preparedness, reflecting concerns about the inadequacy of government healthcare facilities in the region. This is consistent with prior literature that emphasizes the importance of healthcare infrastructure in disaster response (Stevens, 2017).

Experiences in Disaster Situations (ED) provide insights into the practical challenges and the role of administrative interventions in disaster management. This corresponds to the existing literature that highlights the need for improved coordination and reporting mechanisms during crises (Laura J. Steinberg et al., 2004).

Improving Community Awareness (ICA) highlights the importance of raising awareness within the community, with a specific emphasis on culturally sensitive and linguistically appropriate educational materials. This finding aligns with previous studies emphasizing the significance of community education and outreach (Enander, 1997).

Finally, the theme of Industry and Disaster Responsibility (IDR) underscores the moral and ethical responsibility of industries in disaster preparedness, aligning with previous literature that emphasizes the importance of proactive industry engagement in safety measures (Laura J. Steinberg et al., 2004).

In summary, the findings from the thematic analysis provide valuable insights into disaster preparedness and management in the GIDC One of the notified area of Gujarat region. These insights align with existing literature on disaster preparedness and highlight the multifaceted nature of the challenges and opportunities faced by the community, government, and industries in fostering resilience and preparedness. The themes identified in the interviews serve as a foundation for future research and policy development in disaster management, emphasizing the crucial roles played by various stakeholders in the region.

CONCLUSION

The thematic analysis of interviews conducted in the GIDC One of the notified area of Gujarat region has provided valuable insights into disaster preparedness and management. The participants' awareness of the heightened risk of industrial disasters, especially due to the presence of hazardous chemical industries, underscores the pressing need for comprehensive disaster preparedness measures. Community involvement, government guidelines, healthcare infrastructure, and the responsibilities of industries all play pivotal roles in addressing the challenges posed by potential disasters.

In conclusion, the thematic analysis highlights the critical importance of disaster preparedness in the GIDC one of the notified areas of Gujarat region. Addressing the identified challenges and implementing the recommended measures will be vital in fostering resilience and preparedness, ultimately ensuring the safety and well-being of the local community in the face of potential industrial disasters. Further research and policy development in this field should take into account the specific needs and dynamics of the region while also considering the broader context of disaster management.

Future Recommendations

Moving forward, it is imperative that the region takes concrete steps to enhance its disaster preparedness efforts. First and foremost, community awareness and engagement must be prioritized, with a focus on creating culturally sensitive and linguistically appropriate educational materials to bridge the awareness gap. Government agencies should develop and implement community-centric guidelines, address healthcare infrastructure deficits, and improve coordination during crises. Industries should proactively invest in safety measures and actively engage with local communities and authorities to ensure a safer environment.

Limitations

While this study provides valuable insights, there are limitations to consider. The research is based on a relatively small sample size, and the findings may not be fully representative of the entire region. Additionally, the qualitative nature of the interviews may introduce subjectivity, and a broader quantitative survey could complement these findings. The study also does not delve into specific technical aspects of disaster preparedness, which may require further investigation. Finally, the findings are

context-specific to the GIDC one of the notified area of Gujarat region and may not be directly applicable to other areas with different industrial and community dynamics.

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