

CONSEQUENCES OF COSTAL WATER EFFECT ON HEALTH FOR SCHOOL GOING ADOLESCENT AT KALAPARA UPAZIAL OF BANGLADESH

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ABSTRACT

Saltwater intrusion into freshwater sources has emerged as a critical public health concern in the coastal regions of Bangladesh, with profound implications for adolescent health and well-being. This study investigates the health consequences of coastal water exposure among school-going adolescents in Kalapara Upazila of Patuakhali district—a region highly affected by saline intrusion due to climate change, sea-level rise, and inadequate freshwater infrastructure. A total of 250 adolescents were surveyed using a semi-structured questionnaire to assess the prevalence of waterborne, water-washed, and water-related diseases. The results reveal that a significant proportion of adolescents suffer from waterborne illnesses such as cholera (91.36%), dysentery (87.74%), and typhoid (80.62%). Additionally, high rates of skin-related issues and gastrointestinal disorders were reported. The findings indicate a strong association between water quality and adolescent health in coastal environments. These insights can serve as critical evidence for public health authorities, educators, and policy-makers to design context-specific interventions aimed at ensuring access to safe water and improving hygiene practices. The study underscores the urgency of strengthening water infrastructure and health education to protect vulnerable adolescent populations in coastal Bangladesh.

Key words: Consequences, coastal water, adolescent's health.

Introduction

Climate change is a serious issue that will have varying effects on the economy, water, agriculture, and health. More people are realizing that extreme weather events and changing climates affect society more than average climate change (IPCC, 2001). Because of its low topography, Bangladesh, a country with a variable climate, is vulnerable to both the current coastal risks and the anticipated Sea Level Rise (SLR). According to WARPO [2006], Sea Level Rise (SLR) might cause an increase of 14, 32, and 88 cm in 2030, 2050, and 2100, respectively, which would submerge roughly 8, 10, and 16% of Bangladesh's entire land area. In several scenarios, DOE (2001) predicted that the Bay of Bengal's sea level will rise by 0.3 to 1.5 meters by 2050. In Bangladesh's coastal regions, saline water intrusion is very seasonal. Important factors for agriculture, fisheries, and the coastal ecosystem are salinity and its seasonal variations. The dynamics of the coastal region's biophysical system will therefore also be impacted by changes in the salinity pattern as it currently exists as a function of time and space. Salinity's effects are also thought to be among the most urgent environmental problems. Possible risks to human health, biodiversity, water, fisheries, agriculture, food security, and other natural resources. In a comparison study of salt-affected areas from 1973 to 2009, SRDI discovered that agro-biodiversity had been severely impeded by the approximately 0.222 million hectares (26.7%) of new land that had been damaged by varying degrees of saline over the previous four decades (SRDI, 2010). The World Health Organization has also prioritized research on the health effects of drinking highly salinized water as one of its public health goals (Olukanni *et al.*, 2014). Salinity intrusion in drinking water and its impact on health risks, particularly for adolescents in Bangladesh's coastal regions, are among these significant issues. Thus, the present study will offer a specific illustration of how coastal water affects the health of Bangladeshi adolescents.

Materials and Methods

The study conducted during the period of July, 2021 to June, 2022. A draft schedule was first prepared. The draft timetable was subsequently tested, and any new material that was not included in the draft plan was carefully considered. Thus, in light of recent and real-world experiences, the draft timetable was enhanced, reorganised, and changed. After making necessary adjustments, a final survey schedule was developed in logical sequence. The research was conducted in the study area and data was collected by the researchers themselves from 250 respondents via an interview schedule. The researcher first made a report with the respondents and explained the objectives of the study as much as possible using the local language. The questions were clarified when a respondent had problems understanding. The study populations are adolescents aged from 17 to 21, both male and female living in coastal Kalapara Upazial of Bangladesh. Before data collection, the researchers succinctly outlined the study's objectives to the adolescents to mentally prepare them and secured signed informed consent from participants who expressed their desire to partake in the study.

The data gathered from respondents were analysed in alignment with the study's objectives. The encoded data were input into the computer for statistical analysis. The SPSS software was used for data analysis. Statistical measurements were employed to characterise the variables whenever applicable.

Results and Discussion

The study minutely explored the drinking water scenarios for the adolescent in Kalapara upazila of Patuakhali district. Actually the adolescent enjoyed two types of water for drinking purposes such as pond as well as tube-well water. Most of the adolescents use pond water for their daily livelihood. Though they are alert to safe drinking water, but they are bound to depend on pond water due to family as well as financial causes. It is one of the pleasures that the sources are mostly within the household premises, but in each case it is time consuming. Indeed water crisis is very frequent in the study areas at least once in a year. Dryness of the pond is the main cause for drinking water crisis (Table 1). The situations extend upto a month and sometimes it prevails more than one month. In that time they have to suffer for drinking water and cooking purposes. At that time harvested rain water is the prime source for drinking and cooking. Overall the adolescents are moderately satisfied with the existing drinking water sources.

The study did not ignore the hygienic situations and noted that hygienic toilets are mostly available, but the barriers are absence of water facility in toilets, hence they need to carry water but the amount generally not too much. Another issue is that though most of the adolescent uses soap after using toilets, 18.43% adolescents are not using soap (Table 2). Here more awareness needs to grow and circulate so that all adolescent uses soap after using toilets. This activity ensures the sound health and quality citizen in the coastal areas of Bangladesh.

Waterborne diseases were reported by 43.56% of the respondents, indicating that nearly half of the adolescents are exposed to pathogens typically transmitted through contaminated drinking water (Table 3). Water-washed diseases, which are largely preventable with adequate water for hygiene purposes, were experienced by 32.15% of respondents, reflecting insufficient water availability for personal and domestic hygiene. Additionally, 21.78% of adolescents reported suffering from water-related diseases, which include illnesses propagated by vectors that depend on water for breeding, such as mosquitoes. These findings collectively emphasize the multifaceted nature of the water crisis and its implications on adolescent health in the study region. Further insight is provided by the ranking of specific diseases affecting adolescents (Table 4). Cholera emerged as the most prevalent disease, affecting 91.36% of respondents, followed by dysentery (87.74%) and typhoid (80.62%). These are all classical waterborne diseases, commonly linked to poor sanitation and consumption of contaminated water, suggesting systemic failures in water safety infrastructure. Other notable conditions included constipation (73.47%) and jaundice (71.34%), which may indicate broader gastrointestinal distress and exposure to hepatotoxic contaminants. Skin-related problems, such as skin allergy (69.43%), skin itchiness (61.57%), and dry skin (49.52%), point to the lack of clean

water for personal hygiene and possibly the use of polluted water for washing and bathing. Though they are affected but showed very minimum response to get vaccination.

Table 1. Scope for water uses in the study area

Water related issues	Categories	% respondents	% Total respondents
Source of drinking water	Pond	46.20	100
	Tube well	53.80	
Location of water source	Inside household premises	53.40	100
	Outside household premises	46.60	
Time needed to reach	Less than ten minutes	77.67	100
	More than ten minutes	26.33	
Occurrence of water crisis	Yes	73.68	100
	No	26.32	
Causes of water crisis	Dryness of pond	46.81	100
	Lowering of water layer	24.62	
	Flooding	28.57	
Frequencies of water crisis	At least once in a year	50.53	100
	Two or three times in a year	38.71	
	Frequently in a year	10.76	
Duration of water crisis	Weekly	43.21	100
	Fortnightly	10.78	
	Monthly	23.76	
	More than 1 month	22.25	
Source of water during crisis period	Rain harvest water	65.99	100
	Carrying water	23.45	
	Filtered water	9.23	
	Bottle water	1.33	
Quality of drinking water	Low	19.61	100
	Medium	77.83	
	High	2.56	
Level of satisfaction	Poor	6.28	100
	Moderate	78.92	
	Good	13.45	
	Very good	1.35	

Table 2. Water uses in hygienic area

Nature of hygienic facilities	Categories	% respondents	% Total respondents
Availability of hygienic facility	Yes	83.56	100
	No	16.44	
Water availability in toilets	Yes	89.76	100
	No	10.24	
Willing to use soap	Yes	81.57	100
	No	18.43	
Attitude toward sanitation	Low	7.85	100
	Medium	67.89	
	High	24.26	

Waterborne infections were reported by 43.56% of respondents, suggesting that over half of the teenagers are susceptible to pathogens commonly conveyed through polluted drinking water. Water-washed diseases, which are largely preventable with adequate water for hygiene purposes, were experienced by 32.15% of respondents, reflecting insufficient water availability for personal and domestic hygiene. Additionally, 21.78% of adolescents reported suffering from water-related diseases, which include illnesses propagated by vectors that depend on water for breeding, such as mosquitoes. These findings collectively emphasize the multifaceted nature of the water crisis and its implications on adolescent health in the study region.

Further insight is provided by the ranking of specific diseases affecting adolescents (Table 4). Cholera emerged as the most prevalent disease, affecting 91.36% of respondents, followed by dysentery (87.74%) and typhoid (80.62%). These are all classical waterborne diseases, commonly linked to poor sanitation and consumption of contaminated water, suggesting systemic failures in water safety infrastructure. Other notable conditions included constipation (73.47%) and jaundice (71.34%), which may indicate broader gastrointestinal distress and exposure to hepatotoxic contaminants. Skin-related problems, such as skin allergy (69.43%), skin itchiness (61.57%), and dry skin (49.52%), point to the lack of clean water for personal hygiene and possibly the use of polluted water for washing and bathing.

Table 3. Occurrence of water carrying diseases in the study areas

Occurrence of diseases	Categories	% respondents	% Total respondents
Water borne disease	Yes	43.56	100
	No	56.44	
Water-washed disease	Yes	32.15	100
	No	67.85	
Water related disease	Yes	21.78	100
	No	68.22	

Table 4. Adolescent frequently affected by some major diseases in the study area

Name of diseases	% affected respondents	Ranked
Cholera	91.36	1 st
Constipation	73.47	4 th
Diarrhea	58.38	8 th
Dry Skin	49.52	9 th
Dysentery	87.74	2 nd
Jaundice	71.34	5 th
Skin Allergy	69.43	6 th
Skin Itchiness	61.57	7 th
Typhoid	80.62	3 rd
Allergy	48.51	10 th

With detrimental effects on the environment, human health, food security, economic activity, natural resources, and physical infrastructure, climate change and variability (CC and V) are regarded as one of the biggest risks to sustainable development (Huq *et al.*, 2006). The extent to which climate change will actually have negative effects in various regions of the world is a topic of much discussion. There is evidence that industrialized nations in temperate regions might benefit from climate change and experience fewer negative effects. According to Ruamsuke *et al.* (2015), there is scientific agreement that low-income and non-industrialized countries with tropical and sub-tropical climates are more vulnerable to the adverse effects of climate change. Bangladesh is seen as one of the nation's most at risk from climate change, according to Uzzaman (2014).

Sea level rise is clearly the biggest worry for Bangladesh among the negative effects of climate change, as it might have a greater financial impact on the entire nation's economy. Over three crore people are spread throughout 19 coastal districts. The lives and means of subsistence of this enormous people will be impacted by sea level rise. For a number of socioeconomic and cultural factors, women are disproportionately affected by livelihood vulnerability to climate change. These include a greater reliance on natural resources, restricted access to resources, especially land tenure, restricted mobility, restricted access to knowledge and education, and more (Asaduzzaman, 2015). Due to their reliance on domestic economic activities, women are particularly vulnerable to climate-related calamities like floods, which negatively impact their well-being (Goh, 2012). In areas afflicted by salinity, rural women's vital duty of gathering water is particularly complicated, which affects their other household responsibilities, relationships, and education (Pettengell, 2010).

Conclusion

The findings of this study demonstrate that adolescents in Kalapara Upazila face significant health risks due to exposure to saline and contaminated water sources. The high incidence of waterborne and hygiene-related diseases among school-going adolescents reflects the ongoing challenges posed by coastal water degradation. Addressing these issues requires a multifaceted approach involving improvements in water infrastructure, enhanced public health awareness, and targeted interventions by both governmental and non-governmental stakeholders. Ensuring safe water access and promoting hygiene education are essential for safeguarding the health and development of adolescents in Bangladesh's vulnerable coastal regions.

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