

Disaster Psychology and Psychological Adaptation of Disasters: Evidence From Riverine Islands (Char) of Rural Bangladesh

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Abstract: Natural hazards disrupt the social-ecological system, causing much suffering, death, injury, and devastation of property and the environment. This study explores the factors influencing the disaster psychology and psychological adaptation of people living in disaster-vulnerable areas in Bangladesh. Data have been collected from 100 households in Bangladesh's riverine island areas (char) of northern Bangladesh. Several criteria have been used to measure char dwellers' disaster psychology (vulnerability concern, factor, and intensity) and psychological adaptation (weakness concern and emotional response). This study reveals that char dwellers perceived several hazards like floods (100%), riverbank erosion (83%), drought (29%), and earthquakes (14%). It is also found that females (88%) are more concerned about earthquakes than males (12%). The key vulnerability factors in the char areas are geographic position (100%), no access to migration (75%), resources (76%), housing (83%), training (18%), and alternative livelihood (24%). Flood and drought are identified as the most destructive hazards in char areas. Most household heads also felt anxiety (88%), fear (54%), helplessness, sadness, and anger due to natural hazards. The government should implement a context-specific disaster management plan to reduce household vulnerability and create livelihood opportunities in char areas to enhance char dwellers' psychological resilience against disasters.

Keywords: Disaster vulnerability; Resilience; Psychological preparedness; Disaster management; Emotional response.

Introduction

Psychological preparedness is a very recent topic in the research field of disaster. It has a very vast area of research and needs more specific attention in this

field (Zacharias et al., 2022). There is a tendency to prioritise physical preparedness more than psychological preparedness worldwide. This is unwise because the psychological consequences can be more significant than the physical ones (Wang et al., 2022). So, this

is important to know and improve the psychological preparedness for disaster. Considering the aspect, it requires an in-depth investigation to enhance disaster management initiatives with better preparedness (Olivia & Mustikasari, 2021).

In Bangladesh, psychological preparedness for disaster is essential for its valuable and unique characteristics. It will help evaluate the people's psychological preparedness condition and identify the driving factors of disaster psychology of the people (Nahar et al., 2014). Understanding individual and household-level psychological responses are emergent to be prepared and be in control. Effective emergency planning in natural disaster warning situations provides more confidence in the individual (Alam & Bhadra, 2019). The people, government, and other non-government organisations should understand people's psychological and physical preparedness (Parvin et al., 2022). So that the lack of preparedness can be identified, and necessary steps can be taken for effective preparedness and adaptation plan for an upcoming emergency (Lahiri et al., 2021).

Psychological adaptation aims to find a bridge between stress and coping (Hafida et al., 2022). It helps to reduce the psychological vulnerability of an individual or household and enhance resilience. The terms "coping" and "adaptation" were used interchangeably to describe peoples' strategies in the aftermath of disasters (Graber et al., 2015). Coping refers to the short-term and urgent measures taken, whereas adaptation refers to the long-term plans and behaviours developed in response to disasters (Choi & Song, 2022). To cope with any calamity, biological, psychological, and social systems, intrinsic and acquired, are utilised. Adaptation has three goals: reducing harm risk, increasing the ability to deal with unavoidable damages, and using new opportunities. Our study is based on the notions of a stress-coping-adaptation theoretical framework that shows the connections between people and their environments (Zacharias et al., 2022). It has been noticed that communities better at adapting to disasters suffer lower losses (Didar-Ul Islam et al., 2015). Adaptation has been a hot topic in disasters because of the increased frequency and severity of natural catastrophes, damages, and losses (Zulch, 2019).

Scholars and practitioners agree that the most effective strategy to mitigate hazard losses is to guarantee that the impacted populations take proper preparedness and protective measures (Baker & Hill, 2013; Morgado, 2020; Yang & Bae, 2022; Zacharias et

al., 2022). Previous research has found several factors that may influence an individual's disaster preparedness behaviour (Zulch, 2019; Lahiri et al., 2021), including prior experience (Zacharias et al., 2022), acts of God (Fincham & May, 2021), media exposure (Morgado, 2020), and personal safety responsibility (Zimmermann, 2016). Other studies have concentrated on psychological elements such as risk perception (Wang et al., 2022), self-efficacy (Wang & Tsai, 2022), reaction efficacy (Höfler, 2014), etc. Several studies have been conducted on almost similar arenas, but it has been found that only a few studies directly focussed on the evaluation of psychological preparedness for disasters. Recent research and researchers have focused exclusively on the impact of psychological preparedness on health-related issues (Zulch, 2019; Wang & Tsai, 2022) and disaster management (Wang, 2016; Schulenberg, 2016; Ha, 2021). Still, they almost overlooked focussing and evaluating all the factors that influence human psychology before a disaster, which is very important to understand and identify preparedness initiatives to face a disaster. Psychology defers and varies from society to society and country to country according to the nature of the catastrophe, geographical position, and social background (Mishra & Mazumdar, 2015; Robinson, 2018). In this aspect, particular region-specific research on disaster preparedness and adaptation is critical. But till now, almost no such research has been conducted to evaluate the people's disaster psychology and psychological adaptation in Bangladesh. With the concern and association with the problem statement, this study intends to address a research question: What factors influenced the char dwellers' psychology and psychological adaptation in the face of a disaster? Therefore, this study explores the factors influencing disaster psychology and psychological adaptation of char dwellers of rural Bangladesh.

Methodology

Site Selection

For this study, a disaster-prone area, like Bishwanath char, Tepamadhupur union within the Teesta River at Kauniaupazilla in Rangpur, Bangladesh, has been selected (Figure 1). People in these areas face recurrent floods, riverbank erosion, drought, and other disasters. As they live with natural disasters, they have their disaster psychology and emotional response strategy to an upcoming disaster. So, the people of these areas play the appropriate role to be the sample of this study. The village is about 34 kilometers away from Rangpur

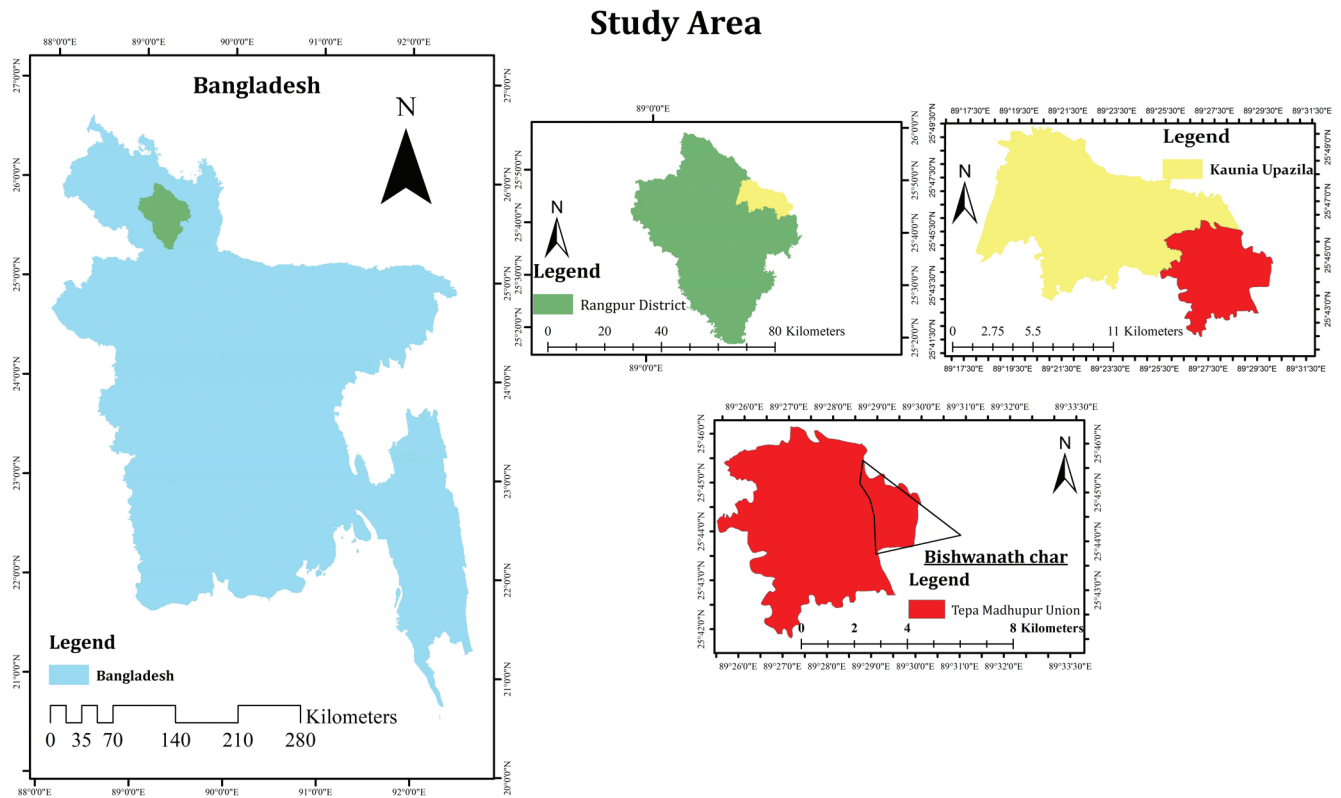


Figure 1: Study areas in Bangladesh.

district headquarters. Almost all of the population of this area are directly and indirectly vulnerable to various disasters.

Measuring People's Disaster Psychology and Psychological Adaptation

According to Gupta (2016), psychological readiness is separated into seven dimensions: concern, anticipation, arousal, management of thought, feeling, and action (TFA), intentions, decision-making, and feeling. Considering all these individual facets and following the Zulch Exploratory Factor Analysis solution pattern matrix (Zulch, 2019), the questionnaire has been formed to evaluate the people's psychology and mental preparedness for the disaster with the best possible validity. People's psychology and tragedy have a net relationship between them. Concerning that relationship, understanding disaster psychology requires an in-depth study. Disaster psychology mainly focusses on the pre-disaster and the disaster period, and according to the psychology of disaster, the psychological impact of a disaster on the people varies. During designing a questionnaire, several questions were taken into mind. For example, does disaster psychology mainly

focus on what people think of a disaster? How do people react to a disaster? How do people control their emotional responses to a disaster? and how do people take preparation for a disaster? Therefore, disaster psychology has been assessed by measuring people's perception of severe disasters, vulnerability concern of disaster, vulnerability factor of the catastrophe, vulnerability factor comparison, and disaster impact intensity perception. Similarly, psychological adaptation has been assessed by measuring weakness concerns regarding family to disaster risk and emotional responses before a disaster.

Data Collection

A pre-designed semi-structured questionnaire was used to conduct 100 in-depth interviews in the research region to understand the people's psychological preparedness and disaster psychology. Interviews were conducted in Bishwanath char, Tepamadhupur union of Kaunia Upazila in Rangpur district, relying on disaster-prone families, using a purposive-random sample approach. Four important informants were interviewed to understand the people's true disaster psychology better. The chairman of the Bishwanath char, Tepamadhupur

union Union Parishad, was one of the informants, and the oldest residents in the research region were also questioned. A face-to-face interview was undertaken to acquire important informants' perspectives and information on catastrophe psychology. Besides, two groups of participants were formed for focussed group discussions (FGDs). There were ten participants in one group and twelve people in the other. They have been living in Bishwanath char for a long time struggling with natural disasters. The participants were asked questions regarding their feelings, emotional responses, and activities before a disaster. The interviewee from different households cross-checked the data collected from FGD. The information about psychological preparedness and disaster psychology issues was compiled by cross-matching among different sources.

Statistical Analysis

The data obtained from the questionnaire were coded, processed, and analysed through SPSS (16 versions), Minitab, and MS excel (10 versions). Descriptive statistical techniques were used in the study. The location map was prepared by ArcGIS (10.2 versions). For this study, collected and encoded data were tested through the Chi-square test by SPSS (2.0). Almost all the data shows 95 and 100% significance levels with less than (0.05).

Results and Discussion

Disaster Psychology of the People

People's Perception of Serious Disasters

Char dwellers face several natural disasters. They face disasters like floods, riverbank erosion, drought, almost every year. Those disasters have taken many of their lives and properties (Sarker et al., 2019). However, the types of disasters can be easily identified. The flood was the most concerning disaster for the people, which was predictable. For better understanding, a figure is presented below to show all the concerned disasters in the char areas (Figure 2).

From the disaster pyramid, it is known that all people are concerned about floods. The frequency of the flood and the losses incurred are one of the main reasons to be worried about it. The survey also found that 100% of the responders have experienced a flood. Though their living houses are safe, many have agricultural land within the river, making them more concerned about riverbank erosion. Later another factor shows that- among the non-native people, almost 90% of them

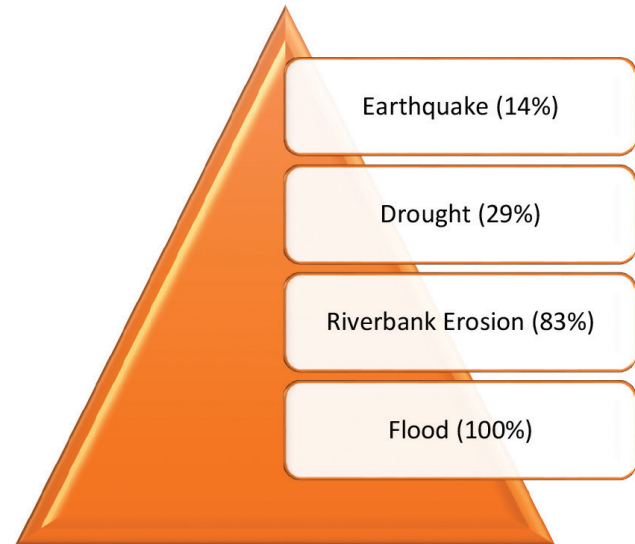


Figure 2: The concerned disaster of the people.

have lost their land due to riverbank erosion. About 29% are concerned about drought, and 100% are related to agricultural activities. Char dwellers' agricultural activities are mainly dependent on the river water. When the river water decreases due to the shortage of rainfall and interruption in the water flow in the upper stream, people suffer from the water shortage for cultivation (Lahiri et al., 2021). The less concerning disaster and the surprising outcome are the earthquakes. 14% of the people are concerned about the earthquake.

Vulnerability Factor of the Disaster

Several vulnerability factors have been identified from people's perceptions. As mentioned earlier, all the people in the char areas felt vulnerable to the disaster, so they were asked to identify the vulnerability factor (Figure 3).

The geographical position is the leading cause of major disasters like floods and riverbank erosion. Poor housing structure (83%) is observed as the second vulnerability factor. The less resource availability (76%) and no migration option (75%) are also matter of concerns of the people. With these major vulnerability factors, people also identified no alternative livelihood, lack of disaster management or preparedness training, and an information gap about disaster warning and preparedness as minor vulnerability factors for a disaster (Yang and Bae, 2022).

Vulnerability Factor Comparison

This study also identified other factors of disaster vulnerability, such as poor housing structure, no

alternative livelihood options, lack of migration options, less resource availability, and no training and information gap (Brown, 2015). The study shows some significant differences between the native and non-native people of the area in terms of the vulnerability factor of disaster (Figure 4).

The non-native people have already lost their native place due to various disasters, so it is tough to find a migration option again if they lose their current living position due to disaster. That is why most non-native people had identified (92%) no migration option as

the disaster vulnerability factor before or during the disaster, along with geographical position, while 58% of natives placed it. Native people also showed a higher frequency (39%) of no alternative livelihood option as a vulnerability factor than the non-native (9%). Less resource availability gets almost the same concern from the native and non-native people, which is 74% and 77%, respectively. A total of 78% of native people and 89% of non-native people considered their poor housing structure as a vulnerability factor, while 23% natives and 13% of non-natives regarded their geographical

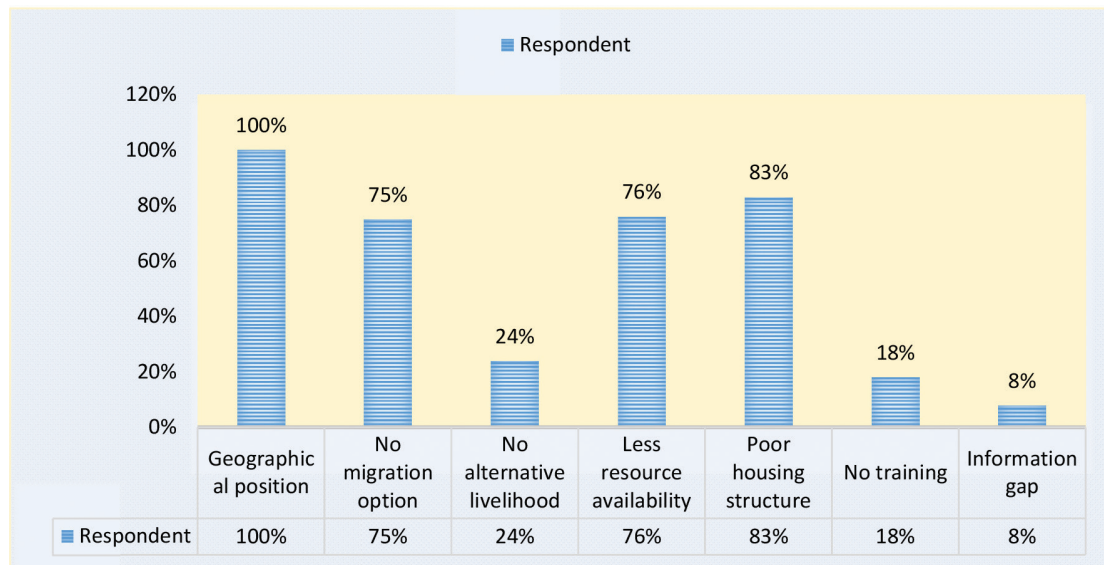


Figure 3: Vulnerability factor identification.

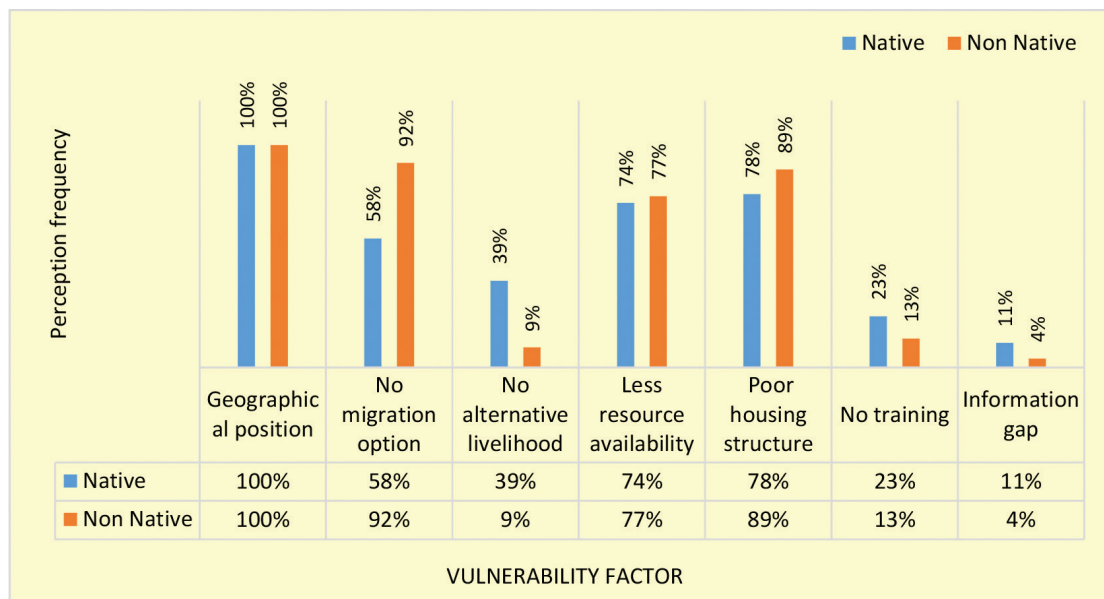


Figure 4: Vulnerability factor vs. origin of the people.

position and no training for disaster management as the vulnerability factors. About 11% of natives and 4% of non-natives considered the information gap as a vulnerability factor before the disaster.

Disaster Impact Intensity Perception

Figure 5 shows that flood and drought have the most destructive intensity relative to drought and earthquake, and drought and earthquakes are much less harmful.

About 27% of people marked flood impact as deadly, while 69% and 4% marked flood impact as destructive and less destructive, respectively. In the case of riverbank erosion, 73% of people scored its impact as destructive, 18% as lethal, and 9% as less destructive. In the case of drought and earthquake, most people (91% and 80%) marked less destructive impact, and in the case of an earthquake, 8% of the people marked a lethal impact.

Psychological Adaptation to Disasters

Weakness Concern Regarding Family to a Disaster Risk
Before or during a disaster, the weakest part of a person is their family. All respondents, irrespective of age and gender, were concerned about their family's safety from disaster risk. From their response, this study tries to determine the weakest and most vulnerable person of concern to the disaster risk (Figure 6).

All respondents are concerned about the children and women, but the highest portion of the concern goes to the family's children. To be specific, 40% of

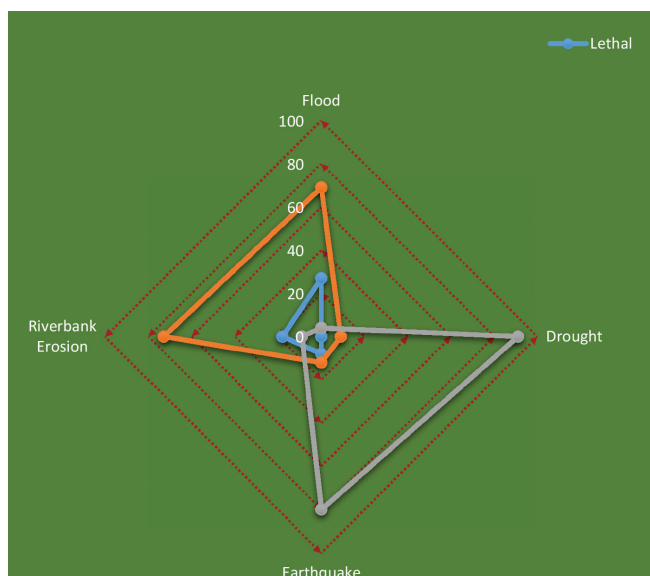


Figure 5: The perception of the people on disaster intensity.

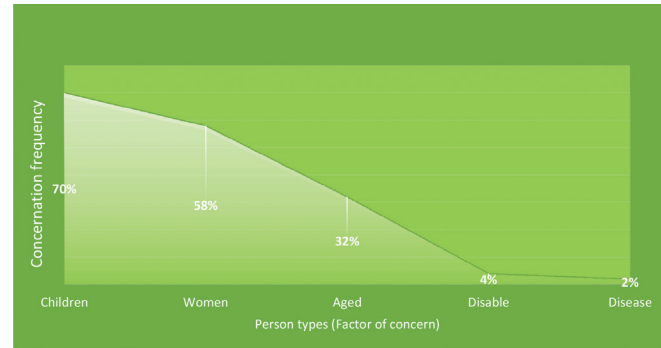


Figure 6: Person in concern to the disaster risk.

the people are concerned about their children and aged family members, while 30% are worried about women and children. It is found that 4% of the people are concerned with their disabled family member and 2% with a family member with a lifelong disease.

Emotional Responses Before Disaster

People were asked how they felt before a disaster. According to the people's responses, most people feel anxiety and fear (Chen et al., 2020). As cognitive behaviour and responses vary within the gender and age variability, this study tried to compare emotional responses towards disaster with different gender and age variability (Figure 7).

The graph shows that 88% of males and females experience anxiety before a disaster, while 54% of females and 32% of males also perceive fear. About 34% of female and 28% of males feel helpless. On the other hand, 8% of females experience sadness, while males have only 4% frequency. Next 16% of male feels anger while female does not feel it totally with 0% frequency. Figure 8 shows the emotional responses compared with age variability.

The plot shows the following data of emotional responses concerning people of different ages before the disaster (Table 1).

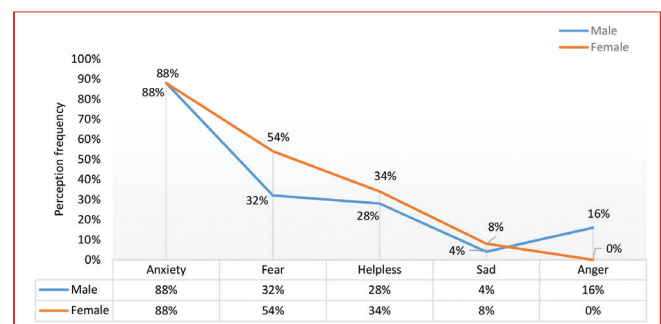


Figure 7: Emotional responses before disaster vs. gender variability.

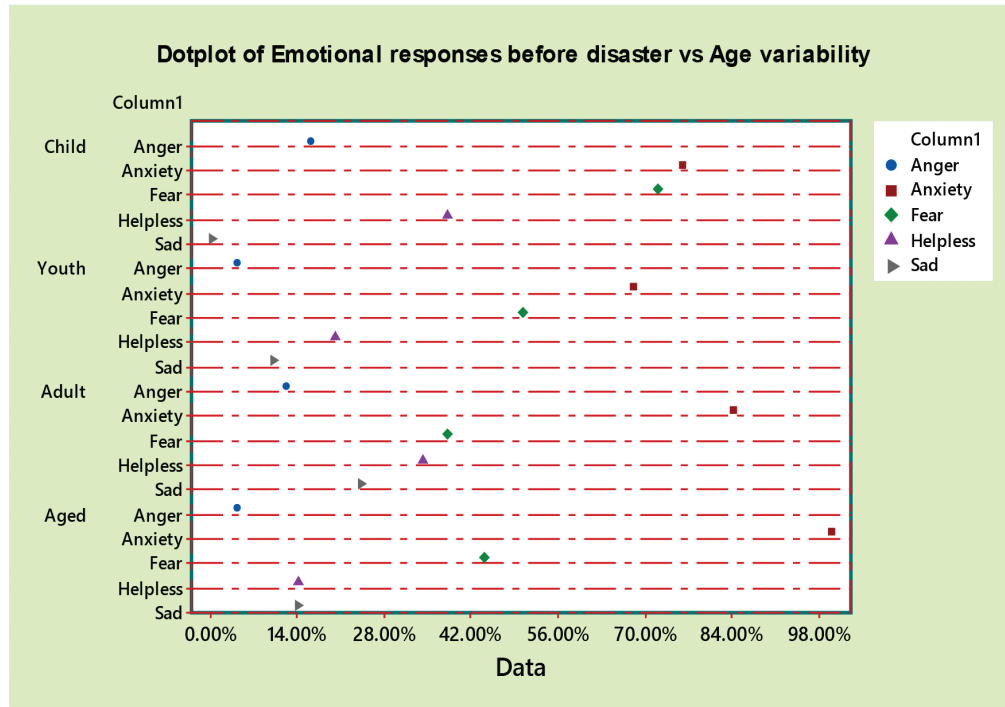


Figure 8: Emotional responses before disaster vs. age variability.

Table 1: Distribution of respondents based on psychological effects

Items	Child	Youth	Adult	Aged
Anxiety	76%	67%	84%	100%
Fear	72%	50%	37%	43%
Helpless	38%	19%	34%	13%
Sad	0%	9%	24%	13%
Anger	15%	4%	11%	3%

Presented data shows that every age group feels the most anxiety before the disaster, while the elderly group shows the highest stress level. After the pressure, fear is the most concerned feeling of all age groups before a disaster. The child group shows the highest frequency. The third most concerning emotional response is feeling helpless before the disaster; the last two less experienced feelings before the disaster are anger and sadness.

Policy Recommendations

The disaster psychology and psychological preparedness status of the people in the char area are not up to the mark. People show moderately lower psychological preparedness conditions in different age and gender stages. Whatever psychological preparedness they are showing, is the blessing of their indigenous knowledge and needs to be improved in various

aspects. Government and non-government organisations related to disaster management should focus on the psychological preparedness of the people before a disaster. People should be trained in psychological preparedness for disasters and physical and household preparedness. Women, children, and the old age group members should get special consideration and care for disaster preparedness and during the disaster. Alternative livelihood options can be created for the people in the disaster-prone area. Community-based disaster management teams and rehabilitation centers will improve the disaster resilience of the people. People should be introduced and trained to information and communication technology to know and share important information about weather and disaster. The early warning system should be improved and introduced to all people. People should be trained in disaster warnings. Local leaders (union Parishad members, chairman, and others) should be influential in information sharing before a disaster.

Conclusion

Psychological preparedness is the pre-condition of the most effective and systematic disaster management. People in the study area show moderate psychological preparedness. Though the literacy rate in the study area

is very low, their experience of living with disaster and indigenous knowledge helps them a lot to be at this moderate level, along with their physical preparedness. Keeping oneself calm and relaxed before and during a disaster is one of the most advantageous behaviours that helps one escape the risk of an emergency. However, flood and riverbank erosions are primarily responsible for the disaster in the char areas, whereas geographical position is the main vulnerability factor for the people. It can be assumed that these people are more likely to face these disasters almost every year. Preparedness action can be taken to reduce the disaster's impact on people's lives and property. Many government organisations (GOs) and non-government organisations (NGOs) working with these people in disaster management should focus on psychological and physical preparedness. It can help the people of these disaster-prone areas to change their disaster psychology with positive and effective psychological preparedness, which will reduce the impact of disaster and promote sustainable and effective disaster management.

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