



Significance of Sheltering as an Emergency Response to Potential Disasters in Dhaka

Sakib Nasir Khan*¹

¹ Department of Architecture, Bangladesh University of Engineering and Technology, Dhaka, Bangladesh
sakibnasirkhan@gmail.com

Abstract. Rapid unplanned urbanization, high population density, inadequate open spaces, and a few other issues are making Dhaka city highly vulnerable to urban disasters like earthquakes and fires. Although the city has not experienced a building-collapsing earthquake for many years, several tremors have been reported to be felt in recent years, raising concerns about an imminent high-magnitude disaster. If a major quake were to occur here in Dhaka, many buildings would collapse or sustain substantial damage such that they become uninhabitable. Fatal fire incidences are increasingly occurring here in Dhaka, damaging building infrastructure. Disaster relief (DR) shelters play a vital role in disaster management, generally in terms of recovery during any emergency. It is essential to ensure adequate shelter for the displaced people immediately after such events. Successful shelter interventions are important parts of disaster recovery processes because they give secure places during repairs and offer stability and routine. In addition to providing basic human needs such as food, water, and healthcare, shelter sites can help the affected recover from trauma. This study examines the significance of immediate sheltering as a disaster management emergency response for possible disaster-affected communities in Dhaka. With almost no large-scale calamities in recent years, there are few available studies related to post-disaster sheltering. The study also analyzes the previous emergency responses in Dhaka city, recognizes vulnerable communities, and explores people's views on sheltering. The results may not only raise attention to this growing issue but also enrich the existing and further develop the new post-disaster rehabilitation guidelines and approaches necessary for densely populated urban areas.

Keywords: Disaster Relief Shelter, Emergency Response, Urban Disaster

1 Introduction

An adequate and safe sleeping place is recognized as a basic human right. Shelter is not only a means of survival but also ensures security, protection, and better health against infections and diseases. Although it seems impossible, especially for developing countries, to put a roof on the heads of all their citizens, the government must ensure that most citizens meet this primary requirement.

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Dhaka has not seen a building collapsing in a devastating earthquake for more than 120 years. A major earthquake hits near the land of the current Bangladesh every 100-150 years with a magnitude over 7 [1]. The 1897 Great Indian Earthquake at Assam had a magnitude 7.5+ earthquake that caused widespread damage in India and Bangladesh, killing over 1,000 people. The ground beneath Dhaka lost its tenacity and rigidity. Some structural elements of the historical building, the Ahsan Manzil, were damaged and later repaired. Many in Dhaka lived in fear of aftershocks, spending days without food or sleep. As an emergency response, the British colonial authorities quickly dispatched medical teams to the affected areas to provide immediate medical care to the injured and set up temporary hospitals to treat the victims. Support for the injured survivors and rehabilitation helped them reintegrate into society [2].

There have already been lots of significant fire incidents that have damaged buildings and infrastructure in Dhaka. For instance, a massive fire engulfed one of the largest slums in Dhaka in 2017, the Chalantika Slum, Mirpur. It destroyed more than a thousand shanties to ashes and left those families homeless. The mayor opened shelter centers at local schools and arranged food for the victims. However, no credible information exists on the rehabilitation program promised to the victims [3]. In 2019, a fire broke out in the historic Chawkbazar area of Dhaka, Bangladesh, resulting in 70 deaths and significant damage to several multi-storeyed buildings [4]. The affected were not provided temporary accommodation, so people had to form a human chain, demanding it [5]. History indicates that emergency responses, including DR sheltering approaches after such incidents have fallen short of the standards observed in most developed countries.

The devastating flood in 1988 in Bangladesh caused 85% of the city to be inundated, lasting for about three weeks. The 1998 flood lasted over two months, the longest recorded in Dhaka. It inundated two-thirds of the country, including most of the eastern Dhaka. Thirty million people were homeless; some were people in Dhaka, especially the lower-income groups [6]. In 1988, emergency responses involved rescuing and evacuating affected individuals and establishing temporary relief camps and shelters in community centers or other high structures [7]. In 1998, there was no notable disaster plans to mitigate the effects of floods in Dhaka. Most shelter-seeking people from less affluent socioeconomic backgrounds took refuge in educational institutions, hospitals, markets, community centers, private residences, and under-construction commercial buildings [8].

The likelihood of urban disasters threatens life, property, and livelihood in this crowded city. Earthquakes, deadly fires, and floods are a few of the many threats that designers, urban planners, and policymakers must address in their works. If an earthquake comparable to the Great Indian Earthquake were to strike here again, it is predicted that an average of 28% of structures would be damaged [9]. The density of the population and the lack of proper infrastructure make post-disaster emergency response harder. One of the most immediate priorities after rescuing and emergency medical attention following a disaster is sheltering displaced communities. As a part of humanitarian response, sheltering becomes crucial to overall disaster management, giving those who lost their home a secure place, which may help the affected recover from the sudden trauma of losing belongings. It helps them gradually get back to normal life.

Therefore, sheltering is an integral part of the emergency response to disasters. The required category of shelter and required facilities in the sheltering site also depend on the social context and the damage level.

In 2012, the government adopted a national disaster management policy, including a section on DR sheltering. The policy calls for developing more resilient and sustainable shelters that meet the needs of the displaced population [10]. Many non-governmental organizations (NGOs) have helped provide temporary housing in Bangladesh. National and international organizations such as BRAC, Action Aid, CARE Bangladesh, Oxfam, UNDP, Bangladesh Red Crescent Society, and many others have also developed innovative approaches to sheltering [11]. However, the implemented shelters were mostly located in rural and coastal areas. The only instruction regarding sheltering in Dhaka can be found in the Detailed Area Plan (2022-2035) and Draft Dhaka Structure Plan (2016-2035), in which playgrounds and parks in Dhaka are instructed to be utilized as shelter places during disasters such as earthquake or fire. However, no other details regarding sheltering are mentioned there.

The objectives of this study are to compare Dhaka's past damages and sheltering response to those of historical catastrophes in some other cities worldwide, identify communities with possible vulnerability to disasters, and find and analyze vulnerable communities' needs and perspectives on sheltering.

2 Methodology

The methodology for this research is a mixed-methods approach, using secondary data and evaluating those qualitatively and conducting a questionnaire survey to identify the problem and recommending probable solution by comparing the field data with past knowledge from the available literature. Fig. 1 shows a schematic presentation of the methodology followed in the present study.

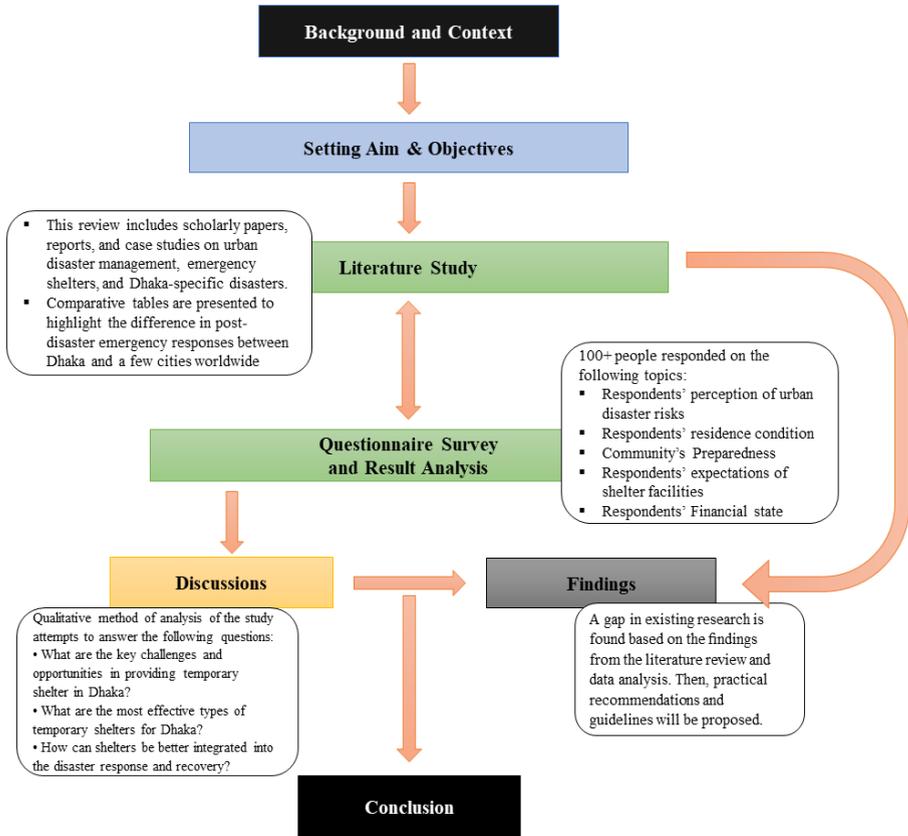


Fig. 1. The methods followed during this study are shown with a flow diagram.

2.1 Questionnaire Survey and Interview

A close-ended questionnaire survey was conducted on around 105 people around Dhaka city via Google form to comprehend the Dhaka residents' perspectives focusing on this study. The number of respondents per specific location has been illustrated in Fig. 2. Respondents from Bosila and Mohammadpur topped all others in numbers.

The pie chart (a) of Fig. 3 shows that 7% of the respondents reside elsewhere than their permanent addresses in Dhaka, and 20% live in their own houses. The specific addresses of this 20% of respondents are shown in chart (b) of Fig 3. It highlights some areas in Dhaka where the ratio of having the same present address and permanent address is high (based on the respondents' addresses). About 23% and 26% of those who voted for having the same present and permanent address are from Mohammadpur and Mirpur, respectively. In contrast, every one out of two residents of Old Dhaka has the same present and permanent address.

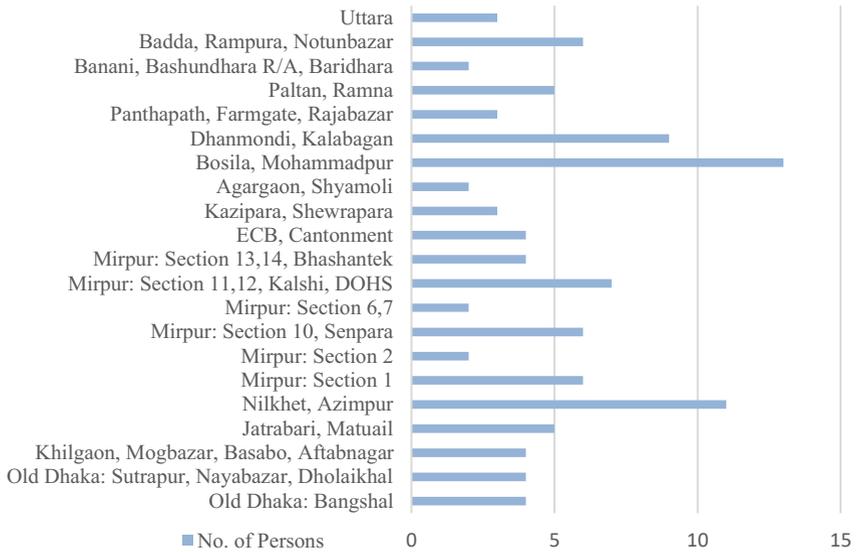


Fig. 2. Locations of Survey vs Persons per location

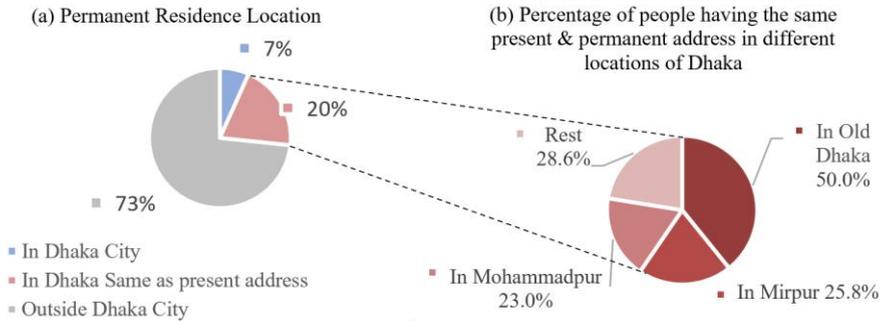


Fig. 3. Distribution of surveyed persons around the city.

2.2 Limitations of this Study

One limitation of this survey was that only those with internet access could answer the questions. As a result, opinions and information from individuals who cannot afford regular internet access were not collected.

3 Results and Discussion

3.1 Disaster Awareness and Preparedness.

Fig. 4. shows that very few buildings have open spaces around them. Fig. 5(a) and 5 (b) show that almost all respondents from Jatrabari, Matuail, Mohammadpur, and Old Dhaka considered their residential area to be at risk.

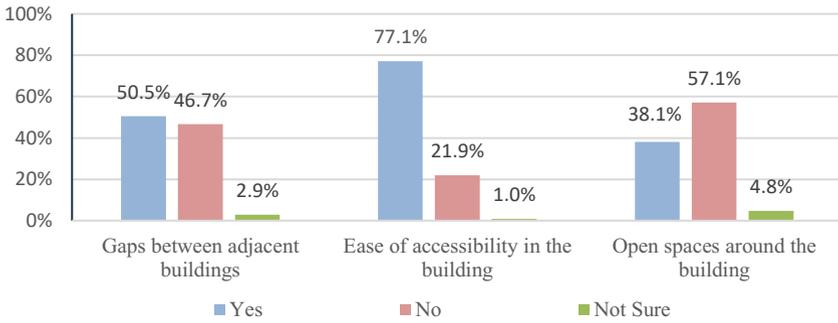


Fig. 4. Buildings’ User Satisfaction with the following features

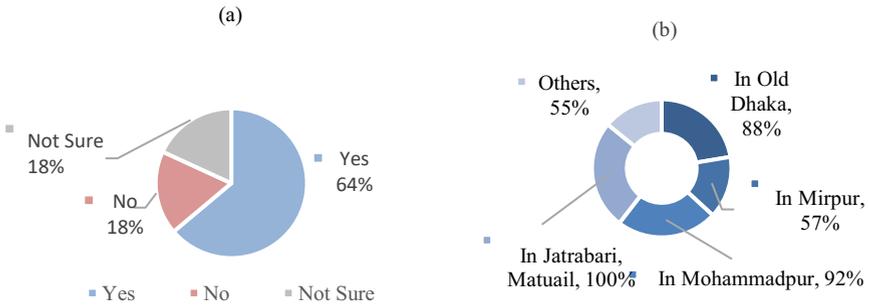


Fig. 5. Percentage of people in Dhaka who consider their respective residential area to be at risk of urban disasters or not.

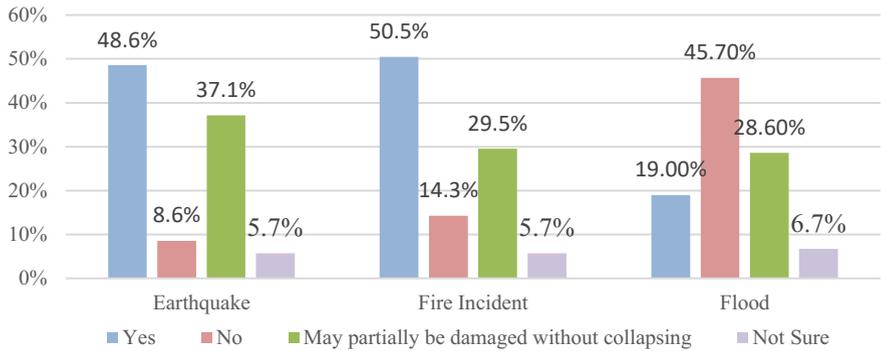


Fig. 6. Residents thinking their building may collapse due to any strong disastrous force in the future.

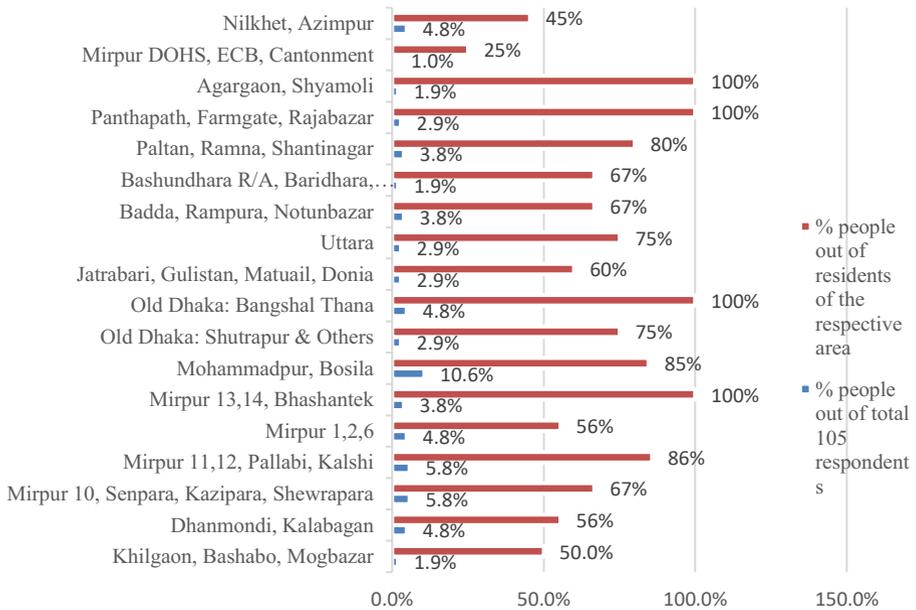


Fig. 7. Earthquake Risk Perceived by Participants.

Fig. 6. displays that less than 15% of respondents believe their building is strong enough to resist damage from earthquakes and fire, and only a few identified floods as a threat to their buildings. Fig. 7. shows that most of the respondents in Mohammadpur and Bosila think that their residences may sustain severe damage or even collapse due to an earthquake. In the second place, 5.8% of respondents from Mirpur 10, 11, 12, Kalshi, Pallabi, Kazipara, and Shewrapara indicated that their buildings are risky. Of 105 respondents, 6.7% have marked Mirpur 1, Mirpur 2, and Mirpur 6 as sustaining damage

due to fire hazards, making them at the top of the list in Fig. 8. With 5.8% votes, Dhanmondi, Kalabagan, Mohammadpur, and Bosila take second place in having the most fire-risky buildings. Old Dhaka areas, like Bangshal Thana and Mirpur, take third place with 4.8% votes. Fig. 9. shows that most Dhaka communities are unprepared for an earthquake. Fire is second. Pie charts (a), (b), (c), and (d) from Fig. 10. show that 36% of Dhaka residents may require DR sheltering. Most are from Old Dhaka, Khilgaon, Basabo, and Mogbazar.

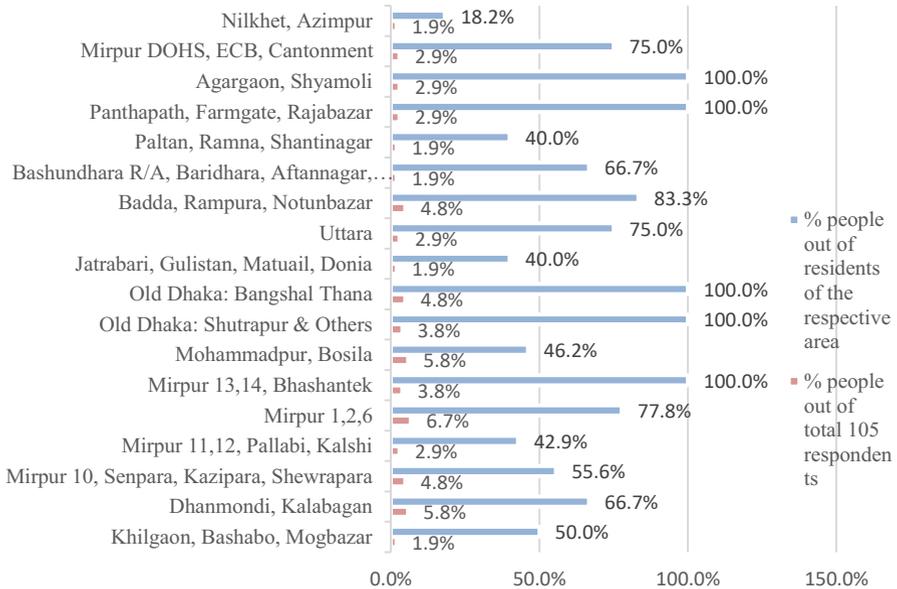


Fig. 8. Fire Risk Perceived by Participants.

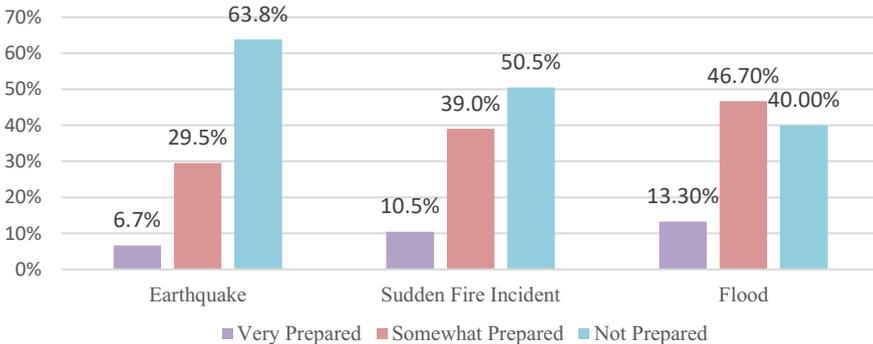


Fig. 9. Level of prepared the residents feel their community is to cope with a disaster if it happens in their area.

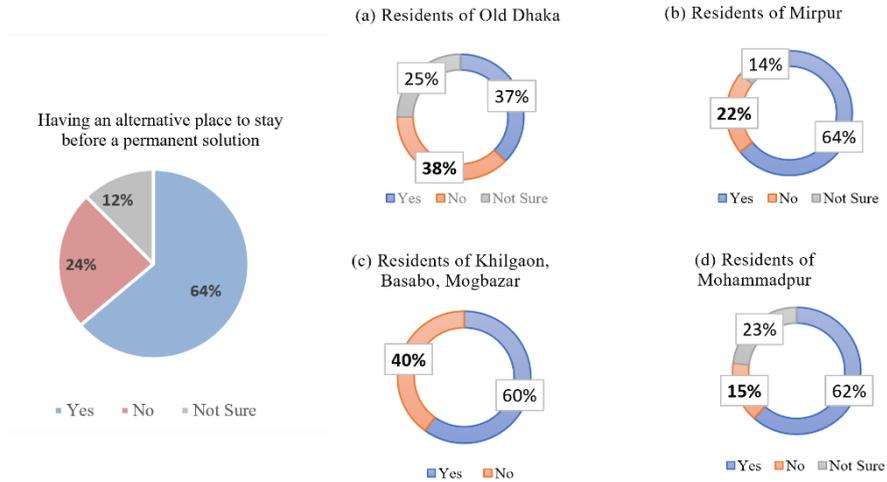


Fig. 10. Percentage of Dhaka residents having an alternative place to stay as long as their housing issue is solved if they have no abandon their current house to a disaster.

3.2 Expectations, Requirements, and Experiences of the People

The experiences of people living in shelters can vary widely. Some have positive experiences, while others have negative experiences. Several factors, including the type of shelter, location, and availability of resources, can influence them. Based on field surveys and interviews at a couple of DR sheltering sites in Bangladesh, some of the common challenges that people face when living in temporary shelters can be shortlisted below:

1. Lack of privacy: Shelters can often be crowded and lack privacy. This can be a challenge for people who are used to living in private homes.
2. Lack of security: Shelters often make people feel unsafe, which can be particularly challenging for women and children.
3. Lack of access to essential services: Shelters often lack critical services such as food, water, and healthcare, making it difficult for people to meet their basic needs.

Even though all of these are essential features, Access to clean water and sanitation received the most votes, as shown in Fig. 11. Other suggestions given by the interviewees: Electricity and Internet connectivity, Proximity to educational institutions, Open space and playground, Adequate light and airflow, Special attention to women (especially pregnant) and elderly persons, Inclusiveness for all social strata, etc.

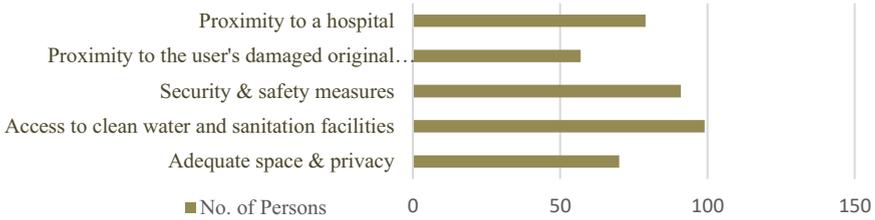


Fig. 11. Expectations of users from shelters or temporary housing.

3.3 Financial State of the People

Fig. 12. shows that very few people (23%) have a financial backup to reconstruct their original residence and rent a unit.

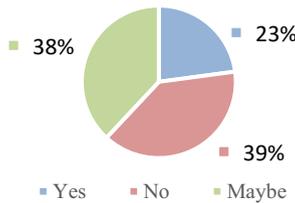


Fig. 12. Financial Backup or savings of residents to cope with the aftermath of a disaster.

3.4 Public Perception of Disaster Risks

The survey revealed that 20% of people live on their land or in their own houses, with Old Dhaka having the highest percentage of such residents. However, 63% of the respondents indicated that they would need to seek shelter if their homes were damaged or collapsed. Almost all interviewees from Old Dhaka, Jatrabari, some areas of Mirpur, and Mohammadpur perceived their buildings as at risk of urban disasters like earthquakes or fires. Nonetheless, very few identified flooding as a potential threat, suggesting that this particular risk might be more relevant to lower-income groups living in low-rise structures or slums.

3.5 Identifying Potentially Vulnerable Communities

Many places in Dhaka may not withstand a catastrophic earthquake or fire incident. There were some incidents when even a comparatively weak quake was on the verge of causing destruction and fatalities. Several fire incidents also took people's lives and

damaged buildings and property. When a fire damages a house, it may displace its inhabitants, leaving them needing emergency shelters. Although numerous apartments in Dhaka are being constructed in compliance with building codes, many structures remain inadequately designed and pose considerable risks. This number is primarily high in Old Dhaka, some parts of Mirpur, Mohammadpur, etc. Already, several buildings in Dhaka have been detected to have developed cracks, and some have even tilted to a side. For instance, the fire service marked the Modern Mansion at Motijheel as risky after cracks appeared in different building parts [12]. In Dhaka, hotel Sarina at Banani, Diamond Garment at Mirpur, a six-story building at Motijheel, and the seven-story Kaji Bhaban have also been slightly tilted [13]. Even a weaker earthquake or fire incident may easily cause these buildings to collapse in the future. RAJUK's Town Planner, Md Ashraful Islam, said, "The soil underneath the buildings in such areas are not solid, and in case of a tremor, the bottom floors of the buildings may go down due to 'soil liquefaction effect'" There are several places where buildings have been erected on comparatively weak soil. Bosila, Bashundhara Residential Area, Aftabnagar, and Banasree are some of the areas in Dhaka that gradually developed after filling up water bodies with sand, doubling the vulnerability [12].

Fig. 13 shows the top 10 wards with the highest physical risk index (PRI) marked, research conducted by the World Bank and EMI. It that Mirpur 1, 10, 11, 12, 13, 14, Kalshi, Senpara, Gabtoli, Uttara Sector 7, 11, 14, Shyamoli, Bosila and Mohammadpur, and the Tejgaon area are risky due to their soil conditions, building conditions, and infrastructure. In Fig. 14, risky areas are marked based on people's perceptions through the survey.

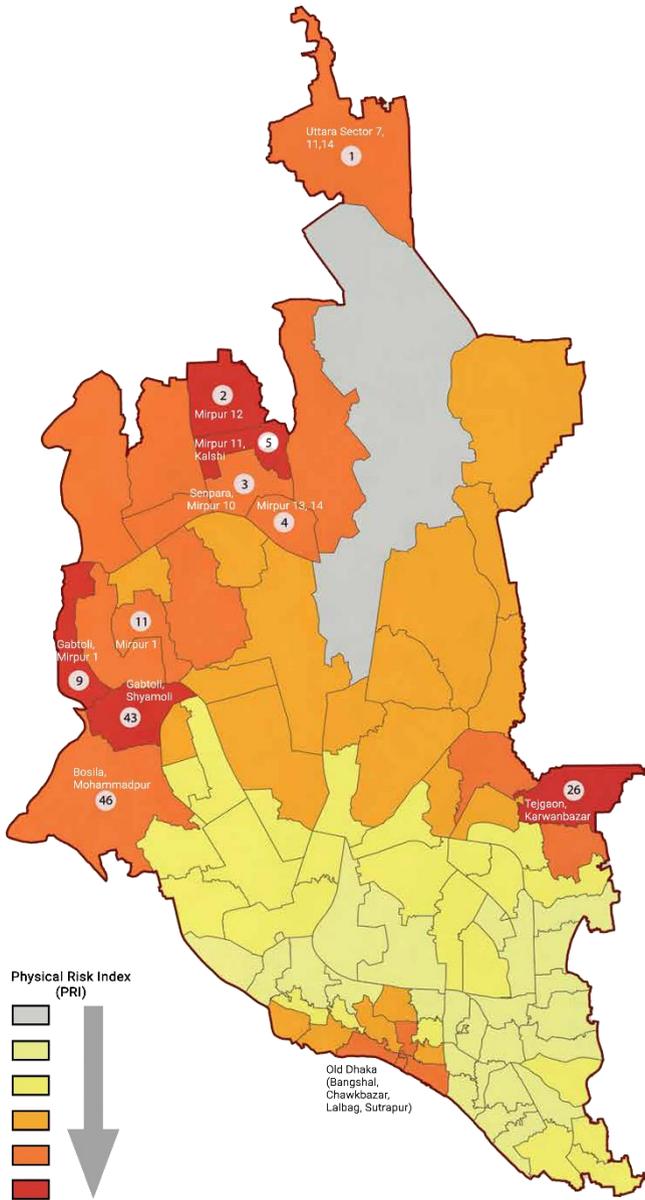


Fig. 13. Location (Ward) based physical risk of Dhaka due to urban disasters such as earthquakes [14]

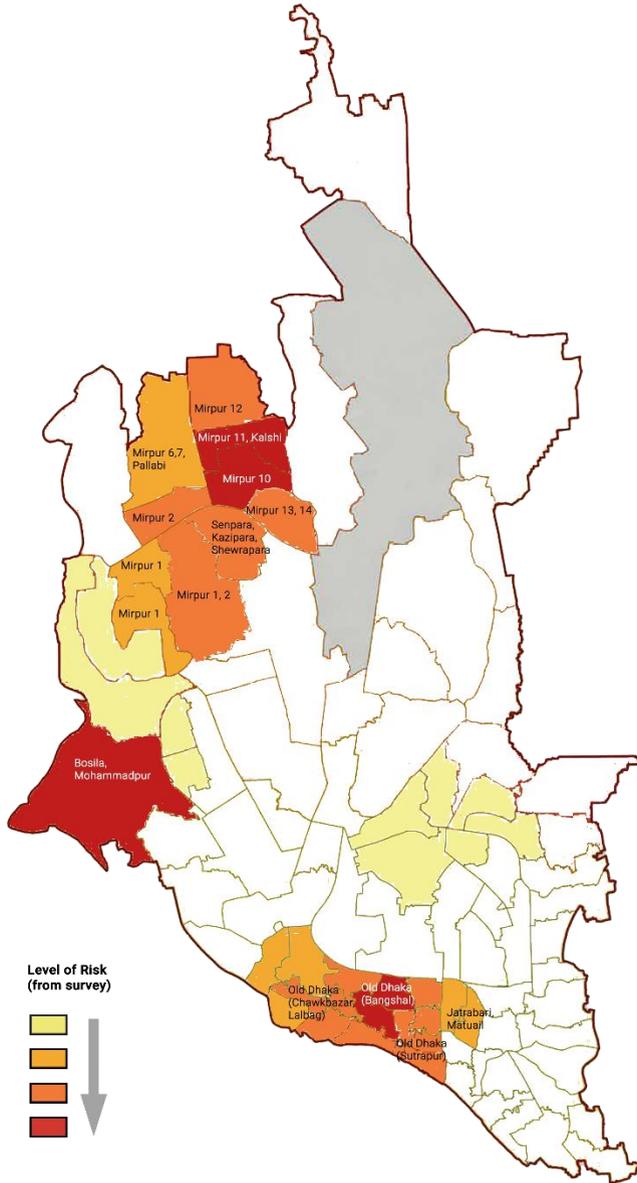


Fig. 14. Location-based risk of Dhaka due to urban disaster derived from questionnaire survey

When people’s perceptions of disaster risk from graphs 5, 5.1, and 5.2 are compared with Fig. 2., which presents the areas with risky buildings and infrastructure, it is found that respondents' perceptions of disaster risk are quite similar to the literature. Most res-

idents of Mohammadpur, Bosila, Mirpur, and Old Dhaka (especially Bangshal and Sutrapur) have shown concerns regarding urban disasters and their buildings' physical conditions and surroundings.

3.6 Disaster Preparedness and Emergency Shelter Needs

The survey highlights a critical concern: most communities in Dhaka are ill-prepared to cope with disasters. Many residents believe their homes may one day collapse due to a large-scale earthquake or fire, and they lack the financial resources to recover from such events. This situation underscores the importance of DR sheltering as an immediate response in the aftermath of disasters. While many respondents expressed satisfaction with the ease of accessibility in their current residences, doubts remain about their ability to safely exit buildings during emergencies, particularly given the high density of risky structures with inadequate open spaces and narrow gaps between adjacent buildings. Despite widespread concerns about earthquakes and fires, many continue to live in unsafe buildings that do not comply with building codes. It can be assumed that when building a house on their land, most people try to make the most profit off their land without caring about disaster risks.

3.7 Recommendations for Disaster Relief and Sheltering Strategies

Interviewees also voiced a range of expectations regarding shelter facilities, most of which are relevant and necessary. These expectations provide valuable insight for policymakers and designers, helping to set guidelines for developing adequate DR shelters. The literature review emphasizes the need for disaster preparedness to mitigate both physical and psychological harm. However, the survey reveals a clear lack of readiness in Dhaka to confront large-scale urban disasters. Although some emergency response teams and guidelines exist, a gap remains in comprehensive disaster relief and sheltering strategies, particularly in urban contexts. These guidelines should account for humanitarian and architectural factors, such as trauma recovery, social interaction, well-being, sanitation, daylight, and ventilation. Addressing these needs is essential to fostering trust in sheltering programs, which currently focus primarily on basic needs in rural and coastal areas, neglecting the broader urban humanitarian context. In addition, different design strategies are required for different regions in Dhaka due to the distinct sociocultural criteria. Most developed cities in the world have learned from their mistakes, and many of them have developed better emergency responses. The relevant authorities in this country need to study the disaster management guidelines, including their emergency responses, and learn from their previous mistakes.

4 Conclusions

A major earthquake can collapse buildings in seconds, while others may become uninhabitable without repairs. Even undamaged buildings could be at risk from the collapse of adjacent structures. Fire takes longer but can inflict serious harm.

Shelter is a crucial factor for survival in the initial stages after a disaster for the people whose house is damaged. In addition to these immediate survival and well-being considerations, disaster relief sheltering projects can play a vital role in disaster management in Dhaka city by providing essential services such as medical care, food distribution, and psychological support and facilitating efficient resource allocation during critical post-disaster phases. So, sheltering is an integral part of the emergency response to disasters. The government and NGOs must understand the significance of emergency sheltering, have sufficient materials, and have general guidelines as well as area-based guidelines to deploy shelters quickly and ensure that authorities and residents are prepared for such disasters in densely populated urban areas, especially Dhaka.

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