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## Impact of River Bank Erosion on Mental Health and Coping Capacity in Bangladesh

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### Abstract

*Objectives:* Riverbank erosion is a regular phenomenon that displaces millions of people every year worldwide. More than 100,000 people are displaced due to river erosion every year in Bangladesh. People have to resettle in a different place leaving behind their property and familiar environment. This transformation with economic crisis acts as a major stressor for the persons and their families. However, people may adapt different strategies to adapt this difficult situation and keep themselves healthy. They might have higher coping skills due to what they had to endure. This study aimed to find out the difference in the mental health status and coping strategies among the river bank erosion affected and non-affected people in Bangladesh

*Methods:* We interviewed 100 adult respondents, of whom 50 had been affected and 50 had never been affected by river erosion in Bangladesh. All the participants completed self-report sociodemographic questionnaires; their mental state was evaluated with the Bangla version of the General Health Questionnaire-12 (GHQ-12) and the coping was measured using the COPE scale.

*Result:* The mental health well-being score of the affected group was significantly lower than the non-affected group. However, accounting for gender, income and age, the affected group had lower mean score in coping (55.86) than the non-affected group (64.04). However, the difference was not statistically significant.

*Conclusions:* Riverbank erosion is a major natural disaster in Bangladesh that makes people vulnerable to mental disorder. However, it receives less attention; we hope this study will stimulate future researcher to explore mental state and coping mechanism in multiple perspectives and develop evidence-based service for them.

### Keywords

Riverbank erosion, mental health, coping strategy, Bangladesh, resilience

### INTRODUCTION

Impact of disaster on health has long been discussed in the scientific community. Natural disasters affect millions of people physically and psychologically all over the world (Norris, et al., 2002) and the consequences are widespread and may be long term. About 30–50% of the disaster affected people suffer from moderate to severe psychological distresses (WHO, 2017) due to high exposure to the trauma, experiencing injury or death of loved one and reduced social support (Brooks, et al., 2018). Among the disaster victims, post-traumatic stress disorder (PTSD), major depressive disorder (MDD), anxiety, phobia, prolonged grief and behavioural problems are common (Neria,

et al., 2009; Norris & Elrod, 2006; Norris, et al., 2002). Among the different types of natural disasters, river bank erosion is less discussed in the social, political or scientific community as it is happening most of the time somewhere in the world.

Bangladesh is a riverine country in the Southeast Asia where natural disasters are a very common phenomenon due to its geo territorial location, land characteristics, multiplicity of rivers and monsoon climate (Yeasmin & Islam, 2011). As a result, river bank erosion is one of the major devastating ongoing natural disaster for the country (Islam & Rashid, 2011). Large number of people in this region live along the rivers and are more likely to be affected by bank erosion (Das et al., 2017). The

affected people face displacement, economic loss, physical and psychosocial problems that shift them in economic downwards. All these stressors put their coping capacity and mental health in a stressful condition and the insufficient coping behaviour under chronic stress lead to mental health problems (Mohr, et al., 2013) and attempts to successful suicide have been reported among the victims. Though Karatsoreos and McEwen (2013) found the coping capacity was strongly associated with a person's previous experience and neurophysiological adaptation of brain. That explains why every person being exposed to natural disasters will not suffer from mental health problem. Most of the affected people that encounter the catastrophic event tried to resist or recover (Norris, et al., 2008). They used different coping mechanisms to adjust with daily life and new environment. The frequent exposure in natural disaster made people of Philippines resilient by adapting specific coping mechanisms to mitigate the worst effects of disasters (Bankoff, 2007). Keya and Harun (2007) evaluated the psychological state of river erosion affected women amongst a small number of people in one of the affected site in Bangladesh. The study revealed that women used different types of coping mechanisms to reduce their stress – by reappraisal and seeking social support, sometimes, using less confrontive coping – which is a sign of constructive adaptation strategy. The scientific evidence on the psychological impact of disaster and its coping capacity of the river bank erosion is almost absent in Bangladesh. In the current study, we aimed to fill this gap in the knowledge by evaluating the impact of mental health wellbeing and coping mechanisms of the people. We hope this research will help in better understanding of the coping strategies and will provide initial evidence for future research and planning.

## MATERIALS AND METHOD

This study was conducted in two neighbouring villages adjacent to the mighty river Padma in the mid-western region in Bangladesh, close to the Indian border. One village is Philipnagar (5156 inhabitants) and the other is Maricha (2920 inhabitants) about 4 kilometres apart in the Daulatpur Upazilla of the Kushtia District. According to the Bangladesh disaster report (2013), Philipnagar is one of the most severely affected areas by river erosion, where the river Padma has engulfed 1000 houses and 1500 hectares of agricultural lands and imposed a severe psychological distress among the victims. For this study, we aimed to evaluate the coping capacity and mental health of 100 residents in this area living permanently for more than 15 years and having no previous diagnosed mental disorders. Participants having physical illness making it difficult for them to communicate were excluded from the study. To have a total

of 100 respondents, we aimed to include 50 respondents from Philipnagar, who were victims of river erosion and had lost their land or household, and the another 50 respondents were randomly selected from Maricha, who never experienced river bank erosion. To reach this desired number, we approached 103 participants. However, 3 participants refused to participate in the study due to their busy schedule. The respondents were recruited randomly and their participation was voluntary; no financial benefit was provided for the participation in this study. The participants were informed of the purpose of the present study and necessary rapport was established before administering the questionnaires. The respondents were instructed to read the items of the scales attentively and to respond rapidly. All the necessary clarifications were made regarding the items. They were asked to put tick (✓) marks in the appropriate boxes. They were also requested not to leave any item in the questionnaire, and were told that there was no right or wrong answer and no time limit for answering. The respondents were requested to complete the following questionnaires:

1. Demographic and Personal Information Questionnaire (age, gender, education, income, marital status, occupation and socio-economic status, etc.).
2. Bangla version of the General Health Questionnaire-12 (GHQ-12). The original GHQ was developed by Goldberg (1978) as a measure of the current mental health status that has been widely used in different cultures and different settings (Montazeri et al., 2003). It was translated and adapted in Bengali (Ilyas, 2002). A high General Health Questionnaire-12 score indicated reporting of more symptoms, that is, lower mental health.
3. The COPE scale (originally developed by Carver, Scherier and Weintrauh, 1989) adapted by Rahman and Islam (2011). The COPE scale is theoretically based 60 items on self-report measures. Here participants are instructed to report what they usually do when they are dealing with stress. The scale assesses the three factors as: (a) Problem focused, b) Emotion focused and c) Dysfunctional coping strategies of the participants. The internal consistency of the Bangla scale was acceptable.

After completing the questionnaire, they were thanked for their cooperation and assured that their answers would be completely confidential and these would be used for research purpose only. To compare the general health as a function of the participants' coping strategies for affected and non-affected people, we used independent sample t-test, cross tabulation and frequency. The data were analysed using the Statistical Package for Social Sciences (SPSS) Software version-20.

Table 1. Socio-demographic information of the respondents of the two sites

Criterion		Affected		Non-affected	
		Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Gender	Male	22	44.0	26	52.0
	Female	28	56.0	24	48.0
Daily income	5 USD and above	2	4.0	12	24.0
	2–5 dollar/day	36	72.0	30	60.0
	Less than 2 USD/day	12	24.0	8	16.0

Table 2. Mean COPE score of the riverbank erosion affected and non-affected group

Condition	Mean	SD	p
Affected	55.86	8.0	0.225
Non-affected	64.04	7.2	

\*  $p > 0.05$  (for a two-tailed test)

Table 3. Mental health wellbeing of the affected and non-affected people measured by GHQ

Condition	Mean	SD	p
Affected	27.72	3.4	0.03
Non-affected	29.42	4.4	

\*  $p < 0.05$  (for two tailed test)

## RESULTS

Among the total participants, the mean age of the affected participants was 30.1 years ( $SD = 11.09$ ) and the non-affected was 28.98 year ( $SD = 5.17$ ). Table 1 shows that about 4% people in the affected site earned daily 5 USD and above, whereas the rate was 24% in the non-affected, on the other hand 24% of affected people earned less than 2 USD per day, that is, only 16% in the non-affected group.

Table 2 shows the average coping score of the affected and non-affected people. The COPE score for the affected group ranged from 33 to 71 (mean 55.86), and for the non-affected group, it was 38 to 84 (mean 64.04). However, although the affected people scored higher mean, the difference was not statistically significant.

Table 3 shows that people who were not affected by riverbank erosion scored higher than those of river bank affected group.

## DISCUSSION

This was one of the first few studies that compared the mental health and coping of the river erosion affected people with the non-affected people in Bangladesh. We observed that the mental health wellbeing of the people who were affected by river bank erosion was poor in comparison to the non-affected group that was consistent with the previous researches in other countries (Munro et al., 2017; Doherty & Clayton, 2011; Everly, Perrin and Everly, 2008; Diaz et al. 2006). It may have occurred due to the fact that river bank erosion uprooted them, and they were forced to adapt themselves in a new environment with minimum or no economic source to sustain. Moreover, river erosion exposure can elicit pre-existing psychological distress, somatic complaints, sleep problems and psychosocial behavioural problems (Neria et al., 2009; Norris & Elrod, 2006; Norris et al., 2002). Though these people are vulnerable to physical and mental health problems, they face severe lack of medical facilities and treatment as the health care infrastructures engulfed by the river and new settlement takes time to reconstruct their medical facilities. People have to travel longer distances than before and bear extra cost for medical treatment. Sometimes, medicine shops are also eroded and it becomes impossible to provide first aid treatment to the victims (Das et al., 2017). Many people needed to schedule physician visits for disaster related conditions. Telemedicine and telepsychiatry can be a good option to ensure early treatment for the victims of river erosion.

Displaced populations face stressors related to the disruption of their social networks, separation from family and social isolations. To adapt in new environment, people use problem solving and emotion coping mechanisms. Besides, displaced people maintain pre-existing social networks at distance. These social ties may serve as a source of substantial resilience or capacity to cope with adverse events (Torres et al., 2017). Moreover, this resettlement process created short- and long-term psychosocial stress. Overall, the study found that the mental health of river bank erosion affected people was poor

in comparison to the non-affected group. This finding was consistent with the previous researches in different countries (Munro et al. 2017; Doherty & Clayton, 2011; Everly, Perrin and Everly, 2008; Diaz et al., 2006; Aslam & Kamal, 2015). Evidence indicates that natural disasters influence the burden of mental health consequences in the affected population. When disasters strike the community and human population, physical harm and losing resources is accompanied by psychological distresses among the survivors (Shultz, 2013). However, the stresses were reported to be linked with stress disorders, anxiety, depression, somatic complaints, sleep disorders and other psychosocial behavioural problems (Neria et al., 2009; Norris & Elrod, 2006; Norris et al., 2002; Helgeson et al., 2012; Hutton and Haque, 2003). Moreover, the psychological resilience helps to cope with the losses and increases the ability to bounce back. The river erosion affected people showed better adaptability due to the need to resettle themselves in the new environment and their perception that river erosion is not an impending danger to their livelihoods and well-being (David & Hutton). The affected people are more active in coping, planning, suppression of competing activities, restraint coping and seeking of social support, which conform with some other research findings. People having strong previous mental health makeup respond to river erosion more confidently, and accessing necessary resources (Gil- Rivas & Kilmar, 2016; Aldrich & Sawada, 2015; Bankoff, 2007) made them more resilient to the disaster. In stressful situations, people focus on versatile coping (Baqtayan, 2015), and human behaviour is not only a function of environmental demands, but also shaped by organizing daily activities, and fixing difficulties and problems (Norris, Stevens, Pfefferbaum, Wyche and Pfefferbaum, 2008). Government should take initiative for the psychological issues regarding the disaster.

### LIMITATION OF THE STUDY

During the interpretation of the study findings, we need to consider a few limitations. This was a cross sectional study with a small number of participants that limits us to commit it as the general scenario of the country. Moreover, coping mechanism is diverse and people use different coping strategies at different times that need in depth interviews with the participants. The study was conducted in a specific area in the country that may not be representative of the whole country. According to us, a large scale multicentre study involving all the divisions of the country will be more helpful.

### CONCLUSION

Crisis from natural disasters represent particularly complex experiences that diminish the quality of life by impacting both individual and community support systems, causing distresses and devastation of resources. River erosion is a significant stressor for mental health and wellbeing. We need to evaluate the mental health and coping skills of the river bank affected people in a larger scale and mental health support system need to integrate in the existing health care system.

### ETHICAL DECLARATION

We performed the study in accordance with the ethical standards of the 1964 Helsinki Declaration. Informed consent was obtained from all individual participants involved in the study. Consent to participate in the research has been given freely and without coercion. Subjects have the capacity to understand the research project. Consent of the research subject has not been influenced by financial inducement, improper pressure or any form of misrepresentation.

### CONFLICT OF INTEREST

None to declare.

### AUTHORS' CONTRIBUTIONS

All authors contributed to this work equally.

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### DATA AVAILABILITY

The dataset has been shared with the editorial office of the journal.

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