

Challenges in Accessing Healthcare and Education in Riverine Displaced Communities in Bangladesh

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ABSTRACT

Riverine and char settlements in Bangladesh are repeatedly reshaped by flooding, riverbank erosion, land loss, and household displacement, while formal health and education systems remain organized around relatively stable mainland settlements. This study examines how geographical isolation, displacement-related socioeconomic vulnerability, service-capacity constraints, and institutional responsiveness shape access to healthcare and education in Charsadipur Union, Kumarkhali, Kushtia, within the wider riverine context of Bangladesh. An exploratory mixed-methods design combined a household survey of 200 respondents, 20 key informant interviews, seven focus group discussions, field observation, and secondary evidence. Quantitative analysis was descriptive; qualitative material was thematically coded and triangulated. In the study community, 65.5% of respondents lived more than 5 km from a healthcare facility, 87.0% reported access difficulties, and 88.5% rated healthcare quality as poor or very poor. For education, 71.5% reported insufficient local facilities and only 8.0% had attained college or university education. In addition, 92.5% viewed government efforts as inadequate and 72.0% rated existing programmes ineffective or very ineffective. Qualitative findings linked these patterns to transport constraints, low income, staffing shortages, weak infrastructure, disrupted schooling, poor government-NGO coordination, and limited local capacity. The findings indicate cumulative service exclusion in which geography creates an access penalty that poverty, capacity shortages, and weak institutional responsiveness intensify. Integrated, place-sensitive responses are therefore required across healthcare, education, transport, affordability, workforce deployment, resilient infrastructure, and local coordination.

1. Introduction

Bangladesh's Ganges-Padma, Brahmaputra-Jamuna, and Meghna river systems sustain fertile floodplains and livelihoods but also generate recurrent erosion, flooding, accretion, and displacement. Riverine households can lose land, housing, livelihoods, and access to basic services repeatedly rather than through a single shock (Alam et al., 2020; B. Hossain, 2022; Sarker et al., 2019). Evidence from the Jamuna and northwestern Bangladesh further shows that erosion can encourage permanent migration aspirations and repeated adaptation among internally displaced households (Chowdhury, 2025; Rudolph et al., 2025). In char and riverbank settings, effective access to public services is therefore more demanding than the formal existence of a clinic or school. Travel by boat, poor roads, seasonal isolation, transport costs, lost work time, staff shortages, and household income constraints can

prevent people from using services that technically exist. A mixed-methods study of a riverine island documented recurrent flooding and erosion alongside weak diagnostic capacity, health worker shortages, alternative medicine use, and poor educational conditions (A. Hossain, 2024). A multi-district assessment in northern chars similarly identified distance, travel time, and transport cost as barriers to conventional healthcare, while community, satellite, and floating services reduced travel burdens (Sajib, 2025). Educational evidence points to related mechanisms: weak communication networks have constrained access despite strong educational aspirations (Kabir, 2006), and erosion-related displacement has been associated with temporary and permanent dropout, lower attendance, fewer years of schooling, child labour, early marriage, and greater school distance (Saha et al., 2026). A baseline survey of 6,120 households in 90 northern chars also documented weak road access, limited secondary-school provision, poverty, livelihood vulnerability, and service deprivation (Barua et al., 2024). These findings indicate that healthcare and education are linked at household level through the same mobility, income, infrastructure, and continuity constraints. Governance cuts across both sectors because funding, implementation, local-government capacity, NGO coordination, workforce deployment, and community participation can either reduce or amplify geographical disadvantage (Barua et al., 2024; de Castro & Guinea, 2026; A. Hossain, 2024). Yet the Bangladesh literature remains fragmented geographically across river systems and analytically across sectors. Studies commonly focus on one service or intervention, leaving limited evidence on how the same displacement context simultaneously shapes access to multiple essential services. This study addresses that gap by treating governance as a cross-cutting institutional condition and examining healthcare and education together. Charsadipur Union is used as an empirical case for mechanism-focused analysis rather than as a basis for national prevalence estimates. The objectives are to identify the main barriers to healthcare and educational access; examine how geographical isolation, displacement-related socioeconomic vulnerability, and service capacity shape access; and assess how governance and institutional responsiveness influence service delivery and possible context-specific responses. Correspondingly, the study asks: What are the main barriers to healthcare and education in riverine displaced communities? How do geography, socioeconomic vulnerability, and service capacity shape effective access? How do governance and institutional responsiveness affect access, and which strategies could improve service delivery?

2. Literature Review

2.1 Riverine Displacement and Socioeconomic Vulnerability

Riverbank erosion is an ongoing threat in Bangladesh's deltaic region, but its social impacts are not limited to the loss of physical land alone. Erosion has been shown to cause repeated displacements, loss of agricultural and homestead land, changes in occupations, and significant livelihood losses at the community and household level (Ahmed et al., 2019; B. Hossain, 2022; Sarker et al., 2019). Household-based longitudinal studies conducted along approximately 250 km of the Jamuna River have found that riverbank erosion increases aspirations for permanent internal migration, whereas flood effects are addressed through adaptation in situ (Rudolph et al., 2025) highlighting how the nature and temporality of environmental losses shape the response to those losses. This is pertinent for service accessibility, since households residing in precarious locations face increasing dependency on public services difficult to access, whereas relocated households lose continuity of service delivery. The socio-economic background of char communities exacerbates these challenges, as shown by BIGD's 2024 baseline study in 90 chars of northern Bangladesh, where the socio-economic background is characterized by low levels of education, poor access to infrastructure and services, and dependence on livelihoods in less productive sectors (Barua et al., 2024). Likewise, previous studies in the area point to the following issues: land insecurity, poverty, lack of formal employment opportunities, poor communication links, and repeated exposure to environmental risks (Chowdhury, 2025; B. Hossain, 2022; Sarker et al., 2019). All of these issues interact, as asset loss lowers the ability to afford medical treatment or transportation; unstable work raises the cost of attending schools; and repeated relocations make families hard to reach for schools, clinics, and social support. Thus, socio-economic vulnerability is a household mechanism transforming environmental risk into inequitable service delivery.

2.2 Healthcare Accessibility in Riverine and Hard-to-Reach Communities

Healthcare access in riverine Bangladesh has at least four dimensions: reachability, affordability, service availability, and acceptable quality. According to A. Hossain (2024), the island population exposed to recurrent

erosion and floods has lacked access to a sufficient number of registered doctors and diagnostic facilities and has used alternative medicine and been exposed to adverse maternal health conditions. Halim and Mia (2025) have identified geographic isolation, infrastructure, transport, and socioeconomic problems as the main determinants of healthcare-seeking behavior in Char Nizam. Both studies suggest that exclusion from health services is not related to distance only. It is necessary for a household to have means of reaching the location, paying, finding a suitable service provider, and getting medicines and diagnostics upon arrival.

Service delivery alternatives demonstrate that some geographical barriers are adjustable. Ahmed et al. (2019) describe the experience of a Friendship floating hospital using the framework of 4As: affordability, availability, acceptability, and awareness. Service delivery locations may be adjusted according to the needs of riverine geographies. Recent research by Sajib (2025) assesses a three-tiered service delivery model of community providers, satellite clinics and hospital ships in five hard-to-reach sub-districts of Kurigram, Gaibandha, Bogura, Sirajganj and Jamalpur. This approach has facilitated healthcare-seeking by reducing travel burden and establishing a trusted first point of contact. Such service delivery models require, however, organizational sustainability, referral pathways, staffing, funding and integration with public health facilities.

The evidence collected at the national level confirms that interpretation. According to the World Health Organization (WHO), inadequate infrastructure in underserved areas, insufficient number of providers, limited diagnostics and medicines, financial protection deficiencies and inadequate referrals represent continuing barriers to universal health coverage in Bangladesh (World Health Organization, 2025). A similar qualitative study of healthcare seeking in the riverine islands of Sirajganj district has revealed geographic and weather-related transport barriers, medical support and resource shortages, and socioeconomic inequalities (Sohel, 2024). The issue is thus not only geographic but also institutional. Riverine households face a heavier burden due to additional barriers of weak primary care infrastructure.

2.3 Educational Access, Continuity and Attainment

Access to education in char areas depends on the location of the schools, continuous residency of the household, the resilience of schools to function under shock circumstances, and the financial capacity of households to maintain children in schools. Kabir (2006) showed that a poor communication network was the cause of lack of access to education despite having very high educational aspirations in communities. Hasnat and Kabir (2024) provide an additional institutional and relational perspective and found that poverty, educational aspirations of parents, schools' initiative to encourage parents, and the quality of interaction between schools and families affect engagement. This literature is crucial in distinguishing between the lack of access and lack of demand for education.

In recent years, there is more empirical evidence on the consequences of displacement on education. Saha et al. (2026) reported that erosion-related displacements in Jamuna led to poor schooling outcomes, including temporary and permanent dropout, less years of schooling, and low attendance. The repeated exposure increased the adverse outcomes, whereas child labor, early marriage, household size, and income volatility served as mechanisms of transmission. Similarly, A. Hossain (2024) found that the flood situation and poor transportation system hindered the movement of students and teachers to educational institutions in a riverine island. Thus, an erosion event not only interrupts schooling but also leaves long-lasting scars. A child that is interrupted due to relocation will enter the labor market, marry early, or simply fail to go back to formal education.

National-level programmes aimed to benefit disadvantaged children show that the flexibility of provision can promote re-entry. However, these programmes also show that identification of children prior to disconnection should be carried out. The Educate the Most Disadvantaged Children programme launched by UNICEF is based on flexible community-based learning initiatives (UNICEF Office of Strategy and Evidence-Innocenti, 2025). In the riverine context, a similar approach suggests introducing a flexible calendar, learning space, transportation, and school record transfer systems.

2.4 Governance, Institutional Reach and Adaptive Service Delivery

The quality of governance affects how environmental and socioeconomic barriers lead to service exclusion. Local agencies will provide services, repair infrastructure, coordinate relief efforts, mobilize their own personnel, and link people to national programs. In cases where local agencies are weak, an otherwise formally inclusive program will

generate territorially unequal results. Climate-induced displacement governance in Bangladesh has pointed to ongoing coordination and implementation problems (Kisinger & Matsui, 2021), while universal health coverage research by WHO has focused on difficulties in providing good-quality primary care in disadvantaged and difficult-to-access locations (World Health Organization, 2025). More recently, World Bank support for secondary education, early years development, social protection, and river management of the Jamuna River has again linked human development to climate adaptation (World Bank, 2023). There may be roles for NGOs and social purpose organizations in filling gaps in riverine areas, although fragmented projects may result in a spatially skewed distribution of resources. Evidence for floating hospitals and three-tiered health service provision is hopeful (Ahmed et al., 2019; Sajib, 2025); but for the projects to be sustainable, government-NGO coordination, referrals, information systems, and responsibility for difficult-to-reach areas need to be assured. The same idea is applicable in education, where community centers may improve the continuity of services but will still need to be connected to mainstream education institutions (UNICEF Office of Strategy and Evidence-Innocenti, 2025). Governance, then, is not an outcome that should come after access measurement; it is a cross-cutting condition.

2.5 Critical Synthesis and Research Gap

Four recurring domains in the literature are: (1) environmental and spatial instability; (2) socio-economic vulnerability within the household; (3) sector-specific service capacity; and (4) responsiveness of institutions. The healthcare literature identifies distance, transport cost, shortage of qualified health professionals, weak diagnostic ability, and shortage of medicine (Halim & Mia, 2025; A. Hossain, 2024; Sajib, 2025; Sohel, 2024). The education literature identifies distance to schools, disruption of schooling, dropout, shortage of teachers, child labor and early marriage (Hasnat & Kabir, 2024; Kabir, 2006; Saha et al., 2026; UNICEF Office of Strategy and Evidence-Innocenti, 2025). Livelihood and displacement research indicates how loss of lands and repeated movement reduce household ability to overcome such obstacles (Barua et al., 2024; Chowdhury, 2025; de Castro & Guinea, 2026; Sarker et al., 2019). The governance literature highlights that it is resources, implementation, and coordination that determine if the services are adapted for difficult terrain (Kisinger & Matsui, 2021; World Bank, 2023; World Health Organization, 2025).

More underexplored is the integrated analysis in which healthcare and education are seen as public service outcomes resulting from one common riverine vulnerability system. This paper attempts to fill the gap. Rather than estimate the national prevalence from one place and develop a model outside of the data, it aims at developing and illustrating the framework of effective service access in light of household data and stakeholders' perspectives in Charsadipur with comparison to other cases of riverine vulnerabilities in Bangladesh.

Table 1 Synthesis of selected literature on riverine displacement, healthcare, education, and service access in Bangladesh

<i>Study</i>	<i>Context</i>	<i>Approach</i>	<i>Contribution</i>	<i>Limitation relevant here</i>
<i>Hossain (2024)</i>	Riverine island, Tangail	Mixed methods; 442 households + qualitative interviews	Flood/erosion disrupt livelihoods; doctor/diagnostic shortages; inadequate education	Single island; not designed to model health and education access jointly
<i>Sajib (2025)</i>	Five northern riverine sub-districts	Concurrent mixed-method evaluation	Community/satellite/floating services improve reach and affordability	Intervention-focused rather than general service-exclusion study
<i>Saha et al. (2026)</i>	Jamuna erosion-prone communities	Mixed methods + econometric analysis	Displacement associated with dropout, attendance loss, child labour, early marriage	Education-specific
<i>Barua et al. (2024)</i>	90 chars, Gaibandha and Kurigram	Baseline survey; 6,120 households	Low literacy, weak infrastructure, limited secondary schooling and services	Northern chars; descriptive programme baseline

Study	Context	Approach	Contribution	Limitation relevant here
Halim and Mia (2025)	Char Bhola	Field-based mixed evidence	Isolation, transport and socioeconomic limits shape healthcare seeking	Healthcare-specific, single island
Present study	Charsadipur, Kushtia	Exploratory mixed-methods case study	Integrates healthcare, education, socioeconomic and governance barriers	Single-community empirical case

3. Conceptual Framework

Access is seen here as an effective rather than purely formal condition. Access exposure begins in the riverine displacement setting, namely erosion, flooding, relocation, and isolation. This is based on three proximate barrier dimensions. Geographical and transportation barriers determine physical accessibility. Economic vulnerability determines the ability to afford travel, treatment and schooling, and also determines whether the child's time needs to be spent on income-earning activities. Health services capacity determines what people will find once they have reached an institution, which involves facilities, health personnel, medicines, equipment and infrastructure, among others.

Access to healthcare and education are the two key service outcomes. Responsiveness of governance and institutions is a crosscutting issue rather than a mere outcome. Good governance and capacity at various levels will ensure that geographic disadvantage is reduced, while poor responsiveness can increase it. The last set of issues relates to context-specific interventions which would change at least one pathway such as mobile or decentralized services, infrastructure resilience, transport and referral systems, workforce incentives and financial support. The conceptual framework helps organize the three research questions.

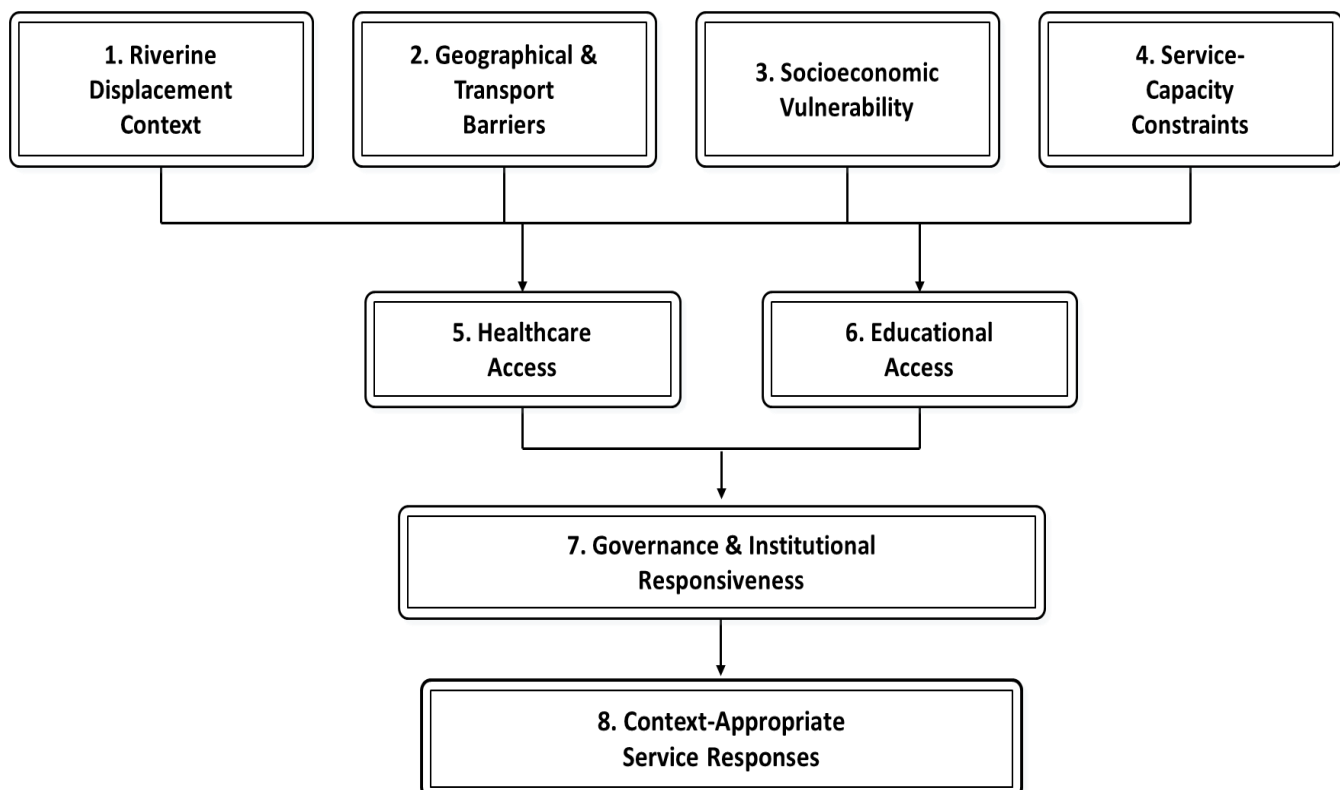


Figure 1 Integrated conceptual framework for healthcare and educational access in riverine displaced communities in Bangladesh

4. Methodology

4.1 Research Design

The research design applied in the study was an exploratory mixed-methods case study because the problem under investigation demanded not only a quantitative description of the access barriers in the study community, but also an explanation of the way in which these barriers were experienced by its residents and institutions. While the

quantitative approach provided descriptive data about demographics, access to healthcare, educational opportunities, services, and institutional views, the qualitative method sought to explore the mechanisms and lived experiences associated with these barriers, as well as stakeholders' explanations. Triangulation reasoning was applied as the means of integration; that is, one kind of data was used to verify, contextualize, and interpret another. The research paper is centered on riverine displaced communities in Bangladesh, but the empirical data were obtained in one community. Thus, the national context is analytical and comparative, rather than representative.

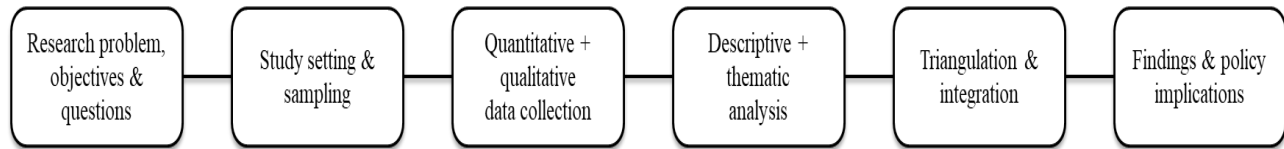


Figure 2 Mixed-methods research design and analytical workflow

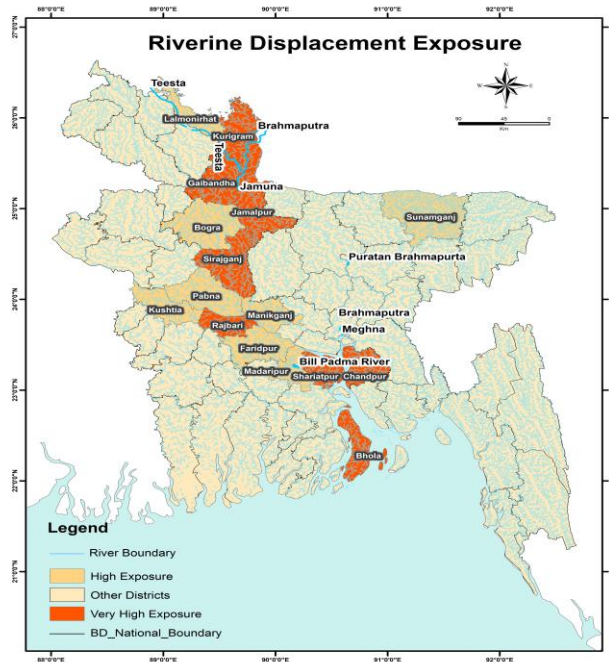


Figure 3 Riverine displacement exposure and study-location context in Bangladesh

4.2 Study Setting

The empirical research took place in the Charsadipur Union in the Kumarkhali Upazila in Kushtia District, Bangladesh (around 23.9596°N, 89.2184°E). It consists of a 64.75 km² area with nine villages and ten mouzas. The area is prone to erosion and floods because of the riverside location, which makes the geography unstable there. In the original monograph, the livelihoods of local people are described as agricultural-based and fishing, with small-scale work and informal jobs, which make them sensitive to erosion and changes due to seasons.

4.3 Population, Sampling and Participants

The household survey involved 200 households. The original study involved the use of purposive sampling, and there were also convenience aspects of household sampling. It is important to note that this is more of a case study sampling and not a probability sampling from which national prevalence can be estimated. The study involved 20 key informants consisting of stakeholders in the health care industry, education, local administration, government, and NGO/development sectors. According to the methodology of the study and sampling chart, there are seven FGD sessions involving about 10 to 12 individuals per session. These involve male, female, and young respondents

for the purpose of addressing mobility, livelihood of the household, maternal and child health, education, and future opportunities. As seen later in the qualitative section of the source monograph, there is an indication of ten FGD sessions. With seven FGD sessions mentioned in the abstract and methodology sections and sampling chart, it is safe to assume that there were seven FGDs.

4.4 Data Collection

Household questionnaires were used to gather information about age, gender, occupation, annual household income, distance from healthcare, type of healthcare provider, difficulty accessing healthcare services, existence of more than one barrier for healthcare services, traditional medicine, maternal and children's healthcare, perception of the quality of healthcare services, distance from schools, education status, availability of education facilities, government initiatives, governance issues, the presence of NGOs, efficiency of programs, and suggestions. The questionnaire was provided in both English and Bangla in the source article. Key informant interviews focused on the aspects of staffing, facilities, policy implementation, resource limitation, and coordination. Focus group discussions (FGDs) covered community experience, household coping strategies, sociocultural barriers, education, and mobility. Field observation was used for transport, health, and education infrastructure assessment.

4.5 Data Processing and Analysis

The Quantitative data were edited, coded, classified, and tabulated using SPSS and Microsoft Excel. In the preparation of this paper, only aggregate statistical output was accessible, hence limiting the quantitative analysis to the descriptive statistics available in the study records. Frequencies and valid percentages are presented for single-response variables. However, for multiple-response variables, percentages of cases are presented as they indicate the proportion of the 200 participants choosing each barrier or improvement priority. Regression analysis, chi-square test, correlation, confidence interval, odds ratio and p-value could not be reconstructed from the aggregate tables. Qualitative information collected from Key Informant Interviews, Focus Group Discussions and observations was analyzed thematically. There are four major domains identified in the source study, namely: health services accessibility, educational barriers, governance and services delivery, and NGO/developmental obstacles. Theme identification, coding, grouping of codes under themes, and theme interpretation in relation to the research questions were part of the thematic analysis. Integration of mixed methods involved joint interpretation of the two methods. For instance, survey findings on distance and transportation were jointly interpreted with stakeholder perceptions on emergency transport, while poor service quality ratings were linked with qualitative findings on shortage of personnel, drugs and equipment.

4.6 Ethical Considerations and Data Integrity

These aspects of ethical conduct were noted in the source study: informed consent, voluntary participation, confidentiality, the right to withdraw, data usage for academic purposes, and proper handling of participant information. No official number indicating ethics committee approval for the study was provided in the monograph; this should be confirmed prior to submitting it to the journal. Due to 19.5% of respondents in the survey being below 18 years old, field records need to be examined to describe the process of getting consent from a guardian and participant's assent. Coding problems in two outputs were preserved rather than fixed. First, the healthcare-distance output has a residual category coded as '11.00' for four participants (2.0%). Second, the school-distance output has a residual category code that does not correspond with the final questionnaire category. These are considered unsolved source codes.

5. Results

5.1 Socio-Demographic and Economic Profile

The 200-person survey described a relatively young population with pronounced economic vulnerability. Respondents aged 18–30 constituted 47.5% of the sample, followed by those aged 31–50 (24.0%), those below 18 (19.5%) and those above 50 (9.0%). Men represented 63.0% and women 37.0%. Income was concentrated at the bottom of the reported distribution: 57.0% of households reported annual income below BDT 30,000 and a further 20.0% reported BDT 30,000–60,000. Only 10.0% reported more than BDT 100,000 annually. Occupational data were less precise: 52.5% were classified as 'other' and 16.0% as unemployed, suggesting a substantial informal or inadequately specified labour profile.

Table 2 Socio-demographic and economic characteristics of survey respondents (n = 200)

Variable	Category	n	Percent (%)
Age	Below 18	39	19.5
Age	18–30	95	47.5
Age	31–50	48	24.0
Age	Above 50	18	9.0
Gender	Male	126	63.0
Gender	Female	74	37.0
Occupation	Farmer	8	4.0
Occupation	Fisherman	16	8.0
Occupation	Small business owner	15	7.5
Occupation	Laborer	12	6.0
Occupation	Teacher	8	4.0
Occupation	Health worker	4	2.0
Occupation	Unemployed	32	16.0
Occupation	Other	105	52.5
Annual Household Income	Below BDT 30,000	114	57.0
Annual Household Income	BDT 30,000–60,000	40	20.0
Annual Household Income	BDT 60,000–100,000	26	13.0
Annual Household Income	Above BDT 100,000	20	10.0

5.2 Healthcare Accessibility, Utilization and Quality

Spatial disadvantage in Healthcare Access is clearly evident. In the source output, 65.5% of the respondents lived more than 5 km from a healthcare facility, 16.0% of the respondents lived within 1 km, 5.0% lived 1-3 km, and 11.5% lived 3-5 km away from healthcare facilities. Residual source code '11.00' accounted for 2.0% of the total respondents. However, 87.0% of the respondents claimed that they or a relative faced challenges accessing healthcare services in the previous year. Government Hospitals were the main providers of healthcare services to 83.0% of the respondents, followed by 13.5% to private clinics, 2.0% to traditional healers, and 1.5% to NGOs. In the case of maternal and child healthcare provision, 90.5% of the respondents received health services from government hospitals and 9.5% from NGO-run clinics. However, despite using government hospitals, most people did not have a positive perception of the quality of services. This was indicated by 40.0% rating healthcare services as poor and 48.5% as very poor which gave a total of 88.5%. Only 6.0% rated the services as good or very good. Multiple responses provide details on how the challenge of accessibility manifests itself. 98.0% of the respondents cited distance from the healthcare facility while 89.0% cited problems with transport. 40.0% of the respondents cited poor infrastructure, 36.0% shortage of doctors or medical practitioners, 33.0% high cost of treatment, and 4.0% social/cultural problems.

Table 3 Healthcare accessibility, service utilization, and perceived quality of care (n = 200)

Indicator	Category	n	Percent (%)
<i>Distance To Healthcare</i>	Less than 1 km	32	16.0
<i>Distance To Healthcare</i>	1–3 km	10	5.0
<i>Distance To Healthcare</i>	3–5 km	23	11.5
<i>Distance To Healthcare</i>	More than 5 km	131	65.5
<i>Distance To Healthcare</i>	Unresolved source code “11.00”	4	2.0
<i>Main Provider</i>	Government hospital	166	83.0
<i>Main Provider</i>	Private clinic	27	13.5
<i>Main Provider</i>	Traditional healer	4	2.0
<i>Main Provider</i>	NGO-run healthcare	3	1.5
<i>Difficulty Accessing Healthcare</i>	Yes	174	87.0
<i>Difficulty Accessing Healthcare</i>	No	26	13.0
<i>Alternative/Home Remedy</i>	Yes	174	87.0
<i>Alternative/Home Remedy</i>	No	26	13.0
<i>Maternal/Child Healthcare</i>	Government hospital	181	90.5
<i>Maternal/Child Healthcare</i>	NGO-run clinic	19	9.5
<i>Perceived Quality</i>	Very good	4	2.0
<i>Perceived Quality</i>	Good	8	4.0
<i>Perceived Quality</i>	Moderate	11	5.5
<i>Perceived Quality</i>	Poor	80	40.0
<i>Perceived Quality</i>	Very poor	97	48.5

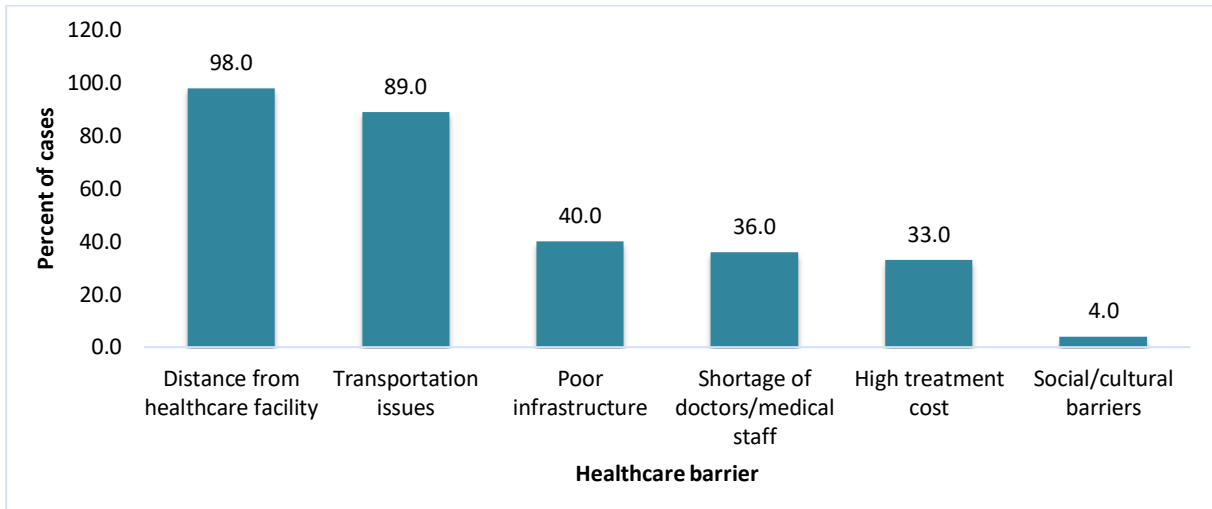


Figure 4 Major barriers to healthcare access among survey respondents

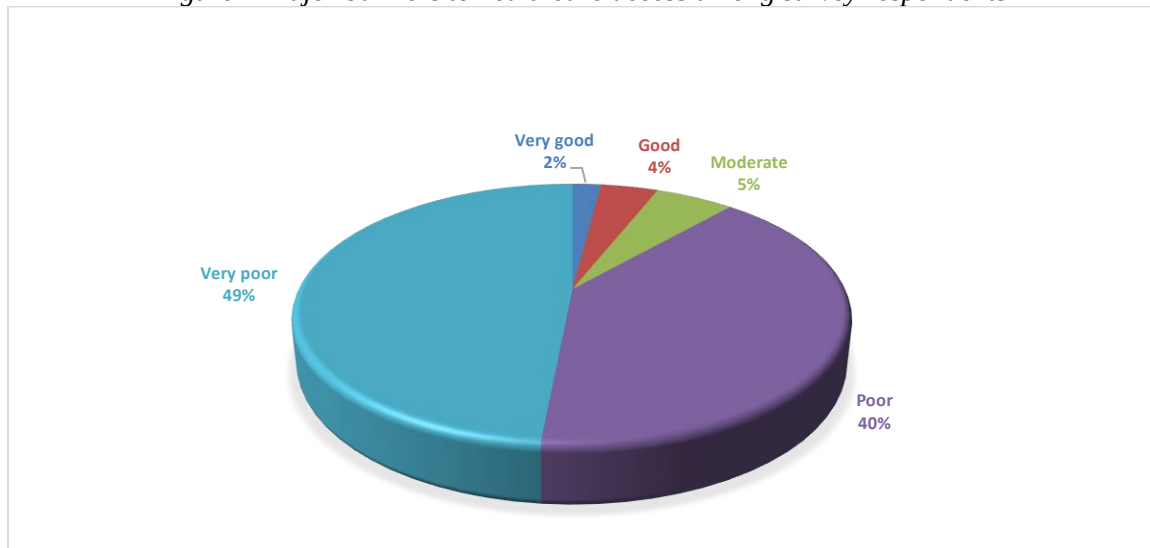


Figure 5 Respondents' perceived quality of available healthcare services

5.3 Educational Accessibility and Attainment

Similarly, access to education followed a similar trend. 3.0% of the sampled people lived within a 1-kilometer radius of the nearest school, 29.0% lived between 1 and 3 kilometers from the nearest school, and 67.5% lived between 3 and 5 kilometers from the nearest school. One respondent (0.5%) was identified in a residual category that could not be clearly explained in relation to SPSS code versus the question on distance. The key measure here related to local availability, where 71.5% said that schools and other facilities for education were insufficient in their locality, whereas 28.5% felt provision was adequate. Education level attained was mainly primary and secondary. Primary education was the highest level of education attained by 33.5% of the respondents, secondary education by 31.5%, and higher secondary education by 19.5% of the respondents. The other 7.5% had no formal education, and just 8.0% attained college or university education. Teacher and community interviews showed that there were problems of access to education not just due to distances but also due to poor infrastructure, lack of qualified teachers, learning materials, no higher educational institutions in the locality, poverty, pressure of child labour, and early marriages.

Table 4 Educational accessibility, facility availability, and attainment among survey respondents (n = 200)

Indicator	Category	n	Percent (%)
DISTANCE TO SCHOOL	Less than 1 km	6	3.0
DISTANCE TO SCHOOL	1–3 km	58	29.0
DISTANCE TO SCHOOL	3–5 km	135	67.5
DISTANCE TO SCHOOL	Unresolved residual source category	1	0.5
SUFFICIENT SCHOOLS/FACILITIES	Yes	57	28.5
SUFFICIENT SCHOOLS/FACILITIES	No	143	71.5
HIGHEST EDUCATION	No formal education	15	7.5
HIGHEST EDUCATION	Primary	67	33.5
HIGHEST EDUCATION	Secondary	63	31.5
HIGHEST EDUCATION	Higher secondary	39	19.5
HIGHEST EDUCATION	College/university	16	8.0

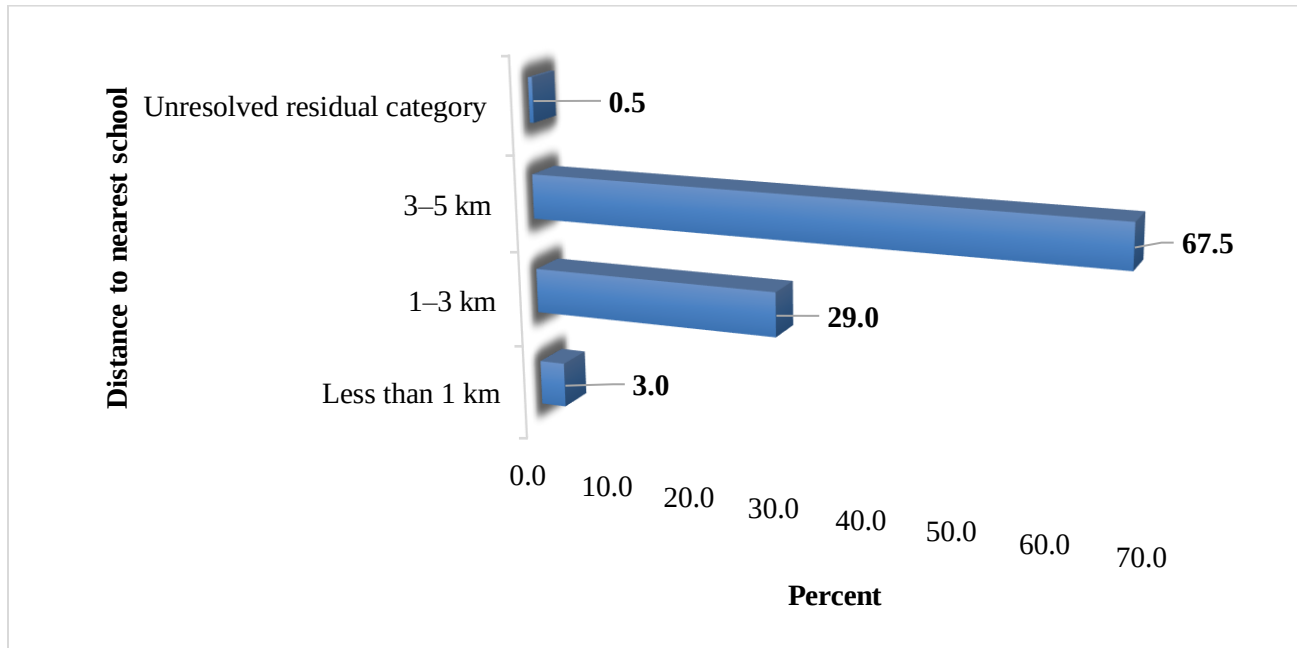


Figure 6 Distribution of respondents by distance to the nearest school

5.4 Governance and Institutional Responsiveness

The institutions were viewed extremely negatively. Only 7.5% thought that the local governments' attempts to enhance healthcare and education were sufficient, while 92.5% viewed the attempts as inadequate. Also, NGOs had low visibility, as 8.0% noted the presence of NGOs, 61.0% did not note the presence of NGOs, and 31.0% were uncertain. The effectiveness of the program took the same trend as well. 41.5% thought that the government/NGO programs were ineffective and 30.5% very ineffective, giving an overall negative perception of 72.0%, while 10.0% found the programs somewhat effective and 18.0% were neutral.

The multiple-response governance indicator shows that people perceive corruption or mismanagement (96.5% of cases), lack of funding (92.0%), poor implementation of policies (61.5%), and lack of community involvement (26.5%) as the main issues. These figures should not be seen as measures of corruption that are independent of verification, but the convergence in the qualitative data showed the following institutional pattern: poor coordination between local administration and NGOs, lack of funding, delays in providing services, and lack of community involvement.

Table 5 Perceived government responsiveness, NGO presence, and programs effectiveness (n = 200)

Indicator	Category	n	Percent (%)
GOVERNMENT EFFORTS ADEQUATE	Yes	15	7.5
GOVERNMENT EFFORTS ADEQUATE	No	185	92.5
NGO PRESENCE	Yes	16	8.0
NGO PRESENCE	No	122	61.0
NGO PRESENCE	Not sure	62	31.0
PROGRAMME EFFECTIVENESS	Somewhat effective	20	10.0
PROGRAMME EFFECTIVENESS	Neutral	36	18.0
PROGRAMME EFFECTIVENESS	Ineffective	83	41.5
PROGRAMME EFFECTIVENESS	Very ineffective	61	30.5

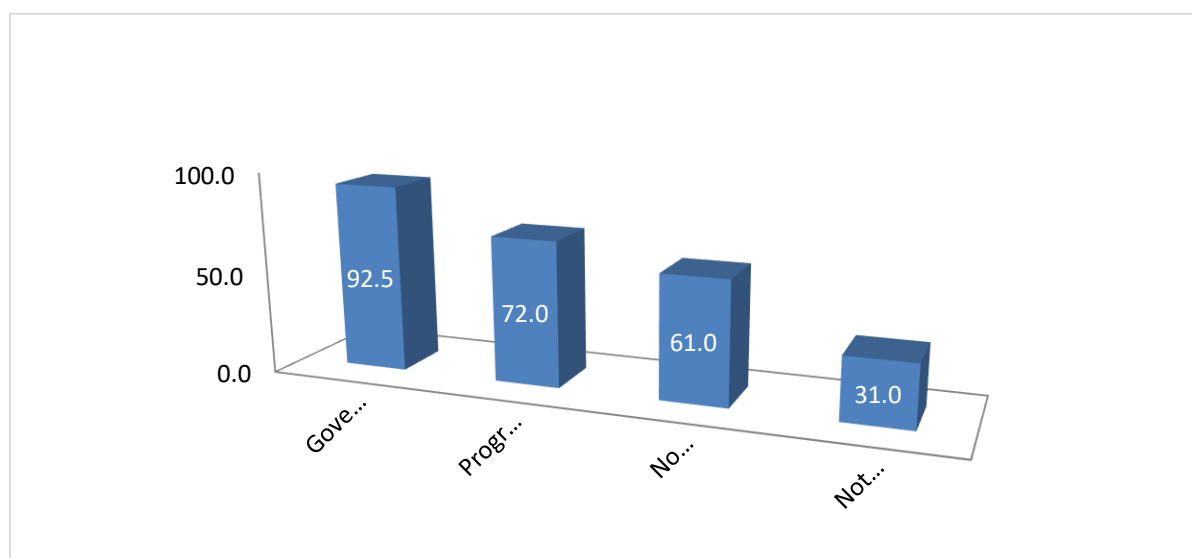


Figure 7 Perceived governance and institutional service-delivery gaps

5.5 Integrated Mixed-Methods Findings

There appear to be four mechanisms at work in both the quantitative and qualitative data. First, geography makes mobility costly in terms of reaching healthcare facilities, schools and emergency care services. Second, poverty turns mobility into an issue of affording healthcare, schooling and other services, with competing needs for transport, healthcare, educational supplies and school materials among others. Third, there continue to be shortages of capacity even after the facilities are reached. In terms of healthcare, shortages included staff, medicine and equipment. In terms of education, they included teachers, learning materials and infrastructure. Fourth, there appears to be poor institutional responsiveness where implementation is lacking.

Community priorities appear to align quite well with this understanding of exclusion. In the multiple response question dealing with health improvement, 94.5% listed more health facilities, 81.5% more qualified doctors and nurses, 80.0% free or affordable healthcare, and 61.5% better infrastructure and medical supplies. The open-ended questions dealing with recommendations included such issues as transportation, better local government, control of corruption, establishment of health facilities, availability of teachers, and education improvement.

Table 6 Mixed-methods joint display of quantitative findings, qualitative explanations, and integrated interpretations

Domain	Quantitative evidence	Qualitative explanation	Integrated interpretation
Healthcare distance/transport	65.5% >5 km; 98% selected distance; 89% transport	Weak connectivity and difficult emergency movement	Physical distance becomes functional exclusion when transport is unreliable or costly
Healthcare quality/capacity	88.5% poor/very poor; 36% selected staff shortage; 40% poor infrastructure	Shortages of doctors, medicines, equipment and functional facilities	Access requires both reaching a facility and receiving adequate care
Education access	71.5% insufficient facilities; 67.5% lived 3–5 km from school	Teacher shortages, poor infrastructure, limited higher education, poverty and early marriage	Spatial barriers interact with household and institutional constraints to interrupt progression
Governance	92.5% inadequate government effort; 72% programs ineffective/very ineffective	Weak coordination, funding gaps, delayed delivery, limited participation	Institutional weakness amplifies geographical disadvantage

6. Discussion

The findings show that exclusion from healthcare and education in Charsadipur results from the interaction of unstable riverine geography, socioeconomic vulnerability, service-capacity limitations, and institutional responsiveness. Quantitative and qualitative evidence converged on the same mechanisms: distance and transport were the dominant healthcare barriers; educational facilities were widely viewed as insufficient; healthcare quality and programme effectiveness were rated poorly; and participants repeatedly described shortages of personnel, infrastructure, funding, and coordination. A central distinction is between service use and effective access. Government hospitals were the main healthcare provider for 83.0% of respondents, yet 88.5% rated available healthcare as poor or very poor. Reliance on public facilities therefore does not indicate adequate care when trained providers, diagnostics, medicines, referrals, and reliable transport are limited, as reported elsewhere in hard-to-reach and riverine Bangladesh (A. Hossain, 2024; Sajib, 2025; Sohel, 2024; World Health Organization, 2025). Geography is also relational rather than merely spatial. A five-kilometre distance is manageable where roads, ambulances, and affordable transport exist, but can become a major barrier in seasonally isolated settings. In this study, 65.5% lived more than 5 km from a healthcare facility, while 98.0% identified distance and 89.0% transport as barriers. Similar evidence from riverine communities shows that isolation and flood-season mobility constrain health-service use, whereas decentralized services can reduce travel burdens (A. Hossain, 2024; Halim & Mia, 2025; Sajib, 2025).

Education displayed a related pattern. Although 67.5% of respondents lived 3–5 km from the nearest school, 71.5% considered local educational provision inadequate. Interviews linked access problems to poor infrastructure, teacher shortages, limited learning materials, poverty, child labour, early marriage, and the absence of nearby higher-level opportunities. These findings are consistent with research showing that communication networks, school distance, erosion-related displacement, and institutional shortages affect educational participation in char communities (Barua et al., 2024; Kabir, 2006; Saha et al., 2026). Repeated disruption can affect not only immediate attendance but also dropout and long-term attainment. Socioeconomic vulnerability intensifies these spatial barriers. Fifty-seven percent of surveyed households reported annual income below BDT 30,000, making transport, treatment, medicines, school materials, and children's time competing claims on limited resources. Previous studies show that erosion can reduce land and livelihood security and that climate-related displacement can deepen impoverishment and limit healthcare access (Alam et al., 2020; Chowdhury, 2025; R. Haque et al., 2020; B. Hossain, 2022; Sarker et al., 2019). Evidence on educational displacement likewise links repeated moves and income instability to dropout and child labour (Saha et al., 2026). Displacement can also interrupt continuity of care, immunization, maternal and

child services, enrolment, school records, and regular teaching (M. R. Haque et al., 2019, 2020). These mechanisms support portable records, flexible enrolment, mobile outreach, interoperable referrals, and rapid re-registration after displacement.

Capacity constraints remain important even when households physically reach services. In healthcare, respondents and stakeholders described shortages of staff, medicines, equipment, infrastructure, and referral capacity, consistent with evidence from other underserved riverine settings (A. Hossain, 2024; Sohel, 2024; World Health Organization, 2025). Mobile or decentralized clinics therefore require trained personnel, supplies, diagnostics, and functioning referral pathways. Education shows the same complementarity between infrastructure and human resources: a school without sufficient teachers, learning materials, or continuity mechanisms may exist formally but remain only partly accessible in practice (Barua et al., 2024; Hasnat & Kabir, 2024; Kabir, 2006; Saha et al., 2026). Governance compounds these issues. More than nine in ten respondents viewed government efforts as inadequate, and 72.0% rated government/NGO programmes ineffective or very ineffective. Perceived corruption or mismanagement, funding gaps, poor implementation, limited participation, coordination problems, and bureaucratic delay were recurring concerns. These measures represent perceptions rather than audited institutional performance, but such perceptions can affect trust and programme engagement. Governance can either absorb or transfer the costs of geographic disadvantage: stronger institutions can coordinate NGOs, support workforce retention, maintain resilient facilities, and organize emergency transport, while weaker institutions leave households to manage these costs themselves (Kisinger & Matsui, 2021; World Health Organization, 2025). The findings therefore support a territorial and equity-based approach that distinguishes formal entitlement from effective access.

The integrated policy implication is to adapt service delivery to riverine conditions rather than treat healthcare and education as separate fixed-facility systems. Health responses can combine scheduled mobile or floating services, community providers, essential diagnostics and medicines, teleconsultation where feasible, and emergency river-and-road referral systems. Education responses can include resilient schools, temporary learning spaces after displacement, teacher-retention measures, transport support, flexible transfers and calendars, and targeted measures against poverty-linked dropout, child labour, and early marriage. Flexible community-based learning can also help reconnect children at risk of remaining outside formal education (Saha et al., 2026; UNICEF Office of Strategy and Evidence-Innocenti, 2025). These measures should be coordinated with river management, disaster preparedness, and social protection, with seasonal mapping of service gaps and displaced households (World Bank, 2023). The study's main strength is its integration of survey, KII, FGD, observation, and secondary evidence across healthcare, education, and governance. Its limitations are also important: the empirical evidence comes from one site; household sampling was purposive and partly convenience-based; only aggregate quantitative outputs were available; two distance variables retained unresolved source codes; source records were inconsistent on the number of FGDs; men were overrepresented; governance measures were perceptual; and the cross-sectional design cannot estimate change before and after displacement. The findings therefore indicate locally observed mechanisms rather than national prevalence. Future research should use multi-site probability samples across river systems, longitudinal displacement histories, travel-time measures, gender-stratified analysis, and multilevel models of healthcare and educational access.

7. Conclusion

This study examined healthcare and educational access in a displaced riverine community through the combined effects of geography, socioeconomic vulnerability, service capacity, and governance. The Charsadipur case shows cumulative disadvantage: difficult travel, low household income, inadequate facilities and personnel, poor perceived healthcare quality, limited educational opportunity, and weak institutional responsiveness reinforce one another. Healthcare and education are therefore two outcomes of a common territorial and institutional vulnerability system. Geography raises the cost of reaching services, poverty reduces households' ability to absorb that cost, capacity deficits reduce the value of reaching a facility, and weak governance can leave these disadvantages unaddressed. Integrated responses should combine decentralized services, reliable referral and transport, workforce retention, resilient schools and clinics, continuity mechanisms, affordability support, and stronger local government-NGO coordination. Because the study is a single-site case, its percentages should not be generalized nationally; the identified mechanisms should instead be tested across multiple river systems using representative, longitudinal, and geographic data.

8. Policy Recommendations

Policy should be integrated and geographically adapted. Riverine health services should combine scheduled mobile or floating clinics, essential medicines and diagnostics, teleconsultation where feasible, and functional emergency referral using boat and road transport. Educational continuity requires disaster-resilient schools, temporary learning spaces, rapid transfer and re-enrolment, transport assistance, and flexible calendars. Remote-area workforce shortages should be addressed through financial and professional incentives, housing or transport support, and rotational deployment for doctors, nurses, teachers, and other essential staff. Social protection should include treatment subsidies, transport vouchers, educational stipends, school meals, or cash assistance for low-income displaced households. Union Parishads, health and education departments, disaster-management bodies, NGOs, and community representatives should coordinate seasonal service-gap mapping and implementation. Investment priorities include resilient clinics, schools, roads, river landing points, water and sanitation, and digital connectivity. Monitoring should track displacement history, service travel time, unmet healthcare needs, school interruption, and programme coverage by sex, age, socioeconomic status, and location.

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