Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Climate-Resilient SRHR Services for Migrant Women in Bangladesh: Bridging Gaps and Empowering Vulnerable Populations

Nafisa Mosaddek

nmosaddek.na@gmail.com

Bangladesh University of Professionals https://orcid.org/0000-0002-5003-0772

Research Article

Keywords: climate resilience, SRHR, internal migration, urban informal settlements, health systems, gender-based violence, Bangladesh

Posted Date: September 25th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-11135364/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: The authors declare no competing interests.

Climate-Resilient SRHR Services for Migrant Women in Bangladesh: Bridging Gaps and Empowering Vulnerable Populations

Nafisa Mosaddek[1*]

1. **Department of Environmental Science, Bangladesh University of Professionals**

Abstract

Bangladesh is projected to see up to 13.3 million internal climate migrants by 2050, and Dhaka absorbs a disproportionate share of this movement into informal settlements already growing at roughly 7% annually against an urban population growth rate of 3%. Migrant women arriving in these settlements carry a double burden: the gender-differentiated impacts of climate displacement, and the near-absent sexual and reproductive health and rights service environment of the urban poor. This study maps the SRHR coverage gaps facing climate-migrant women in Dhaka's informal settlements, analyses how climate shocks disrupt SRHR service continuity, and proposes an operational model for climate-resilient SRHR service delivery aligned with the WHO Operational Framework for Building Climate Resilient Health Systems. A mixed-methods design combining (i) a systematic synthesis of empirical studies on migration, climate exposure, and SRHR service utilization in Bangladesh's urban informal settlements, and (ii) a field protocol for a cross-sectional survey of ever-married migrant women aged 15–49, complemented by in-depth interviews, focus group discussions, and key informant interviews with providers, NGO clinic staff, and municipal actors. Reported SRHR coverage in Dhaka's slums trails non-slum urban areas on every pregnancy-related indicator: antenatal care with a medically trained provider is 29% versus 58%, facility delivery 37% versus 65%, and skilled birth attendance 37% versus 68%. Contraceptive use is comparatively high while unmet need for family planning persists at 41.1% in one Dhaka slum sample and 19.5% in an urban slum sample in Chattogram. Gender-based violence is the dominant SRHR risk multiplier: 82% of surveyed slum women reported any form of lifetime intimate partner violence, with physical violence at 66%, economic 47%, sexual 44%, and emotional 38%, and past-year physical spousal violence is 34.8% in slums against 19.8% in non-slum areas. Climate exposure compounds these gaps through heat stress, monsoon flooding, and recurrent waterlogging that disrupt housing, sanitation, mobility, and clinic attendance. Closing the SRHR gap for climate-migrant women in Dhaka requires treating SRHR as climate infrastructure, a service line that must be heat-protected, flood-accessible, mobile, digitally supplemented, and financed through climate adaptation channels. We propose a five-pillar model anchored to the six building blocks of the health system.

Keywords: climate resilience; SRHR; internal migration; urban informal settlements; health systems; gender-based violence; Bangladesh

Introduction

Climate change is now understood as a structural determinant of health that operates through long causal pathways, acting on environmental, social, and institutional determinants rather than through singular exposures (Campbell-Lendrum et al., 2023). For women in Bangladesh, those pathways converge on the body. Recurrent cyclones, tidal surges, salinity intrusion, sea level rise, and riverbank erosion drive displacement (Hoque et al., 2026), and projections place the scale of that movement in the millions: the World Bank estimates up to 13.3 million internal climate migrants in Bangladesh by 2050 under a high-emissions, unequal-development reference scenario, while other estimates place South Asia at 17–36 million internal climate migrants by the same year, with approximately one-third of them in Bangladesh. UNESCO/IUCN-based projections cited in the literature put climate-induced displacement in Bangladesh at up to 15 million by 2050. Approximately 50,000 people become homeless annually due to natural disasters, and the country could lose 17.5% of its land area, including 30% of its food-producing areas.

The gendered distribution of these losses is stark and well documented. Women's mortality from climate disasters is reported at 14 times that of men, 80% of those displaced by climate change are women and girls, and an additional 2.5 million women relative to men are projected to be pushed into poverty by climate change by 2030. Among climate migrants in Bangladesh's urban slums, women are poorer, less educated, lower in social status, and have more limited access to and control over resources than their male counterparts. Displaced women frequently lack control over the migration decision itself and face discrimination and marginalization on arrival (Khanam, 2025), alongside intensified risks of social punishment and stigmatization in destination settlements (Ayeb-Karlsson, 2020).

The SRHR consequences of this are direct and indirect. Climate-related events affect maternal and neonatal outcomes, fertility, HIV infection and transmission, and the spread of vector-borne disease, and these outcomes worsen sharply when services are disrupted or physically damaged (Husaini & Davies, 2022). Climate-related disasters damage health infrastructure, interrupt medical supply chains, and cause loss of medical data. A scoping review of SRH in the context of climate migration identifies a compounding "risk-multiplier" effect: migration disrupts SRH services, producing high unmet need for contraception, unplanned pregnancy, and unsafe abortion, while reduced antenatal and postnatal care raises maternal and neonatal morbidity and mortality, worsens postnatal mental health, and is associated with increased sexual and gender-based violence (Daalen et al., 2021). Climate change affects SRH through four recognized pathways - increased human migration; increased prevalence of pests, diseases and vectors; erosion of public health infrastructure; and increased food insecurity and hunger , each of which erodes the adaptive potential of individuals, households, and communities (Kasekende et al., 2025).

Dhaka is the analytical epicenter of this convergence. Approximately 40% of Bangladesh's population now lives in urban areas, growing at an estimated 3% annually, while informal settlements grow at 7%. More than one-third of Dhaka's urban population lives in slums, characterized by overcrowding, housing insecurity, insufficient water and sanitation, unregulated health service provision, eviction threat, and elevated crime and exploitation, conditions that intersect with and exacerbate health inequalities (Razzaque et al., 2019). Structural conditions in climate-exposed settlements overcrowded housing, inadequate drainage, insecure tenure, limited sanitation coverage, restricted access to basic services raise sensitivity to climate hazards and reduce adaptive capacity among low-income urban populations.

Korail, the largest and longest-standing informal settlement, illustrates the data problem as much as the service problem. It spans approximately 100 acres in the middle of the city and has been reported as home to around 16,500 households and 151,500 people, with other sources reporting over 100,000 residents across 364,230 m² (ALAM & Matsuyuki, 2017), or some 200,000 people in a city of 12 million (Jensen & Andersen, 2017). Population and land-size statistics for Korail are widely contested across government, city corporation, and NGO sources, and are further complicated by the absence of coordination among government bodies (Andersen & Choudhoury, 2016).

Research questions

1. What is the pattern of SRHR service utilization among climate-migrant women in Dhaka's informal settlements, and how does it differ from non-slum urban populations?
2. Through which mechanisms do heat, flooding, and waterlogging disrupt SRHR access at household, community, and facility levels?
3. How do intersecting vulnerabilities — gender, duration since migration, disability, adolescent status, tenure insecurity — shape SRHR outcomes?
4. What service, governance, and financing architecture would constitute a climate-resilient SRHR service line for this population?

Literature Review

Gendered climate displacement into Dhaka

The literature converges on two findings. First, displacement is not gender-neutral in cause or consequence. Gendered socio-economic conditions in Bangladesh's patriarchal context condemn migrant women to poverty, limited resource access, and lower family and social status, increasing their exposure to discrimination (Ngcamu, 2023). When disaster strikes, women's mobility is constrained relative to men's. Second, urban arrival does not resolve vulnerability. In Korail, women reported that migration sometimes produced greater liberty but simultaneously increased the risk of social punishment and stigmatization, with stigma extending from parents to children; more women than men reported feeling unsafe, depressed, and anxious, and mental and physical ill health were common consequences of compromised living and working conditions. Loss of health damaged wellbeing and pushed already fragile families into downward spirals without escape.

Cross-sectional evidence on heat adaptation in Korail (June–August 2024) shows that individual income is pivotal to adaptation, social capital supports community resilience through resource sharing, and women face heightened challenges from dual household-management and paid-work responsibilities, while older adults face mobility constraints in reaching shaded space; participants preferred long-term structural adaptation over temporary measures such as cooling centers (Sultana et al., 2025). In Dhaka more broadly, slum dwellers, street vendors, factory workers, and women and children are more exposed and less resilient to heat stress, which can cause dehydration, heat exhaustion, heat stroke, and death, reduce labor productivity, impair cognitive function, and exacerbate pre-existing conditions (Mosaddek & Ahmed, 2025).

SRHR of migrant women in Dhaka's slums

Qualitative work with migrant women aged 18-49 in a Dhaka informal settlement found that all respondents reported financial and infrastructural barriers to formal SRHR services and relied on social networks within the slum and informal providers instead; women exercised more agency over contraceptive experimentation but had less power in pregnancy decisions and healthcare-seeking; and menstrual health remained a neglected public health domain (Jahan et al., 2024). Longer-resident migrants navigated networks and resources more effectively than recent arrivals, a finding consistent with the "adaptation effect," whereby length of stay, social network strength, and health literacy narrow migrant/non-migrant health gaps.

Quantitative studies confirm the coverage penalty. Urban migrant women in Bangladesh are significantly less likely than non-migrants to use pregnancy-related reproductive healthcare (Islam & Gagnon, 2016), with one notable exception: modern contraceptive use is comparatively high, plausibly due to easy contraceptive access, NGO family-planning awareness, and space constraints in urban housing. Recent migrant women and slum dwellers are systematically disadvantaged on antenatal care, place of delivery, and postnatal care (Sutopa, 2019), and slum populations with

weaker social networks and familiarity with urban services are further disadvantaged still (Clair et al., 2020).

Adolescent married girls are the most exposed subgroup. Bangladeshi adolescent fertility stands at 128 births per 1,000 girls aged 15–19, among the highest in the Asia-Pacific, and girls are married 3-4 years before the legal age of 18; unwanted pregnancies are more than twice as common among married adolescent girls in slums as in non-slum areas (Haque et al., 2024). A survey of 500 married adolescent girls in Dhaka and Gazipur slums found near-universal knowledge of menstrual self-care and the oral contraceptive pill, but low knowledge of condoms, abortion, pregnancy danger signs, and sexually transmitted infections, with low antenatal care and institutional delivery; 70% agreed young people should have access to menstruation-related hygiene facilities, contraception, and sex education, though agreement that abortion is a woman's right was weaker (Topa et al., 2024). Gazipur emerged as the most disadvantaged site.

Violence and mental health as SRHR determinants

Gender-based violence is not a parallel issue to SRHR in Dhaka's slums, it is the primary mechanism through which SRHR autonomy is lost. A cross-sectional survey of 607 ever-married women in Dhaka North, Dhaka South, and Gazipur found an overall lifetime prevalence of any form of intimate partner violence of 82%, with physical violence most reported at 66%, followed by economic (47%), sexual (44%), and emotional (38%); uneducated women and women whose husbands were uneducated faced particularly high risk, Gazipur reported higher violence than other slum areas, and working women experienced more lifetime violence than non-working women. Earlier data show past-year physical spousal violence at 34.8% among slum women versus 19.8% among non-slum women. Help-seeking is minimal: among 2,604 randomly selected currently married women aged 15–29 in Dhaka slums, about 60% reported past-year spousal physical violence, yet only 21% disclosed and 19% sought help , most commonly from informal sources (89%) with high acceptance of violence the main reason for not seeking help (Parvin et al., 2016). Among 291 women from five Dhaka slums reporting IPV, PTSD prevalence was 21.16%, higher among women with non-communicable diseases (AOR 3.29; 95% CI 1.6–6.7), those concerned about COVID-19 infection (AOR 3.87; 95% CI 1.12–13.22), and those reporting increased marital arguments (AOR 3.00; 95% CI 1.57–5.74); 87.9% had married before age 18, 69.3% were unemployed, and 38.6% had no formal schooling (Koly et al., 2025).

Climate-resilient health systems: the framework

WHO's Operational Framework for Building Climate Resilient Health Systems defines a climate-resilient health system as one capable of anticipating, responding to, coping with, recovering from, and adapting to climate-related shocks and stress, so as to bring sustained improvements in population health despite an unstable climate (Mayhew & Balabanova, 2025). The framework builds on the six core building blocks of health systems- leadership and governance, health workforce, health information systems, medical products and technologies, service delivery, and financing and specifies actions to add climate resilience to each across ten components, including

integrated risk monitoring and early warning, climate-informed health programmes, emergency preparedness and management, and climate and health financing ((IPCC), 2023; Lokotola, 2023).

A scoping review of strategies to strengthen climate-resilient health systems identified the most frequent interventions as: developing a national health and climate change adaptation plan; developing contingency plans and backup systems for essential services; assessing stakeholder vulnerabilities, needs, and capacities; enhancing surveillance targeting climate-sensitive diseases and risk sources; research into climate change's health impacts; and improving the adaptive capacities of health services (Mosadeghrad et al., 2023). Evidence on implementation in low- and middle-income countries, however, is thin: a scoping review of climate-resilient health facilities identified 26 case studies across 46 countries but found very little evidence of actual implementation, and no evaluations, conversely, key enablers include supportive policies, strong information systems, stakeholder coordination, adequate funding, and technical expertise, with community engagement recommended for inclusion in resilience frameworks (Schwerdtle et al., 2024).

Financing is the binding constraint. In the Lancet Countdown's survey, 51 of 101 countries reported having national health and climate change strategies or plans, but less than 10% reported having funds to fully implement them, and only four countries with plans reported adequate national funding; fewer than half of national health authorities in low- and lower-middle-income countries (17 of 35) reported current access to climate funds from the Global Environment Facility, Adaptation Fund, Green Climate Fund, or other donors (Watts et al., 2020).

Bangladesh's urban health delivery architecture

Urban primary health care in Bangladesh is delivered through a pluralistic mix: government outdoor dispensaries, NGO clinics under the Urban Primary Health Care Project, and for-profit providers. UPHCP, initiated with Asian Development Bank support in 1998, contracted NGOs and the for-profit private sector to deliver primary health care including nutrition and family planning to urban poor areas, and demonstrated increased maternal and child health care utilization with improved equity among the poorest half of the population (Albis et al., 2019; Rashid, 2009). Contracting has been shown to be more effective, cost-efficient, and responsive than direct government provision, with lessons around NGO accountability for results, management flexibility, and transparency between contracting parties (Drexler et al., 2025). The Ministry of Local Government, Rural Development and Cooperatives runs 138 clinics through NGOs , Comprehensive Reproductive Healthcare Centers and Primary Healthcare Centers to provide maternal health services in urban areas (Ángeles et al., 2018). Yet qualitative work in four NGO clinics and two government outdoor dispensaries in Dhaka identified persistent barriers to primary care utilization: costs and perceptions of cost, availability and quality of medicines and facility opening times, provider and patient behavior (particularly toward socially stigmatized groups), a perception that primary care is focused on maternity and neonatal child health, and patient perceptions of disease (Jahan et al., 2026).

Implementation, WASH, digital, and adaptation evidence base

On care-seeking around childbirth, studies in selected Dhaka slums have documented home delivery in 85% of births and assistance by untrained traditional birth attendants in 58% (Choudhury et al., 2012), while national survey analysis indicates that antenatal care and skilled birth attendance in Bangladesh remain shaped by female education and family affordability (Bhowmik et al., 2019). On fertility control, a study of slum dwellers in two Dhaka slums found that 33.7% of couples used no contraceptive method, that among non-users 29% cited no specific cause, and that only 3.5% reported difficulty obtaining contraceptives, with shyness the main reported difficulty (Ahmed et al., 2012). On menstrual and environmental health, improper disposal of solid waste in communal toilets in low-income settlements has been documented and addressed through low-cost hardware interventions (Yeasmin et al., 2017); access to safe, private spaces with water for changing, washing, bathing, and laundering, and inadequate culturally acceptable disposal mechanisms, remain constrained for women and adolescent girls in urban slums, with taboos and stigma intensifying these challenges (Goddard & Sommer, 2019); and women with disabilities in Dhaka slums face discrimination in toilet facilities, menstrual hygiene management education, and transport, with an additional economic burden including caretaker income loss (Chowdhury et al., 2022).

On climate and women's health, the gendered health impacts of climate change and the policy directions required to address them have been set out in the global health literature (Sorensen et al., 2018), and integrative frameworks of health system resilience and climate change have been developed and tested against experiences in Bangladesh and Haiti (Ridde et al., 2024). On digital delivery, voice messaging to married adolescent girls in Dhaka slums has produced measurable knowledge and utilization gains (Shah et al., 2019); analysis of mobile phone use for maternal and child healthcare among Dhaka slum women concluded that large-scale mHealth interventions are implementable and can serve as a sustainable mitigation strategy for the health worker crisis, with relevance to Bangladesh's Digital Health Strategy (Mistry et al., 2021); voice messaging used for at least six months during pregnancy has been associated with improved knowledge and behaviors during pregnancy and after delivery (Chowdhury et al., 2019); and comparable stage-based messaging with a clinical help desk has been implemented in informal settlements elsewhere (Ochieng et al., 2024). On adaptation planning, a document analysis of South Asian National Adaptation Plans found that some countries prioritized maternal and child health with broader gender-based approaches, and recommended that future plan development involve a more comprehensive and diverse representation of women from various cultural and geographic backgrounds (Bhandari et al., 2024); South Asia's first Heat-Health Action Plan in Ahmedabad combined public awareness and community outreach, early warning with inter-agency coordination, capacity building of healthcare professionals, and reduction of heat exposure (Dutta et al., 2021; Knowlton et al., 2014); and analysis of that early warning system showed that illiteracy and low phone ownership create asymmetrical heat warning access, which verbal dissemination and community engagement can partially correct (Trahan et al., 2023).

Methodology

Design

This study uses a convergent mixed-methods design. The quantitative component is a cross-sectional household survey of ever-married migrant women aged 15–49 residing in selected informal settlements in Dhaka North and Dhaka South City Corporations. The qualitative component comprises in-depth interviews, focus group discussions, and key informant interviews with women, community leaders, landlords/landladies, NGO clinic staff, government dispensary providers, and municipal officials. A facility audit captures service readiness and climate vulnerability of SRHR service points.

Study settings

Sites were selected purposively to capture variation in climate exposure, migration history, and service supply. Table 1 summarizes reported characteristics and flags a critical data issue: published site statistics diverge substantially, so the study establishes its own enumeration rather than relying on secondary figures.

Table 1. Study sites, reported characteristics, and data caveats

Site	Reported characteristics	Dominant climate exposure	Data caveat
Korail	Approx. 100 acres; reported ~16,500 households and ~151,500 people; alternatively reported over 100,000 residents across 364,230 m² and ~200,000 people; among the poorest slums with highest recent-migrant concentration (23%) and lowest mean years of education (3.74)	Waterlogging, heat, drainage congestion; recurrent monsoon flooding	Population and land-size statistics widely contested across BBS, city corporation, and NGO sources
Shayampur	Highest concentration of recent migrants (27%) among compared slums	Flooding, waterlogging	Migrant inflow not captured in routine surveillance
Kamrangirchar	Documented site for unmet family planning need study among married women of reproductive age	Riverine flooding, poor drainage	Fragmented provider data

Bhola slum	Informal settlement housing internally displaced people from the southern coast, named after Bhola Island	Heat, insecure tenure	Eviction risk affects denominator stability
Gazipur (comparator)	Higher reported intimate partner violence than other slum areas; also the more disadvantaged site on adolescent SRHR knowledge and practice; highest concentration of Dhaka-born residents (31%) with average duration 47.5 years	Industrial heat, flooding	Mixed migrant/non-migrant population

Sampling and sample size

A two-stage cluster design is proposed. Stage one: probability-proportional-to-size selection of clusters (blocks/sections) within each site using a fresh listing, given documented divergence in existing statistics. Stage two: systematic selection of households with a Kish-grid selection of one eligible woman per household.

Proposed targets for the field phase:

- **Quantitative survey:** n = 420 ever-married migrant women aged 15–49 (roughly 100–120 per site), with oversampling of adolescent (15–19) and recently arrived (<12 months) women to enable subgroup analysis. This target is a design specification, not a result.
- **In-depth interviews:** n = 24 women (stratified by site, migration duration, adolescent status, disability).
- **Focus group discussions:** n = 8 (separate groups for adolescent girls, adult women, men, and women with disabilities).
- **Key informant interviews:** n = 20 (NGO clinic managers, paramedics, government dispensary providers, municipal health officials, community leaders, landlords/landladies).

Variables and instruments

The structured questionnaire covers eight domains: (1) demographic and migration history (origin district, reason for migration, duration of residence); (2) climate exposure and shock experience (heat events, flooding, waterlogging, displacement episodes, days of work/clinic disruption); (3) SRHR service utilisation (antenatal care and provider type, delivery place and attendance, postnatal care, contraceptive use and method mix, unmet need for family planning, menstrual health products and disposal, abortion experience); (4) gender-based violence (WHO questionnaire domains: physical, sexual, emotional, economic); (5) mental health (PTSD Checklist-5, as used in

slum IPV research); (6) health system access (cost, distance, opening hours, provider behavior, trust); (7) digital access (mobile ownership, use for health information); and (8) coping and adaptation strategies. The facility audit uses WHO framework domains — vulnerability and adaptation assessment, climate-informed health programmes, emergency preparedness, and climate and health financing.

Data Analysis

Quantitative data have been analyzed in SPSS or R: descriptive statistics; chi-square and t-tests for slum/non-slum and migrant-duration comparisons; multivariable logistic regression for predictors of antenatal care (≥4 visits), skilled birth attendance, contraceptive use, and unmet need. Qualitative data are transcribed, coded thematically in NVivo, and triangulated against survey findings. Integration used a joint display matrix mapping quantitative and qualitative findings onto the WHO building blocks.

Ethical Approval

Ethics approval has been sought from the relevant Bangladesh Medical Research Council institutional review board, with written informed consent, separate consent for violence-related modules, referral pathways for survivors, and female interviewers trained in GBV-safe practice.

Limitations

Site statistics are contested; under-served populations are systematically absent from routine data; migration status is self-reported and frequently circular rather than unidirectional.

Results

Table 2 consolidates reported SRHR indicators for slum versus non-slum urban women. The pattern is not a gradient but a step change: on pregnancy-related care, slum coverage runs at roughly half that of non-slum areas.

Table 2. Reported SRHR service indicators, slum versus non-slum urban populations

Indicator	Slum	Non-slum urban
Antenatal care with a medically trained provider	29%	58%
Delivery at a health facility	37%	65%
Skilled assisted delivery	37%	68%
Antenatal and postnatal care rates	approximately half of non-slum	reference
Home deliveries (selected Dhaka slum study)	85%	—

Deliveries assisted by untrained traditional birth attendants (same study)	58%	—
Skilled antenatal care, urban overall	—	82.1%
Skilled delivery, urban overall	—	61.3%

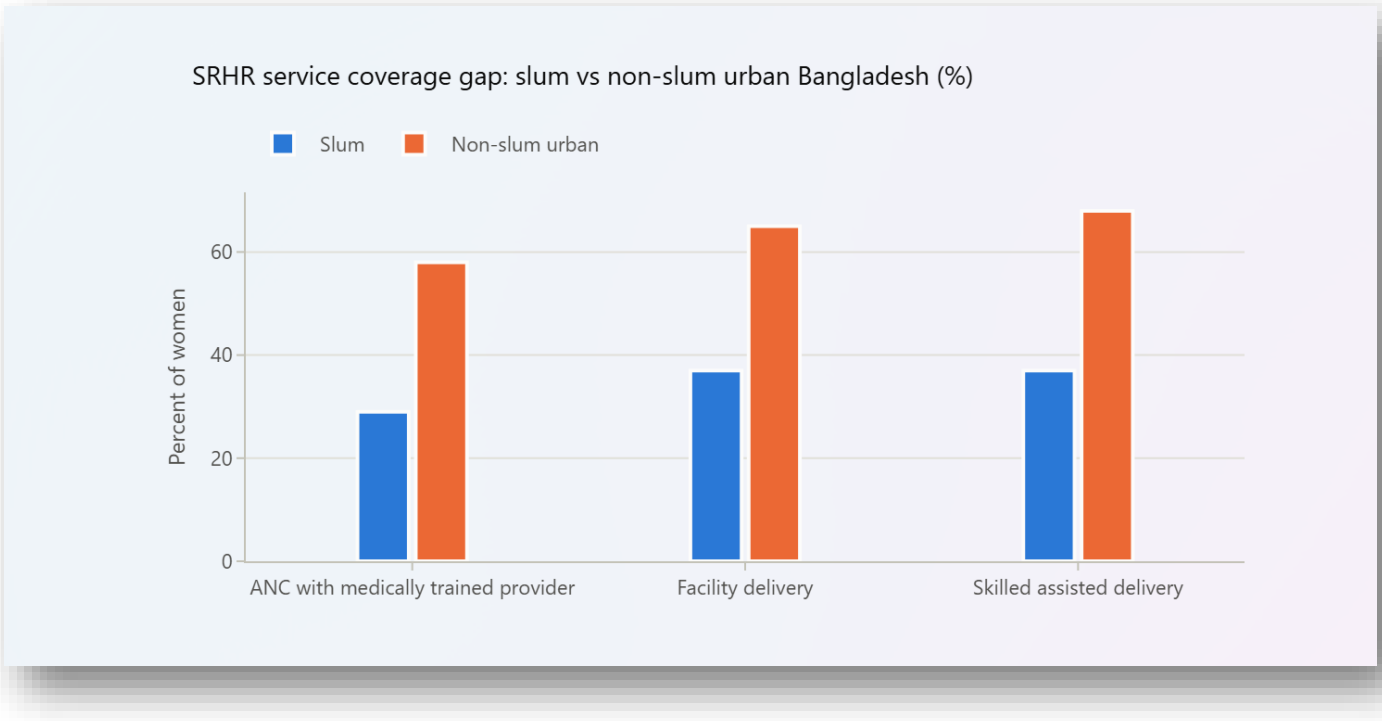


Figure 1. Reported SRHR service coverage in slums versus non-slum urban areas.

The service supply picture explains part of this. Outside secondary- and tertiary-level facilities, urban areas lack primary-level public facilities under the Ministry of Health and Family Welfare to provide maternity care; that gap is filled by private clinics, hospitals, and NGO facilities, with 138 Comprehensive Reproductive Healthcare Center and Primary Healthcare Centers operated through NGOs by the Ministry of Local Government, Rural Development and Cooperatives. Where services exist, they are rationed by cost, hours, and social access: patients reported barriers including cost and perceptions of cost, availability and quality of NCD medicines, facility opening times, provider behavior toward socially stigmatized groups, and a perception that primary care is oriented toward maternity and neonatal child health.

Fertility control: high use, persistent unmet need

Contraceptive use among slum women is comparatively high, and it shows an important counterexample to the general service gap. In a sample of 200 married women across 20 urban

slums in Chattogram, 93.5% had knowledge of contraception and 69.5% were using a method, with oral contraceptive pills the commonest (42.5%) followed by injectables (22%); unmet need for family planning was nonetheless 19.5%, with ignorance, non-cooperative husbands, religious barriers, lack of information, economic constraints, and distance of health Center from residence cited as reasons for non-use. In Kamrangirchar, Dhaka, 51.3% of 265 married women of reproductive age were currently using a contraceptive, while 41.1% wanted to use a method but faced barriers; 21.5% for limiting and 19.6% for spacing, citing lactational amenorrhea, side effects of past use, lack of support from husband or family, poor knowledge, and difficulty obtaining supplies. Among 600 randomly selected slum dwellers in two Dhaka slums, 33.7% of couples used no contraceptive method, and 29% of those cited no specific cause; only 3.5% reported difficulty obtaining contraceptives, the main difficulty being shyness. The interpretation is important for programming: unmet need here is driven less by commodity stockouts than by household power relations, misinformation, and shame.

Table 3. Contraceptive use and unmet need across slum studies

Study population	n	Current contraceptive use	Unmet need	Principal stated reasons
Married women, 20 urban slums, Chattogram	200	69.5%	19.5%	Ignorance, non-cooperative husband, religious barriers, lack of information, cost, distance
Married women of reproductive age, Kamrangirchar, Dhaka	265	51.3%	41.1% (limiting 21.5%, spacing 19.6%)	Lactational amenorrhea, side effects, lack of family support, poor knowledge, supply difficulty
Slum dwellers, two Dhaka slums	600	66.3% (33.7% using none)	Not reported	No specific cause cited (29% of non-users); shyness (3.5%)

Violence as the dominant SRHR risk multiplier

Table 4. Reported intimate partner violence among women in Dhaka and Gazipur slums

Violence type	Lifetime prevalence
Any form of violence	82%
Physical	66%
Economic	47%
Sexual	44%
Emotional	38%

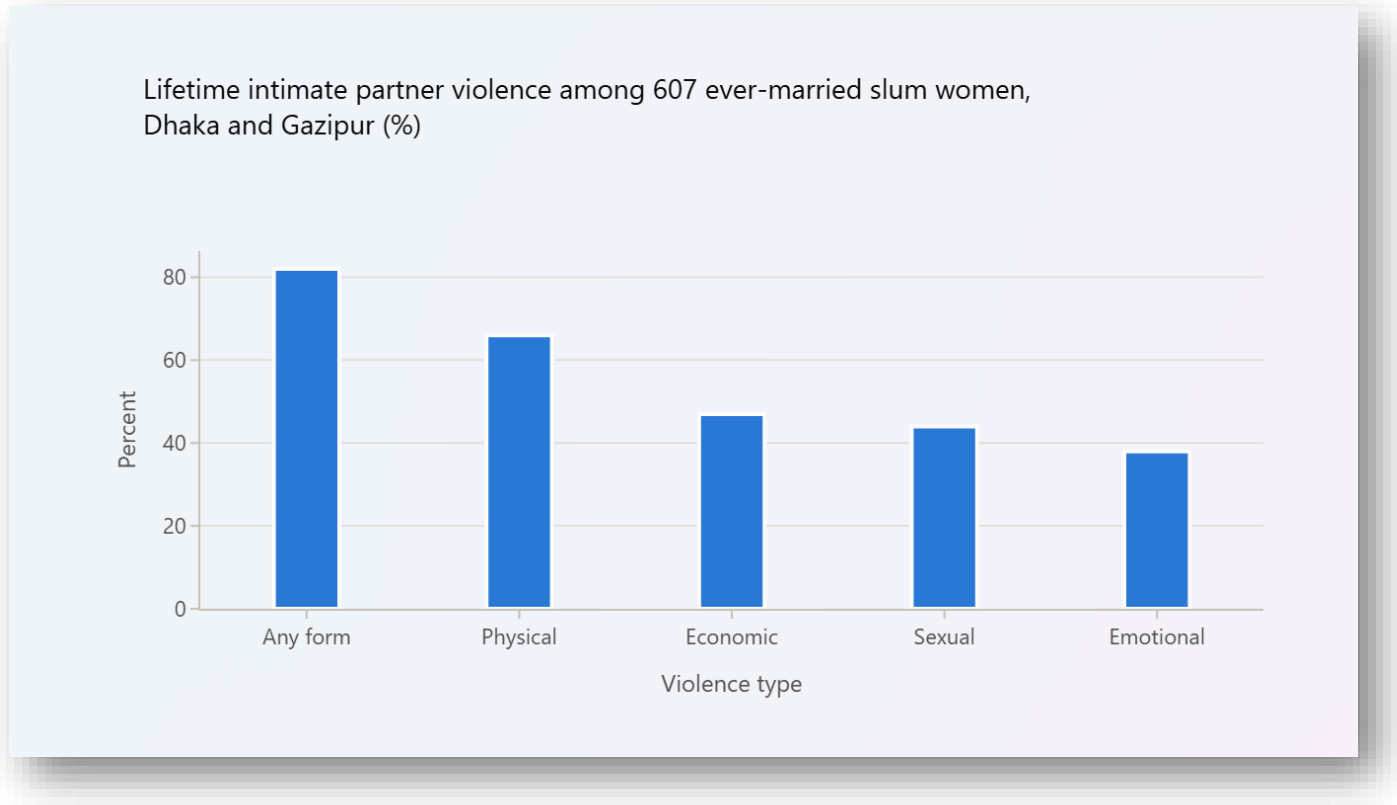


Figure 2. Lifetime prevalence of intimate partner violence by type among ever-married women in Dhaka North, Dhaka South, and Gazipur slums.

The service implications are twofold. First, the prevalence of sexual violence at 44% and economic violence at 47% means that a large share of contraceptive non-use and pregnancy decision-making occurs under coercion, SRHR counselling that does not screen for violence will misdiagnose the

problem. Second, disclosure and help-seeking systems barely function: only 21% of women reporting past-year spousal physical violence disclosed it and 19% sought any help, 89% of them from informal sources, with acceptance of violence the main barrier to seeking help. Working women experienced more lifetime violence than non-working women, which undermines the assumption that labor-market participation is protective. Mental health burden follows: PTSD prevalence of 21.16% among slum women reporting IPV, with elevated odds among women with non-communicable diseases and those experiencing increased marital arguments.

Climate exposure as service discontinuity

Climate exposure in Dhaka is not episodic but chronic; heatwaves, monsoon flooding, and prolonged urban waterlogging recur almost annually in low-lying, poorly drained parts of the city, disrupting housing, sanitation, mobility, livelihoods, and access to safe water for extended periods. Data shows that settlements near drainage canals, wetlands, and low-elevation zones are disproportionately exposed to recurrent flooding and prolonged water stagnation.

Waterlogging has been shown to alter WASH access differentially within the same settlement Korail, with approximately 16,500 households and 151,500 residents, is explicitly described as vulnerable to water-logging. The SRHR consequence runs through menstrual and perinatal hygiene: in Dhaka slums, women commonly use cloth for menstrual management because disposable pads are expensive, with older women more likely to wash and reuse cloth while younger women discard after one use, often into drains and ditches or wrapped in plastic in toilets out of embarrassment. Women and adolescent girls in urban slums face limited access to safe, private spaces with water for changing, washing, bathing, and laundering reusable pads and cloths, and insufficient culturally acceptable disposal mechanisms, with ongoing taboos and stigma augmenting these challenges. Among women with disabilities in Korail and Kalyanpur, discrimination in extra care needed for toilet facilities, menstrual hygiene management education, and transport imposes additional economic burden including caretaker income loss.

Table 5. Climate shock : SRHR service continuity matrix

Climate shock	Documented disruption	SRHR consequence	Evidence base
Extreme heat	Heat stress causing dehydration, heat exhaustion, heat stroke, labour productivity loss, cognitive impairment, exacerbation of pre-existing conditions; women carry dual household and paid-work heat burdens	Poor birth outcomes; need for heat-protected maternal wards; reduced care-seeking during peak heat	Global climate and women's health literature

Monsoon flooding and waterlogging	Housing, sanitation, mobility, livelihood and safe-water access disrupted for extended periods; settlement-level WASH access differentials	Interrupted antenatal and postnatal attendance; menstrual hygiene breakdown; facility access blocked by damaged roads	Korail WASH and waterlogging studies
Cyclone and storm surge (origin areas)	Damage to health facilities; supply chain interruption; blocked roads; facility and community clinic collapse	Disrupted SRH services, unmet need for contraception, unplanned pregnancy, unsafe abortion; reduced ANC and PNC	Climate-migration SRH scoping reviews; health system resilience frameworks
Slow-onset displacement into Dhaka	Loss of social networks; unfamiliar service ecology; tenure insecurity	Lower SRH service utilisation among recent migrants; reliance on informal providers	Migrant SRHR and urban health equity studies

Adolescent SRHR

Married adolescent girls in slums combine the highest fertility risk with the lowest service access. Bangladeshi adolescent fertility is 128 births per 1,000 girls aged 15–19, with girls married 3–4 years before the legal age of 18 and pressure to conceive quickly after marriage; unwanted pregnancies are more than twice as common among married adolescent girls in slums as in non-slum areas. Knowledge gaps are specific rather than general — near-universal knowledge of menstrual self-care and the oral contraceptive pill coexists with low knowledge of condoms, abortion, pregnancy danger signs, and STIs, alongside low antenatal care and institutional delivery.

Digital reach and voice-message delivery

The clearest implementation evidence for this population is in mHealth. Voice-message delivery to married adolescent girls in Dhaka slums produced statistically significant knowledge gains on danger signs during pregnancy (55.5% to 93.3%, $p<0.001$), during delivery (54.2% to 82.2%, $p<0.001$), and for newborns (56.7% to 75.6%, $p<0.02$), with antenatal care utilisation rising from 70.4% to 87.5% ($p<0.02$) and postnatal care use from 31.6% to 73.7% ($p<0.03$). This approach was designed precisely because adolescents in Dhaka slums are difficult to reach through traditional home visits by community health workers, since many work outside the home. Broader evidence supports feasibility: a study of mobile phone usage to access maternal and child healthcare among women of urban slums in Dhaka concluded large-scale mHealth interventions are implementable and represent a sustainable mitigation strategy for the acute health worker

crisis, with relevance to Bangladesh's Digital Health Strategy. Aponjon voice messaging used for at least six months during pregnancy was associated with increased knowledge and positive behaviors during pregnancy and newborn healthcare knowledge after delivery. Comparable design features such as stage-based messaging with a clinical help desk have been deployed in comparable informal settlements elsewhere.

Governance and financing: the binding constraint

Three governance facts shape what is possible. First, urban primary health care authority is split between health and local government ministries, with the Ministry of Local Government, Rural Development and Cooperatives holding the urban primary health care mandate. Second, contracting NGOs has demonstrably improved urban maternal and child health utilization with equity gains for the poorest half of the population, and is more cost-efficient and responsive than direct provision. Third, the financing for climate-related health adaptation is not reaching the service level: across surveyed countries, less than 10% with national health and climate change plans reported having funds to fully implement them, and fewer than half of low- and lower-middle-income country health authorities reported access to climate funds. Bangladesh's National Adaptation Plan (2023–2050), adopted in 2022, aims to build a climate-resilient nation, but gender integration in climate-specific and sectoral policies is inconsistent and intersectional analysis is almost entirely absent.

Discussion

The evidence assembles into a coherent causal account. Mechanism one is displaced demand. Climate displacement moves women into settlements where SRHR supply is roughly half the non-slum level, and the recent-migrant penalty is largest in the first months, when social networks and service familiarity are weakest. Mechanism two denotes to disrupted continuity. Heat, flooding, and waterlogging interrupt the physical and social preconditions for care-seeking such as mobility, sanitation, private space, work hours, and disposable income in settlements already identified as disproportionately exposed. Mechanism three is constrained agency. Violence, coercive household decision-making, and stigma translate service availability into non-use: 82% lifetime IPV prevalence, 21% disclosure, and unmet need driven by husband non-cooperation and shame rather than commodity shortage.

These mechanisms are multiplicative rather than additive, which is precisely the "risk-multiplier" effect described in the climate-migration SRH literature and the erosion of adaptive potential described through the four-pathway framework.

Figure 3 sets out the analytical frame used in this paper, mapping climate hazards onto SRHR outcomes through health-system building blocks.

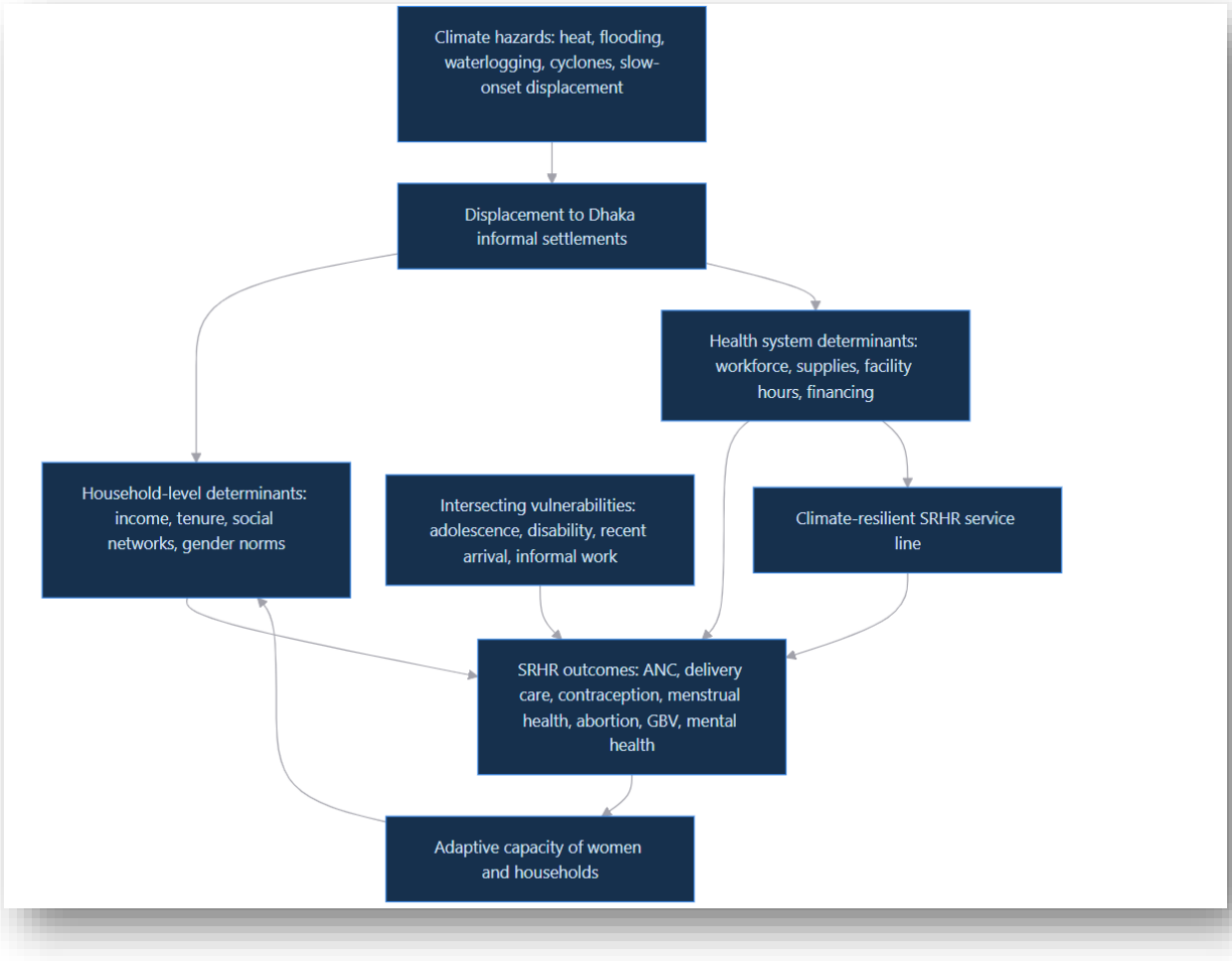


Figure 3. Conceptual framework linking climate hazards, displacement, and SRHR outcomes in informal settlements.

Three features distinguish the SRHR gap for climate-migrant women from generic urban health inequity. First, the exposure is recurring and compounding: settlements are hit by heat and waterlogging almost annually, so recovery periods overlap with the next shock. Second, the deficit is spatial and infrastructural, not only financial: urban areas lack primary-level public maternity facilities under the health ministry, and the gap is filled by private and NGO providers, meaning that a woman's access depends on which NGO holds which contract in which block. Third, the policy instruments are already present but gender-blind in practice: climate policy in Bangladesh references women's vulnerability but omits operational guidance, and gender integration is inconsistent with women treated as a homogeneous group. The regional comparison reinforces this: in a document analysis of South Asian National Adaptation Plans, Cambodia, Nepal, and Timor-Leste prioritized maternal and child health and adopted broader gender-based approaches, with the recommendation that future NAP development involve a more comprehensive and diverse representation of women from various cultural and geographic backgrounds.

The most transferable implementation lessons from this evidence base are: (i) digital, voice-based messaging reaches adolescent girls that home-visiting cannot, with demonstrated gains in danger-sign knowledge and ANC/PNC utilization; (ii) contracting has an evidence base in urban Bangladesh and should be redeployed with climate-conditionality rather than replaced; (iii) community engagement is a recognized enabler of climate-resilient health facilities, alongside supportive policies, information systems, coordination, funding, and technical expertise; (iv) heat action planning is viable in South Asia, as demonstrated by Ahmedabad's Heat Action Plan - the region's first, which combined public awareness and community outreach, early warning with inter-agency coordination, capacity building of healthcare professionals, and reduction of heat exposure; and (v) early warning systems must be designed for gendered access gaps, since illiteracy and low phone ownership create asymmetrical heat warning access that verbal dissemination and community engagement can partially correct.

A Climate-Resilient SRHR Service Model for Migrant Women in Dhaka

The proposed model has five pillars, each mapped to WHO framework components and to the six building blocks of the health system.

Table 6. Five-pillar climate-resilient SRHR model mapped to WHO building blocks

Pillar	Core components	WHO framework component	Building block
1. Heat-protected and flood-accessible SRHR points	Cooled maternal and counselling rooms; elevated or relocated service points outside drainage-path flood zones; extended and shifted opening hours for working women; adolescent-friendly hours	Climate-resilient and sustainable technologies and infrastructure; climate-informed health programs	Service delivery; medical products and technologies
2. Mobile and outreach SRHR delivery	Mobile SRHR teams with contraception, ANC screening, MHM supplies, and GBV referral; boat-based or elevated-platform outreach where flooding is recurrent	Emergency preparedness and management; climate-informed programs	Service delivery; health workforce
3. Digital continuity layer	Stage-based voice/SMS messaging as demonstrated in Dhaka slums; missed-appointment follow-up; heat and flood alerts pushed to enrolled women; clinical help desk for urgent referral	Integrated risk monitoring and early warning; health information systems	Health information systems

4. GBV-integrated SRHR care	Routine violence screening in SRHR consultations; referral pathways with documented outcomes; community awareness challenging acceptance of violence; mental health screening for PTSD	Climate-informed health programs; management of environmental determinants	Service delivery; health workforce
5. Governance, data, and climate financing	Migrant-inclusive denominators built on fresh enumeration; gender- and migration-disaggregated SRHR indicators in municipal reporting; NGO contracting with climate-resilience conditionality; dedicated budget line and access to national and international climate funds	Leadership and governance; climate and health financing	Leadership and governance; financing

Service pathway

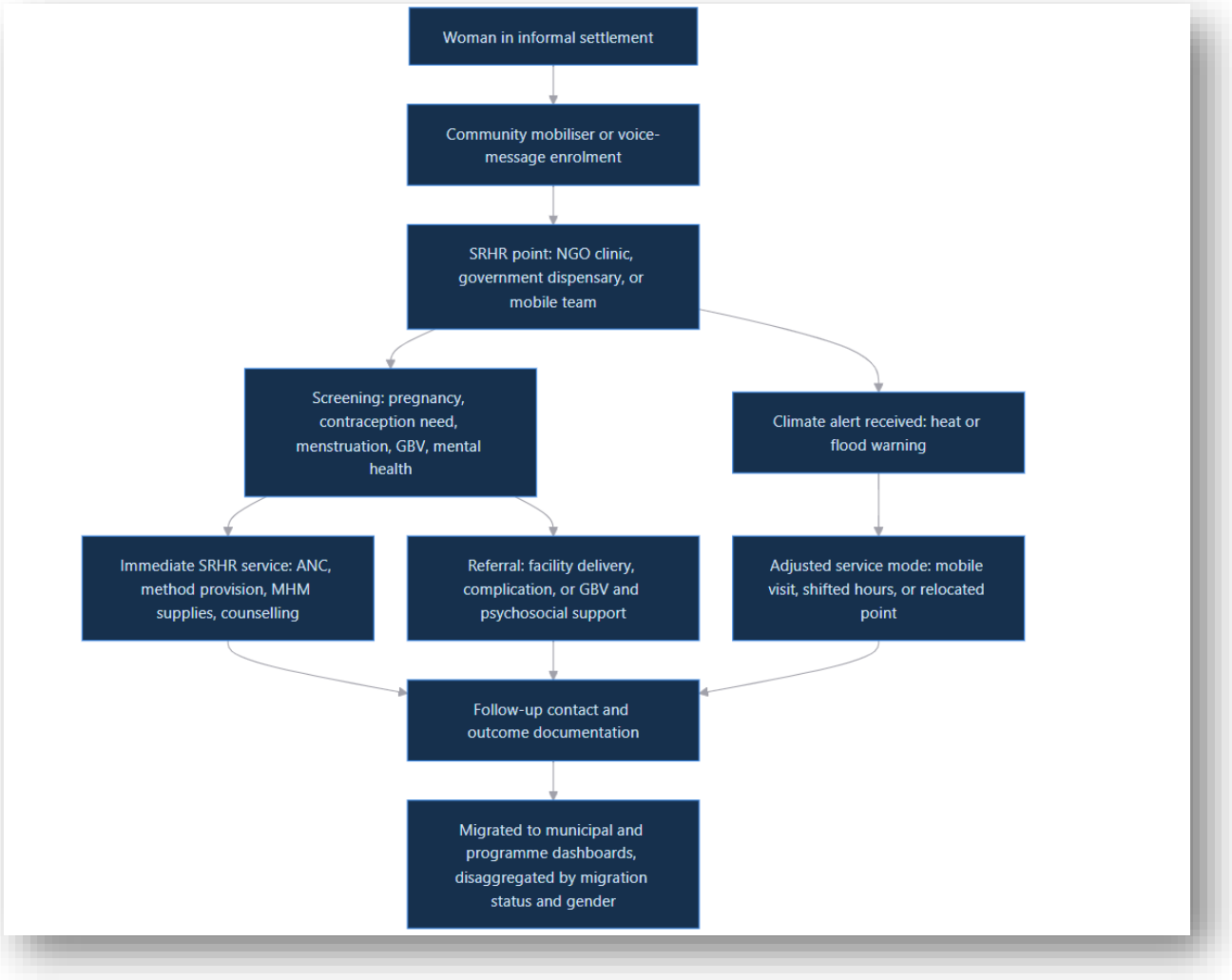


Figure 4. Proposed client pathway through a climate-resilient SRHR service line.

Sequencing and feasibility

Given demonstrated NGO contracting capacity and the absence of implementation evaluations in the climate-resilient health facility literature, the model should be piloted with an embedded evaluation. Priority sequencing: (1) fresh enumeration and baseline to establish the denominator, addressing contested site statistics; (2) digital enrolment of pregnant and postpartum women and adolescent girls, given the strongest evidence of effect; (3) GBV screening integration with referral capacity in place before scale-up; (4) infrastructure hardening of the highest-volume SRHR points; (5) financing architecture aligned to climate funds, given that fewer than half of low- and lower-middle-income country health authorities currently access them.

Monitoring framework

Indicators should include: proportion of migrant women with ≥4 ANC visits and skilled birth attendance (baseline slum reference 29% and 37%); unmet need for family planning (reference 41.1% Kamrangirchar; 19.5% Chattogram); modern contraceptive use; GBV disclosure rate (baseline 21%); PTSD screening uptake among IPV survivors (baseline prevalence 21.16%); days of SRHR service availability during flood and heat events; and proportion of enrolled women receiving a climate alert before a heat or flood event.

Conclusion

Climate change is arriving in Dhaka's informal settlements as a reproductive health crisis. The women who live there are disproportionately those displaced by environmental change; up to 13.3 million internal climate migrants are projected in Bangladesh by 2050, 80% of those displaced by climate change are women and girls and they enter a service environment where antenatal care is 29% against 58% in non-slum areas, facility delivery 37% against 65%, and skilled birth attendance 37% against 68%. Their contraceptive needs are high and often coerced, with 82% lifetime exposure to intimate partner violence and only 21% disclosure. Their menstrual hygiene depends on reused cloth disposed into drains, their homes flood nearly every monsoon, and their clinics are under municipal authority while their entitlements sit with the health ministry.

None of the components required to fix this are speculative. Voice-message SRHR messaging has raised antenatal care utilization from 70.4% to 87.5% in Dhaka slums. NGO contracting has improved urban maternal and child health utilization with equity gains for the poorest half of the population. Heat action planning has been implemented in South Asia. WHO's operational framework specifies exactly where climate resilience attaches to each building block. The gap is not knowledge but architecture: SRHR must be treated as climate infrastructure; heat-protected, flood-accessible, mobile, digitally continuous, violence-informed, and financed through adaptation channels with migration-disaggregated data as the accountability instrument. Empowering climate-migrant women in Dhaka is not a welfare proposition; it is the test of whether Bangladesh's climate adaptation is real.

References

- Abubakar, I., Aldridge, R. W., Devakumar, D., Orcutt, M., Burns, R., Barreto, M. L., Dhavan, P., Fouad, F. M., Groce, N., Guo, Y., Hargreaves, S., Knipper, M., Miranda, J. J., Madise, N., Kumar, B., Mosca, D., McGovern, T., Rubenstein, L., Sammonds, P., … Zhou, S. (2018). The UCL–Lancet Commission on Migration and Health: the health of a world on the move. *The Lancet*, *392*(10164), 2606–2654. https://doi.org/10.1016/s0140-6736(18)32114-7
- Ahmed, M. S. A. M., Shahanaz, C., Karim, M. R., & Haque., M. M. (2012). *UNMET NEEDS OF FAMILY PLANNING AND PRACTICE OF FAMILY PLANNING IN A*

SELECTED URBAN TO RURAL MIGRATED POPULATION OF DHAKA CITY. *6*(3), 115–123.

- ALAM, S. S. B., & Matsuyuki, M. (2017). Applicability of Land Sharing Scheme to Korail Slum, Dhaka, Bangladesh. *Urban and Regional Planning Review*, *4*(0), 151–167. https://doi.org/10.14398/urpr.4.151
- Albis, M. L. F., Bhadra, S., & Chin, B. (2019). Impact evaluation of contracting primary health care services in urban Bangladesh. *BMC Health Services Research*, *19*(1), 854. https://doi.org/10.1186/s12913-019-4406-5
- Andersen, M. K., & Choudhoury, Z. ul A. (2016). Slum, Poverty and Violent Conflict in Korail Bosti, Dhaka. In *Research at the University of Copenhagen (University of Copenhagen)*. University of Copenhagen. https://researchprofiles.ku.dk/da/publications/dbfe98ae-0b3f-4b98-b737-dca64fe4d851

- Ángeles, G., Ahsan, K. Z., Streatfield, P. K., Arifeen, S. E., & Jamil, K. (2018). Reducing Inequity in Urban Health: Have the Intra-urban Differentials in Reproductive Health Service Utilization and Child Nutritional Outcome Narrowed in Bangladesh? *Journal of Urban Health*, *96*(2), 193–207. https://doi.org/10.1007/s11524-018-0307-x
- Ayeb-Karlsson, S. (2020). 'When we were children we had dreams, then we came to Dhaka to survive': urban stories connecting loss of wellbeing, displacement and (im)mobility. *Climate and Development*, *13*(4), 348–359. https://doi.org/10.1080/17565529.2020.1777078
- Baidya, C., Mohajan, K., Uddin, M. J., & Akther, N. (2025). Unmet Need of Family Planning among Urban Slum Women in Chattogram. *Chattagram Maa-O-Shishu Hospital Medical College Journal*, *23*(1), 14–18. https://doi.org/10.3329/cmoshmcj.v23i1.78165
- Bhandari, D., Robinson, E., Dhimal, M., Borda, A., Ebi, K. L., & Lokmic-Tomkins, Z. (2024). Maternal and child health climate change adaptation: a qualitative document analysis of South Asian National Adaptation Plans. *Environmental Research Letters*, *19*(8), 84045. https://doi.org/10.1088/1748-9326/ad5fa4
- Bhowmik, J., Biswas, R. K., & Woldegiorgis, M. A. (2019). Antenatal care and skilled birth attendance in Bangladesh are influenced by female education and family affordability: BDHS 2014. *Public Health*, *170*, 113–121. https://doi.org/10.1016/j.puhe.2019.02.027
- Campbell-Lendrum, D., Neville, T., Schweizer, C., & Neira, M. (2023). Climate change and health: three grand challenges. *Nature Medicine*, *29*(7), 1631–1638. https://doi.org/10.1038/s41591-023-02438-w
- Choudhury, N., Moran, A. C., Alam, A., Ahsan, K. Z., Rashid, S. F., & Streatfield, P. K. (2012). Beliefs and practices during pregnancy and childbirth in urban slums of Dhaka, Bangladesh. *BMC Public Health*, *12*(1), 791. https://doi.org/10.1186/1471-2458-12-791
- Chowdhury, M. E., Shiblee, S. I., & Jones, H. E. (2019). Does mHealth voice messaging work for improving knowledge and practice of maternal and newborn healthcare? *BMC*

Medical Informatics and Decision Making, *19*(1), 179. https://doi.org/10.1186/s12911-019-0903-z

- Chowdhury, Md. A., Nowreen, S., Tarin, N. J., Hasan, Md. R., Zzaman, R. U., & Amatullah, N. I. (2022). WASH and MHM experiences of disabled females living in Dhaka slums of Bangladesh. *Journal of Water Sanitation and Hygiene for Development*, *12*(10), 683–697. https://doi.org/10.2166/washdev.2022.060
- Clair, K., Razzaque, A., Islam, M. Z., Mia, M. N., Chowdhury, R., Mustafa, A. G., & Kuhn, R. (2020). *Identifying reproductive health coverage gaps for rural- and urban-born migrant household heads in the slums in and around Dhaka city, Bangladesh* (pp. 261–277). https://doi.org/10.4324/9780429321450-11

- Daalen, K. R. van, Dada, S., Issa, R., Chowdhury, M., Jung, L., Singh, L., Stokes, D., Orcutt, M., & Singh, N. (2021). A Scoping Review to Assess Sexual and Reproductive Health Outcomes, Challenges and Recommendations in the Context of Climate Migration. *Frontiers in Global Women s Health*, *2*, 757153. https://doi.org/10.3389/fgwh.2021.757153
- Drexler, A. E., Islam, M. N., Hoque, M. Z., & Chin, B. (2025). Experience and lessons learned from contracting urban primary health care in Bangladesh. *Discover Public Health*, *22*(1). https://doi.org/10.1186/s12982-025-00999-4
- Dutta, P., Golechha, M., & Mavalankar, D. (2021). *Prioritising climate change and health* (pp. 106–115). https://doi.org/10.4324/9781003190516-14
- Freihardt, J. (2025). Trapped by climate change? (In)voluntary immobility in Bangladesh. *Regional Environmental Change*, *25*(4), 117. https://doi.org/10.1007/s10113-025-02452-3
- Goddard, S. J., & Sommer, M. (2019). MHM and WASH in Urban Slums. *ScholarlyCommons (University of Pennsylvania)*. https://repository.upenn.edu/handle/20.500.14332/49112
- Haque, A. N. (2026). The gendered trap: climate policy, inequality, and adaptation lock-ins in Global South Cities. *Environmental Research Climate*, *5*(3), 35003. https://doi.org/10.1088/2752-5295/ae688b
- Haque, Md. A., Ananna, R. S., Hasan, N., Aktar, Mst. F., & Zakaria, A. F. M. (2024). Social norms and maternal health information-seeking behavior among adolescent girls: A qualitative study in a slum of Bangladesh. *PLoS ONE*, *19*(12). https://doi.org/10.1371/journal.pone.0315002
- Hoque, M. M., Ahmed, N., Khan, Md. A. I., & Bhuyan, Md. S. (2026). Causes, consequences and processes of climate induced coastal migration in Bangladesh. *Discover Oceans*, *3*(1). https://doi.org/10.1007/s44289-026-00126-4
- Husaini, S., & Davies, S. E. (2022). Case Report: Another Burden to Bear: The Impacts of Climate Change on Access to Sexual and Reproductive Health Rights and Services in Bangladesh. *Frontiers in Climate*, *4*. https://doi.org/10.3389/fclim.2022.875515

- (IPCC), I. P. on C. C. (2023). Health, Wellbeing and the Changing Structure of Communities. In *Cambridge University Press eBooks* (pp. 1041–1170). Cambridge University Press. https://doi.org/10.1017/9781009325844.009
- Islam, M. M., & Gagnon, A. J. (2016). Use of reproductive health care services among urban migrant women in Bangladesh. *BMC Women s Health*, *16*(1), 15. https://doi.org/10.1186/s12905-016-0296-4

- Jahan, I., Vučković, M., Kabir, S. S., Rashid, S. F., & Bouey, J. (2024). Reproductive health service access and utilisation among migrant women in Dhaka's urban slums: a qualitative study. *Culture Health & Sexuality*, *26*(9), 1134–1148. https://doi.org/10.1080/13691058.2024.2302052
- Jahan, N., Barua, D., Elsey, H., Kashfi, F., Huque, R., & Das, M. (2026). Patient and provider perspectives of pluralistic primary care services in urban Bangladesh: a qualitative study. *PubMed Central*, *26*(1). https://doi.org/10.1186/s12913-026-14106-z
- Jensen, S., & Andersen, M. K. (2017). *Corruption and Torture: Violent Exchange and the policing of the urban poor*. http://vbn.aau.dk/da/publications/corruption-and-torture(c387fbc6-d14b-4531-a809-8dc159202761).html
- Jolly, S. P., Rahman, M., Afsana, K., Yunus, F. M., & Chowdhury, A. M. R. (2016). Evaluation of Maternal Health Service Indicators in Urban Slum of Bangladesh. *PLoS ONE*, *11*(10). https://doi.org/10.1371/journal.pone.0162825
- Kasekende, N. N., Kabiswa, C., Zake, J., & Kansiime, M. K. (2025). Advancing and scaling up sexual and reproductive health services for climate adaptation and resilience in Uganda. *Frontiers in Global Women s Health*, *6*, 1623785. https://doi.org/10.3389/fgwh.2025.1623785
- Khanam, T. (2025). Home, hope, and hazard : a gendered inquiry into climate-induced migration in Dhaka's slums. In *Trepo - Institutional Repository of Tampere University*. https://trepo.tuni.fi/handle/10024/229354
- Knowlton, K., Kulkarni, S., Azhar, G. S., Mavalankar, D., Jaiswal, A., Connolly, M., Nori-Sarma, A., Rajiva, A., Dutta, P., Deol, B., Sánchez, L. I., Khosla, R., Webster, P. J., Toma, V. E., Sheffield, P., Hess, J., & Group, T. A. H. and C. S. (2014). Development and Implementation of South Asia's First Heat-Health Action Plan in Ahmedabad (Gujarat, India). *International Journal of Environmental Research and Public Health*, *11*(4), 3473–3492. https://doi.org/10.3390/ijerph110403473
- Koly, K. N., Sultana, S., Saba, J., Majlish, M. K., Billah, M. A., Watson, J., & Neves, B. B. (2025). Prevalence and associated factors of post-traumatic stress disorder among women with an experience of intimate partner violence (IPV): Insights from urban slums of Bangladesh. *Cambridge Prisms Global Mental Health*, *12*. https://doi.org/10.1017/gmh.2025.10092

- Lokotola, C. L. (2023). Towards a climate-resilient primary health care service. *South African Family Practice*, *65*(1). https://doi.org/10.4102/safp.v65i1.5749
- Mayhew, S., & Balabanova, D. (2025). Building Climate (and Crisis) Resilience at the Front Line: Connecting Health Systems and Communities. In *The MIT Press eBooks* (pp. 139–150). The MIT Press. https://doi.org/10.7551/mitpress/14871.003.0017

- Mistry, S. K., Akter, F., Yadav, U. N., Hossain, Md. B., Sichel, A., Labrique, A., & Storisteanu, D. M. L. (2021). Factors associated with mobile phone usage to access maternal and child healthcare among women of urban slums in Dhaka, Bangladesh: a cross-sectional study. *BMJ Open*, *11*(4). https://doi.org/10.1136/bmjopen-2020-043933
- Mosaddek, N., (2025). Assessing Socio-Economic Disparities in Heat Stress Vulnerability and Adaptive Capacity: A Comparative Study of Higher-Class Residents and Slum Dwellers in Dhaka. In *Research Square*. https://doi.org/10.21203/rs.3.rs-6040769/v1
- Mosadeghrad, A. M., Isfahani, P., Eslambolchi, L., Zahmatkesh, M., & Afshari, M. (2023). Strategies to strengthen a climate-resilient health system: a scoping review. *Globalization and Health*, *19*(1), 62. https://doi.org/10.1186/s12992-023-00965-2
- Nahar, S., & Amin, F. (1970). Unmet Need of Contraceptives among Eligible Couples of Urban Slum Dwellers in Dhaka. *Ibrahim Medical College Journal*, *3*(1), 24–28. https://doi.org/10.3329/imcj.v3i1.2916
- Ngcamu, B. S. (2023). Climate change effects on vulnerable populations in the Global South: a systematic review. *Natural Hazards*, *118*(2), 977–991. https://doi.org/10.1007/s11069-023-06070-2
- Ochieng, S., Hariharan, N., Abuya, T., Okondo, C., Ndwiga, C., Warren, C., Wickramanayake, A., & Rajasekharan, S. (2024). Exploring the implementation of an SMS-based digital health tool on maternal and infant health in informal settlements. *BMC Pregnancy and Childbirth*, *24*(1), 222. https://doi.org/10.1186/s12884-024-06373-7
- Parvin, K., Naznin, S., & Naved, R. T. (2016). Disclosure and help seeking behavior of women exposed to physical spousal violence in Dhaka slums. *BMC Public Health*, *16*(1), 383. https://doi.org/10.1186/s12889-016-3060-7
- Rabbani, Md. G., Hossain, Z., Tisha, K. I., Nahar, K., Sakin, Z. R., Nasrin, T., Ahmed, M. W., Hasan, Md. J., Soloman, C., Jahangir, M. A., Vandenent, M., & Mahmood, S. S. (2026). Implementation Effect of a Pilot Urban Primary Health Care Model on the Usage of Health Care From Medically Trained Providers for Chronic Diseases Among Slum Populations in Bangladesh: Findings From an Implementation Research Study. *JMIR Public Health and Surveillance*, *12*. https://doi.org/10.2196/76290
- Rahman, M. M., Chongsuvivatwong, V., Geater, A., Talukdar, M. S. H., & Wichaidit, W. (2025). Differences in access to water, sanitation, and hygiene facilities among residents of Korail Slum, Bangladesh, during normal vs. water-logging situations. *PLoS ONE*, *20*(9). https://doi.org/10.1371/journal.pone.0332534

- Rashid, S. F. (2009). Strategies to Reduce Exclusion among Populations Living in Urban Slum Settlements in Bangladesh. *Journal of Health Population and Nutrition*, *27*(4), 574–586. https://doi.org/10.3329/jhpn.v27i4.3403
- Razzaque, A., Clair, K., Chin, B., Islam, M. Z., Mia, M. N., Chowdhury, R., Mustafa, A. G., & Kuhn, R. (2019). Association of Time since Migration from Rural to Urban Slums and Maternal and Child Outcomes: Dhaka (North and South) and Gazipur City Corporations. *Journal of Urban Health*, *97*(1), 158–170. https://doi.org/10.1007/s11524-019-00395-9
- Ridde, V., Barua, M., Bonnet, E., Casseus, A., Clech, L., Allegri, M. D., Kabir, M. M. S., Goudet, J.-M., Henrys, D., Islam, M. N., L'Heureux, Y., Masselot, C., Mathon, D., Meistre, S., & Sarker, M. (2024). *Improving an Integrative Framework of Health System Resilience and Climate Change: Lessons from Bangladesh and Haiti*. https://doi.org/10.31223/x5mh6f
- Sambisa, W., Ángeles, G., Lance, P., Naved, R. T., & Thornton, J. (2011). Prevalence and Correlates of Physical Spousal Violence Against Women in Slum and Nonslum Areas of Urban Bangladesh. *Journal of Interpersonal Violence*, *26*(13), 2592–2618. https://doi.org/10.1177/0886260510388282
- Sams, I. S. (2019). Impacts of Climate Change Induced Migration on Gender: A Qualitative Study from the Southwest Coastal Region of Bangladesh. *International Journal of Social Science Studies*, *7*(4), 57. https://doi.org/10.11114/ijsss.v7i4.4292
- Schie, D. van, Hossain, M. F., & Naushin, N. (2025). Loss and Damage Policy in Bangladesh. In *Cambridge University Press eBooks* (pp. 130–159). Cambridge University Press. https://doi.org/10.1017/9781009565080.007
- Schwerdtle, P. N., Ngo, T. A., Hasch, F., Phan, T. V., Quitmann, C., & Montenegro-Quiñonez, C. A. (2024). Climate change resilient health facilities: a scoping review of case studies in low and middle-income countries. *Environmental Research Letters*, *19*(7), 74041. https://doi.org/10.1088/1748-9326/ad472b
- Shah, R., rahman, K. H. A., & Khondker, H. (2019). Use of voice messaging via mobile phone to communicate female adolescents in Bangladeshi urban slum. *European Journal of Public Health*, *29*. https://doi.org/10.1093/eurpub/ckz185.328
- Shiblee, S. I., & Harun-Or-Rashid, Md. (2025). Patterns and predictors of intimate partner violence among married women living in urban informal settlements of Bangladesh: Cross-sectional survey. *Bangabandhu Sheikh Mujib Medical University Journal*, *18*(1). https://doi.org/10.3329/bsmmuj.v18i1.75888
- Sorensen, C., Murray, V., Lemery, J., & Balbus, J. (2018). Climate change and women's health: Impacts and policy directions. *PLoS Medicine*, *15*(7). https://doi.org/10.1371/journal.pmed.1002603
- Sultana, Z., Mees, H., Mallick, B., Driessen, P., & Bailey, A. (2025). Rising temperatures, rising vulnerabilities: Individual and community adaptation to heat stress in urban slums

of Bangladesh. *Sustainable Cities and Society*, *132*, 106803. https://doi.org/10.1016/j.scs.2025.106803

- Sutopa, T. S. (2019). Maternal Health Care Seeking Behavior in Urban Area of Bangladesh: Does Migration Create Inequity? *Dhaka University Journal of Science*, *67*(2), 131–138. https://doi.org/10.3329/dujs.v67i2.54586
- Topa, A., Shiblee, S. I., & Harun-Or-Rashid, Md. (2024). Knowledge, attitude and practice regarding sexual and reproductive health rights among married adolescents in urban slums of Bangladesh: A cross-sectional survey. *Bangabandhu Sheikh Mujib Medical University Journal*, *17*(4). https://doi.org/10.3329/bsmmuj.v17i4.75623
- Trahan, A., Walshe, R., & Mehta, V. (2023). Extreme heat, gender, and access to preparedness measures: An analysis of the heatwave early warning system in Ahmedabad, India. *International Journal of Disaster Risk Reduction*, *99*, 104080. https://doi.org/10.1016/j.ijdrr.2023.104080
- Watts, N., Amann, M., Arnell, N. W., Ayeb-Karlsson, S., Beagley, J., Belesova, K., Boykoff, M., Byass, P., Cai, W., Campbell-Lendrum, D., Capstick, S., Chambers, J., Coleman, S., Dalin, C., Daly, M., Dasandi, N., Dasgupta, S., Davies, M., Napoli, C. D., … Costello, A. (2020). The 2020 report of The Lancet Countdown on health and climate change: responding to converging crises. *CentAUR (University of Reading)*, *397*(10269), 129–170. https://doi.org/10.1016/s0140-6736(20)32290-x
- Xunda, Y., Moskalenko, K., Rahaman, M. A., Taranova, N., & Islam, Md. R. (2026). Climate-induced vulnerability and health outcomes in urban Bangladesh: the mediating role of psychological stress. *Frontiers in Public Health*, *14*. https://doi.org/10.3389/fpubh.2026.1860955
- Yeasmin, F., Luby, S. P., Saxton, R., Nizame, F. A., Alam, M., Dutta, N. C., Masud, A.-A., Yeasmin, D., Layden, A., Rahman, H., Abbott, R. E., Unicomb, L., & Winch, P. J. (2017). Piloting a low-cost hardware intervention to reduce improper disposal of solid waste in communal toilets in low-income settlements in Dhaka, Bangladesh. *BMC Public Health*, *17*(1), 682. https://doi.org/10.1186/s12889-017-4693-x

Author Contributions: NM had the idea and designed the research, performed the background study, literature search, critical review, and data analysis and provided support for drafting the manuscript. NM reviewed and revised the manuscript, and did the necessary linguistic corrections.

Funding: This research was conducted as a part of Research for Change Grant 2024 scheme by Oxfam in Bangladesh.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The original contributions presented in this study are included in the article and supplementary material. Further inquiries can be directed to the corresponding author.

Acknowledgments: This research was conducted under Research for Change Grant 2024 scheme by Oxfam in Bangladesh. The researcher had received support from Oxfam in terms of finance and resources to carry out this research.

Conflicts of Interest: Not applicable.