

Post-Disaster Health Condition: The Case of Coastal Population from Bangladesh

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Abstract The study aims to know the post-disaster health condition of coastal people in Bangladesh. Both quantitative and qualitative methods were used in the collection of data for the study. It is found that a number of the respondents entirely depended on the old age allowance provided by the government. In most affected areas, there was limited rice production since those lands were intensively used for shrimp farming before the cyclone. Majority of the households identified tube wells as the primary water source of water (Koyra 76.82%, and Shyamnagar 85.14%). Study on sanitation practices found insufficient and varying. In both Upazilas, almost half of the households are deprived of regular waste disposal measures (Koyra 59.7%, and Shyam nagar 51.8%). In the same way, they are not aware of waste disposal system and have no plan for it. Health aides have been commonly known as health service providers of public health services in the study areas. Govt. district hospital, upazila health complex and the union health centers were found popular among the respondents. Most respondents were able to remember the messages of the need to wash their hands before eating food (68.75%) and the need to wash their hands after defecation (60.60%). The present study identified that the lack of consciousness about the health and sanitation system and the different types of diseases associated with undernourishment attacked the ordinary people.

Keywords: *disaster, health, coastal people, Bangladesh*

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1. Introduction

Geography has made Bangladesh one of the most disaster-prone country in the world. With the biggest bay of the world, Bangladesh has a long stretch of coastal areas. Agriculture, livestock rearing, fishing, shrimp culture, and salt production are the major economic activities of these areas. Coastal regions also comprise sites of export processing zones (EPZ), airports, land ports, harbours, and tourism. Moreover, being both a 'World Heritage Site' and an 'ecologically critical area' such as the Sundarbans, the world's largest mangrove ecosystem has grabbed the attention of environmentalists upon the coastal areas of Bangladesh [1]. However, regrettably, these regions are exceedingly susceptible to both natural and anthropogenic risks and calamities like coastal flooding, cyclones, storm floods, erosion, salinity, arsenic

contamination, and pollution, and so on [2]. Along with different hazards, low wages, poor housing and sanitation have intensified the vulnerability of waterfront communities.

The susceptibility of Bangladesh's riparian areas is intensified by impact of climate change. Studies from the IPCC have suggested that, since it is a deltaic plain; climate change-induced sea-level rise and several other hydro-meteorological disasters could catastrophically affect the coastal mangrove ecosystems such as the Sundarbans and adjacent human settlements [3]. Moreover, everywhere throughout the world, alongside climate change, every year the recurrence and intensity of hydro-meteorological adversities is escalating over the time [4]. Disaster-related records of Bangladesh furthermore demonstrate this; for example, the number of cyclones is tripled over the last 50 years [5]. The coastal people are more prone to disasters than the people from other regions. The tsunami of 2004, hurricane Katrina of 2005, Sidr of 2007 and Nargis in 2008 killed millions of coastal people

which are distinct recent instances of climatic extremes and the related vulnerabilities of coastal occupants.

Out of the 64 districts in Bangladesh, 19 are delimited as coastal areas. The population of this area is 36.8 million and more than half of them (52%) are poor, and about 41% is below the age of 15 [6]. Among 64 districts, 19 are coastal districts with 36.8 million population where half of them are poor (52%) and 41% is under the age of 15. With a land area of 144000km², Bangladesh has a population of 146 million where the density is over 1138 per km². Bangladesh is gently inclined from north to south, meeting the Bay of Bengal in the far south. Three major rivers and their various tributaries transport water from the Himalayan basins and overflow one-third of the country in average years. When the peak flow is synchronised and the discharge is obstructed by high tide in the sea, the country encounters flood, which inundates over 50% of the land zone.

Additionally, the coastal community is much acquainted with the cyclone. Dasgupta et al. (2010) had found out some reasons for the significant impact of storm surges on the Bangladesh coast: (a) phenomenon of re-curvedness of tropical cyclones in the Bay of Bengal, (b) shallow continental shape, (c) high tidal range, (d) triangular shape at the head of Bay of Bengal, and (e) high density of population and coastal protection system [7]. Gray (1985) assessed that 10% of the world's tropical cyclones are formed in Bay [8]. If the Bay shares 10% of the world cyclones, the percentage of the world total hitting Bangladesh is 1.4% [9]. Singh et al. (2001) had considered 122 years (1877 to 1998) of tropical cyclone data to answer the question whether the intense cyclones have become more frequent or not over the north Indian Ocean [10].

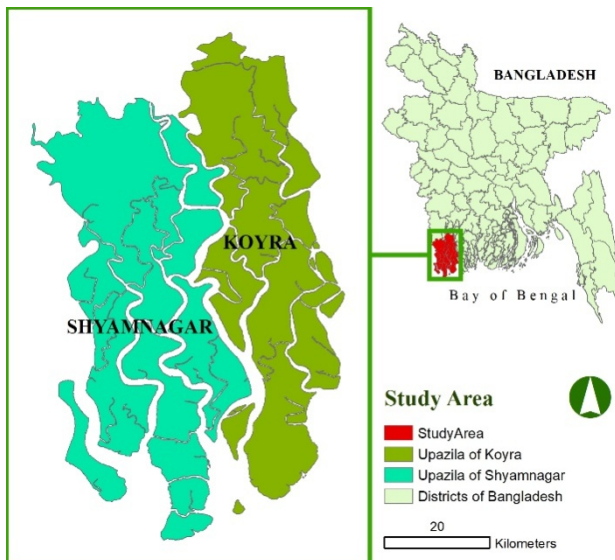


Figure 1 Map of the study area

There has been a considerable concern that the recurrence and intensity of tropical cyclones may rise in the future because of climate change [11]. Since the sea surface is getting warmer due to climate change and the formation of tropical storms depends upon the sea temperature more prominent than 27°C, the rise in sea temperatures intensifies the force of cyclone and rising sea levels threaten extensive areas of the coastal regions. The

cutting-edge climate scientists argue about the rising trend of cyclone in the coastal regions around the globe. Between 1877 and 2009, Bangladesh was hit by 159 cyclones (including 48 severe cyclonic storms, 43 cyclonic storms, 68 tropical depressions). On average, a severe cyclone strikes Bangladesh every three years [12]. More recently tropical cyclone Sidr (November 2007), cyclone Aila (May 2009) in Bangladesh and cyclone Nargis (May 2008) in the Irrawaddy delta of Myanmar gave instances of wrecking storm-surge impacts in coastal areas. These cyclones devastated the population, livelihoods, socio-economic systems, environments, and health.

The coastal zone of Bangladesh is one of the top 10 conceivably hazardous areas, where 29% (40 million) of the total population of the country reside. If there is a 1m increase in sea level, it will generate an extra 15 million homeless environmental refugees [13]. The inundation will not only destroy rural land but also the existing homestead, roads and other communication infrastructure.

Furthermore, economic development is severely interrupted by disaster. At the same time, it impedes an individual's capacity to recuperate from poverty. The protective characteristics of the built environment, i.e., infrastructural supports offer essential means by which humanity can reduce the risk posed by hazards, thereby preventing a disaster [14]. Despite what might be expected, after the calamity, the loss of necessary infrastructures can substantially increase the vulnerability of a community to future risks, and therefore the health condition becomes vulnerable.

Sidr and Aila are making the lives of the coastal people more complicated, and it intensifies the vulnerability in the society for poor people, elderly, children and women. Since this is a poorly explored research area, further empirical research work is required to establish the impact of extreme weather events on the health of the coastal people in Bangladesh.

The study aims to understand the health condition of the coastal people who have faced tropical cyclone Sidr (November 2007), Aila (May 2009) and Nargis (May 2008).

2 Methods

The study was conducted to provide a comprehensive socio-economic and health scenario of the target people.

The primary unit of sampling, as used, was targeted households of the project. A representative and statistically significant sampling approach were undertaken; for example, the sampling was at 95% confidence level with a precision rate or amount of acceptable error margin of 5%.

Sampling approach and the statistical formula used for sample design

$$\eta = \frac{z^2 \cdot p \cdot q \cdot N}{z^2 \cdot p \cdot q + (N - 1)e^2}$$

Where,

n = Sample size

N = Population size

e = Precision rate or amount of admissible error in the estimate

p = Proportion of defectiveness or success for the indicator

$q = 1-p$

z = Standard normal variable at the given level of significance

In the sampling estimate, given values are:

$N = 3,525$ (total households covered by the project)

$e = 0.05$ (5% significance level/admissible error margin)

$p = 0.5$

$q = \text{factor } q (1-p) = 0.5$

$z = 1.96$ (value of standard normal variable at 95% confidence level)

As per the statistical formula, the total sample size arrives at 357, which had been adjusted further at 368 to optimize the confidence level. This total sample size was proportionately distributed first among the targeted households, and then among the Unions.

For a selection of sample households at the field, the 'random sampling approach' was undertaken. At output level, standard procedures were followed for quality control of data and database management.

Quantitative and qualitative, both methods were used in data collection for the study. The validity and reliability of the instruments were ensured by following several steps. Firstly, a literature review was conducted to identify issues. Secondly, the tools were pre-tested among 11 males and 09 females in the field and modified as needed before producing the final version. Quantitative data were analyzed using the Statistical Package for the Social Sciences.

Qualitative data were collected through FGDs, KIIs, and IDIs. In total, the research team completed 4 FGDs, KIIs 8 and 16 IDIs using an interview guideline. Before recording the interview, verbal consent was taken from the participants and played back to them. All FGDs and KIIs were transcribed and analyzed according to the broad themes. Qualitative data were analyzed using the framework approach.

3. Result and Discussion

3.1 Occupations of the Respondents

Since both of the Upazilas were victims of cyclone of Aila, their main livelihoods, farming and fishing suffered from significant damages because of incessant submergence of paddy fields and shrimp farms by saline water. This devastation had been mirrored in the findings of this study with comparable attributes in their occupational profiles. Since community members of both the areas share the same geographical and socio-economic conditions, the respondent's descriptions were identical enough, and their statistics were almost interchangeable.

After Aila, it was possible to bring only a small portion of total cropland under cultivation in these two upazilas. Likewise, due to excess salinity level in the soil, Aman rice cultivation was not possible. Besides, a vast area of cropland is still flooded because of breach in the embankment and high tides.

The following figure represents that, the community mostly depends upon non-agricultural businesses, wherein an average 50% live on labouring in non-agricultural

business concerns. It was also reported in the FGDs that their livelihood is based on diversity of livelihood options. Throughout the year, maximum community members are involved in different ways of earning sources, such as fishery, small business, grocery, service, rickshaw /van/ boat driving, carpentry, crop cultivation, day laborer in agriculture, housemaid, begging, private tutorship, running Tea stall, participating in cash for work/ training of NGOs, village doctor, barber, tailoring etc. (Table 1).

Table 1. Occupation of the Respondent

Occupation	Koyra	Shyamnagar	Total (%)
Day laborer in non-agri. business	104	80	50.00%
Fishery	45	12	15.49%
Small business	16	19	9.51%
Grocery	13	4	4.62%
Service	8	4	3.26%
Rickshaw /van/ boat driving	1	9	2.72%
Carpentry	4	6	2.72%
Crop cultivation	8	1	2.45%
Day laborer in agriculture	5	3	2.17%
Housewife	4	1	1.36%
Housemaid	2	3	1.36%
Begging	2	2	1.09%
Morale / bewail	1	1	0.54%
Student	2	0	0.54%
Private tutorship	1	1	0.54%
Running tea stall	1	0	0.27%
Participating in cash for work/ training of NGOs	1	0	0.27%
Village doctor	1	0	0.27%
Barber	1	0	0.27%
Tailoring	0	1	0.27%
Depending on the old age allowance	0	1	0.27%
Number of respondents	220	148	100.00%

Some respondents were entirely dependent on the old age allowance is given by the government. Rice production was very limited in the affected areas since most of the cultivable land suitable for rice was being used for shrimp farming before the cyclone. Day labourers (mostly female) and small traders were involved in collecting shrimp from the farms and selling to inland wholesalers.

The small businesses found in both areas include selling green vegetables, ferrying cloth, ferrying cosmetics for women, tea stall, grocery with salt, sugar and oil selling, selling utensils, and selling locally made foods items prepared from rice and wheat.

3.2. Sources of Water

Regarding water sources, majority of the households cited tube wells (Koyra 76.82%, and Shyamnagar 85.14%). According to the participants of FGDs, in Post-Aila period these two Upazilas were blessed with different development programs featuring water and sanitation provided by a few relief organizations.

It is the main reason for wide accessibility of tube wells in the area. These groups of households have their own

tube-wells and at the same time, they collect water from public and neighbours' tube wells as well. Apart from that, several public ponds, a few (3.8% Koyra, and 0.6% Shyamnagar) water harvesting techniques were additionally reported in the locality (Table 2).

Table 2 source of water in the study area

		Own pond	Public pond	Tube well		Rainwater harvesting	No specific source
				Own TW	Shared TW		
Koyra	%	0.00	18.64	46.82	30.00	3.64	0.91
Shyamnagar	%	0.68	10.14	52.03	33.11	0.68	3.38
Total	%	0.27	15.22	48.91	31.25	2.45	1.90

A woman said:

"There is a shortage of pure water in the village; it also lacks deep tube well. Due to excess salinity, many of the water sources are unusable for drinking purpose".

3.3. Use of Latrine by the Households

The study shows that most of the households used "one slab sanitary latrine", which was a distorted version of the usually available latrines used for three-ring slabs. In regard to latrines, Koyra Upazila has shown a comparatively better performance of using the sanitary latrines, 29.55% of households use the sanitary latrine in Koyra, whereas only 14.19% is reported in Shyamnagar. It has also been reported that a small portion of the population still use the "Open Place for Defecation" (Koyra 2.27%, and Shyamnagar 3.38%. See Table 3)

Table 3. Latrine in the Study Area

		Open space	Hanging latrine	Sanitary latrine	One slab latrine		Total
					Own latrine	Shared latrine	
Koyra	#	5	45	65	98	7	220
	%	2.27	20.45	29.55	44.55	3.18	100
Shyamnagar	#	5	10	21	110	2	148
	%	3.38	6.76	14.19	74.32	1.35	100
Total	#	10	55	96	238	9	368
	%	2.72	14.95	26.09	64.67	2.45	100

A Union Parishad Member said:

"There area is quite poor because of job shortage. Therefore, they cannot afford sanitary latrine. So, some people are compelled to use open pit latrine."

3.4. Sanitation Practice

Study on sanitation practices was found inadequate and inconsistent. It is also found that in both Upazilas more than half of the households have no customary measures for disposal of wastes (Koyra 59.7%, and Shyamnagar 51.8%). Neither they have any idea nor have any plan for the management of wastes. Furthermore, another one-third of households just stockpiled the garbage/waste (mainly kitchen-born) on their yards (Table 4).

Table 4. Sanitation Practice in the Study Area

		No regular measure for waste disposal	Wastage stockpiled on the courtyards	Drainage System	Local government representative takes measure	Total
Koyra	%	59.7	39.5	0.0	0.8	100.0
Shyamnagar	%	51.8	47.1	1.2	0.0	100.0
Total	%	56.4	42.6	0.5	0.5	100.0

The qualitative study also revealed that households were not well familiar with the hygiene practices. They could not mention required hygiene messages during in-depth interview with them.

A family head mentioned:

"We have set up our toilet line with our pond. So we do not worry about this."

3.5. Perception of Common Illness that Attacked Family Members in the Last Year

Fever, high blood pressure, cold, cough, pain, diarrhoea, these are the common illnesses reported by the respondents. The description of the entire perception has been provided in the Table 5.

Table 5. Perception of Common Illness of Respondent

Illness	Koyra		Shyamnagar	
	#	%	#	%
Fever	208	94.55	139	93.92
High blood pressure	146	66.36	85	57.43
Diarrhea	24.4	11.09	30.6	20.68
Cold	13	5.91	9	6.08
Cough	84	38.18	50	33.78
Pain	102	46.36	88	59.46
Pneumonia	75	34.09	33	22.30
Jaundice	13	5.91	15	10.14
Typhoid	0.8	0.36	1.8	1.22
Acidity	2	0.91	3	2.03
Hernia	10	4.55	5	3.38
Rheumatic	4	1.82	4	2.70
Ulcer	4	1.82	3	2.03
Asthma	7	3.18	3	2.03
Scabies	3	1.36	9	6.08
Paralyzed	9	4.09	6	4.05
Appendix	2	0.91	3	2.03
Whooping cough	4	1.82	2	1.35
Sciatica	3	1.36	1	0.68
Kidney problem	2	0.91	1	0.68
Stroke	2	0.91	1	0.68
Heart problem	7	3.18	4	2.70
Night blindness	4	1.82	1	0.68
TB	2	0.91	1	0.68
Gaul bladder stone	1	0.45	5	3.38
Anemia	1	0.45	0	0.00
Diabetes	3	1.36	6	4.05
Measles	1	0.45	0	0.00
Pox	1	0.45	0	0.00
Tumor	0	0.00	2	1.35
Allergy	1	0.45	0	0.00
Piles	0	0.00	1	0.68

A woman said:

"I have a problem with blood pressure, which caused problems during pregnancy time, so I had to undergo Caesarean Section."

A farmer said:

"We always suffer from fever-flux, cough, diarrhoea and skin diseases."

3.6. Health Services in the Localities

Government district hospital was most familiar to the households (99.09% in Koyra and 91.89% in Shyamnagar). Upazila Health Complex and the Union Health centres were also found quite popular amid the respondents. While half of the households in Koyra could identify the Family Welfare Center, i.e., FWC (58.18% in Koyra and 82.43% in Shyamnagar). Only one-third in Shyamnagar could hardly recall the services of community clinics (Table 6).

Table 6. Recognition of Health Services in the Localities by the Respondents

	Koyra			Shyamnagar		
	M	F	T	M	F	T
Health assistant (HA)	170	42	212	101	33	134
	95.51	100	96.36	87.83	100	90.54
Govt. district hospital	176	42	218	105	31	136
	98.88	100	99.09	91.30	93.94	91.89
Govt. upazila health complex	170	40	210	105	29	134
	95.51	95.24	95.45	91.30	87.88	90.54
Govt. Union health center	167	37	204	94	24	118
	93.82	88.10	92.73	81.74	72.73	79.73
Family welfare assistant (FWA)	104	24	128	90	32	122
	58.43	57.14	58.18	78.26	96.97	82.43
Family welfare center (FWC)	95	24	119	91	22	113
	53.37	57.14	54.09	79.13	66.67	76.35
Family welfare visitors (FWV)	97	22	119	48	11	59
	54.49	52.38	54.09	41.74	33.33	39.86
Community clinics	30	8	38	30	18	48
	16.85	19.05	17.27	26.09	54.55	32.43

From four focus group discussions, most of the participants said that they want Upazila Health Complex to provide for significant health problems. However, for any kinds of health-related problems; they prefer to go to the Union Health Complex.

3.7. Awareness of Health-Related Issues

Table 7. Awareness of Public Health Issues

	Koyra			Shyamnagar		
	M	F	T	M	F	T
Six killer diseases that attack children	41.01	26.19	38.18	36.52	69.70	43.92
Need for immunization	46.63	35.71	44.55	38.26	33.33	37.16
Need of handwashing after defecation	54.49	88.10	60.91	54.78	78.79	60.14
Need for handwashing before getting food	65.17	78.57	67.73	67.83	78.79	70.27
Antenatal care for pregnant women	14.04	57.14	22.27	28.70	54.55	34.46

The majority of the respondents could review the messages of the necessity for washing hands before taking food (68.75%), Need for washing hands after defecation (60.60%). 27.17% of the respondents could recognise antenatal care. However, a meagre percentage of individuals could underscore the requirement for immunisation and antenatal consideration for women (Table 7).

The term "Six killer diseases" refers to Pneumonia, Diarrhoea, Malaria, Meningitis, HIV and Measles.

A school teacher said:

"Due to the absence of proper education, people of this area are still unaware of healthcare. In this area, a large number of women do not go for any facilities to ANC check up on their gestational age."

A rickshaw puller said,

"I cannot even manage my food properly, so when I think about my health?"

4. Conclusion

The present study identified that regarding post-disaster health care and sanitation framework, several types of diseases as well; nonappearance of awareness together with malnutrition affected the ordinary people. At the same time, the health and family planning service providers are very little acquainted with the target population.

References

- [1] Parvin, G. A., Takahashi, F., & Shaw, R. (2008). Coastal hazards and community-coping methods in Bangladesh. *Journal of Coastal Conservation*, 12(4), 181-193.
- [2] Haque, F. (2018). *Assessment of livelihood resilience about cyclones and climate change along the south-western coastal belt of Bangladesh* (Master's thesis, NTNU).
- [3] IPCC. (2001). Working Group II Report "Clim Change 2001: impacts, adaptation, vulnerability". Intergovernmental Panel on Climate Change, Third Assessment Report.
- [4] UN ISDR (2007). Disaster occurrence: number of natural disasters registered in EMDAT. Available at <http://www.unisdr.org/disaster-statistics/occurrence-trends-century.htm>. (Last accessed on February 18, 2009).
- [5] Islam MR (ed) (2004) Where land meets the sea: a profile of the coastal zone of Bangladesh. University Press Limited, Dhaka, 77 pp.
- [6] Islam RM (2008a) Towards institutionalisation of global ICZM efforts. In: Krishnamurthy RR (ed) Integrated coastal zone management. Research Publishing Services, Singapore, p 23.
- [7] Dasgupta S, Huq M, Khan ZH, Ahmed MMZ, Mukherjee N, Khan MF, Pandey K (2010) Vulnerability of Bangladesh to cyclones in a changing climate – potential damages and adaptation cost. Policy Research Working Paper 5280. The World Bank.
- [8] Gray WM (1985) Tropical cyclone global climatology. WMO technical document, WMO/TD No. 72, Vol. I: 3-19, WMO, Geneva, Switzerland.
- [9] Ali A. (1996). Vulnerability of Bangladesh to climate change and sea level rise through tropical cyclones and storm surges. *Water Air Soil Pollut* 92: 171-179.
- [10] Singh OP, Masood T, Rahman MS. (2001). Has the frequency of intense tropical cyclones increased in the north Indian Ocean? *Current Science* 80(4): 575-580.
- [11] Singh OP, Masood T, Rahman MS. (2001). Has the frequency of intense tropical cyclones increased in the north Indian Ocean? *Current Science* 80(4):575-580.
- [12] Government of Bangladesh (GoB). (2009). Bangladesh climate change strategy and action plan 2009.

- [13] Hossain, M. (2008) Sea level rise, natural disasters and threats to human security in Bangladesh, Paper presented in “South Asia: Environment and Human Securities Conference”, 2-3 October 2008. Canberra, Australia.
- [14] ICZMP (2008) Data on coastal district, integrated coastal zone management project, online `unter http://www.iczmpbangladesh.org/district_info/dis_info.htm, Cited 18 Feb. 2008.



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