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Navigating Shame and Salinity: Menstrual Hygiene Management among Women in Climate-Vulnerable Coastal Bangladesh

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ABSTRACT

Menstrual hygiene management (MHM) in climate-vulnerable regions is a critical public health issue, yet there remains a significant gap in understanding how specific environmental stressors, such as salinity intrusion and cyclones, intersect with socio-cultural norms to constrain women's health. This study addresses this gap by exploring the lived experiences of women in Shyamnagar, a coastal upazila in Bangladesh characterized by severe environmental risks. Employing a qualitative research design, the study utilized in-depth interviews, focus group discussions, key informant interviews, and direct observations to capture the complex realities of MHM. The analysis revealed a widespread reliance on reusable cloth due to poverty, compromised by the necessity of washing in saline-contaminated water and drying in hidden, unhygienic spaces due to cultural taboos. The study's primary contribution is the conceptualization of a "Vortex of Vulnerability." This framework demonstrates how environmental exposure, infrastructural deficits, and stigma do not act in isolation but mutually reinforce unsafe practices, creating a downward spiral of adverse health outcomes that is further intensified during disaster-induced displacement. Consequently, the study argues that addressing MHM in such contexts requires moving beyond simple product distribution toward integrated, gender-responsive interventions that tackle this systemic cycle of vulnerability.

INTRODUCTION

Menstrual hygiene management (MHM) is a fundamental component of sexual and reproductive health, gender equality, and human dignity. However, in climate-vulnerable coastal regions, environmental stressors such as salinity intrusion, water scarcity, and recurrent cyclones significantly undermine women's ability to manage menstruation safely. In Bangladesh's coastal upazilas, these ecological challenges intersect with poverty, fragile water and sanitation infrastructure, and deeply entrenched menstrual taboos. Shyamnagar Upazila, located in Satkhira District, exemplifies this compounded vulnerability, where women face persistent barriers to accessing clean water, privacy, and hygienic menstrual materials, particularly during disaster-induced displacement.

Table 1: Menstrual Product Use Patterns in Bangladesh (2020-2024)

Product Type	Overall Usage (%)	Urban Usage (%)	Rural Usage (%)	Primary User Demographic
Commercial Pads	38%	65%	25%	Younger women (15-24), students, urban residents
Cloth	55%	28%	68%	Women >30, rural residents, low-income groups
Other/Improvised	7%	7%	7%	Extreme poverty, humanitarian settings

Source: Compiled by author from national survey data (BBS, 2022).

Significance of the Study

This study is significant for public health, disaster management, and gender equity. Poor menstrual hygiene practices are associated with reproductive and urinary tract infections, psychosocial distress, and reduced participation in education and economic life. In disaster-prone coastal contexts, these risks are magnified as cyclones damage WASH infrastructure and force women into overcrowded shelters lacking privacy and basic facilities. By foregrounding women's lived experiences, this study contributes evidence necessary to integrate MHM into climate adaptation and disaster preparedness planning. It also supports rights-based and gender-responsive policy approaches that recognize menstrual health as an essential, non-negotiable component of resilience and wellbeing.

LITERATURE REVIEW

Existing literature identifies poverty, inadequate WASH infrastructure, and socio-cultural stigma as primary

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barriers to effective menstrual hygiene management in low- and middle-income countries (Patel *et al.,* 2022). Studies in Bangladesh show persistent reliance on reusable cloths, limited access to sanitary products, and widespread menstrual taboos that restrict mobility and hygiene practices (Afiaz & Biswas, 2021). Research further indicates that humanitarian and disaster settings intensify these challenges, yet MHM remains poorly integrated into emergency response frameworks (Patel *et al.,* 2022). While prior studies document MHM challenges broadly, there is limited empirical work examining how salinity intrusion, cyclonic disasters, and socio-cultural norms interact simultaneously to shape women's menstrual practices and health outcomes (Al-Mamun *et al.,* 2025). This study addresses this gap by offering a context-specific, qualitative analysis from a highly climate-vulnerable coastal setting.

Conceptual Framework

This study adopts a multi-level conceptual framework that situates menstrual hygiene management within interconnected environmental, socio-cultural, institutional, and individual domains. At the macro level, climate change–induced salinity and cyclones disrupt water security and sanitation systems. At the community and institutional level, inadequate WASH infrastructure, weak disaster preparedness, and limited service provision constrain women's choices. At the individual level, poverty and stigma shape menstrual practices, health-seeking behavior, and coping strategies. These layers interact to produce adverse health, psychological, and dignity-related outcomes, forming a cyclical pattern of vulnerability rather than isolated challenges.

Theoretical Framework

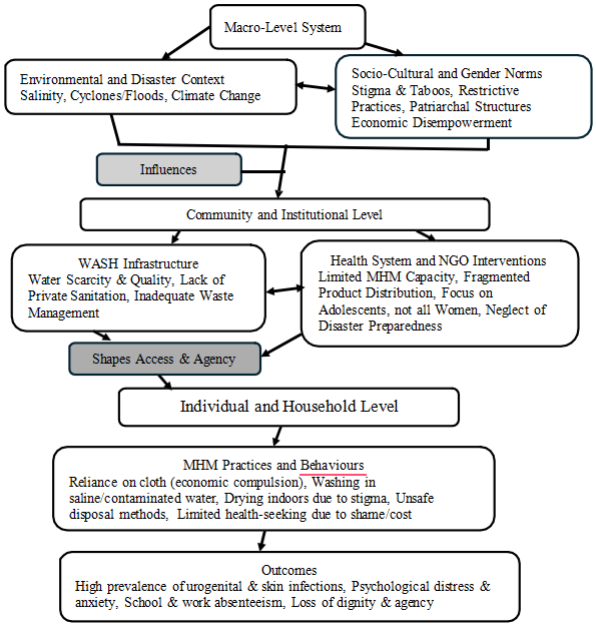

Figure 1: Conceptual Framework of MHM Vulnerability in Salinity-Affected, Disaster-Prone Contexts

The analysis is guided by the Socio-Ecological Model and a gender and vulnerability lens. The socio-ecological perspective explains how individual menstrual practices are shaped by interpersonal relationships, community norms, institutional arrangements, and broader environmental and policy contexts. The gender framework highlights how patriarchal norms, power asymmetries, and stigma disproportionately burden women during environmental crises. Together, these frameworks allow for an integrated understanding of how structural inequalities and ecological stressors constrain agency and intensify health risks, positioning menstrual hygiene management as both a health issue and a manifestation of gendered climate vulnerability.

Research Questions

1. What menstrual hygiene management practices and materials are commonly used by women in salinity-affected coastal communities of Shyamnagar?
2. How does salinity-induced water scarcity influence menstrual hygiene practices and related health outcomes?
3. In what ways do socio-cultural norms and menstrual stigma shape women's hygiene behaviors and coping strategies?
4. How do cyclones and conditions in cyclone shelters affect women's ability to manage menstruation safely and with dignity?
5. What institutional and policy gaps exist in addressing menstrual hygiene management in climate-vulnerable and disaster-prone settings?

MATERIALS AND METHODS

Research Design and Paradigm

This study adopted a qualitative research design to explore menstrual hygiene management (MHM) practices, challenges, and lived experiences of women residing in

salinity-affected and cyclone-prone coastal communities of Shyamnagar Upazila, Bangladesh. A qualitative approach was appropriate due to the sensitive, socially embedded, and context-specific nature of menstruation, which cannot be adequately captured through quantitative measures alone. The study was guided by an interpretivist paradigm, emphasizing participants' meanings, perceptions, and everyday realities within their socio-cultural and environmental contexts. Consistent with this paradigm, the research team engaged in continuous reflexivity to address positionality, acknowledging their status as researchers and bracketing personal assumptions to ensure findings remained grounded in participants' lived realities. While this design delimits the study to the specific socio-ecological boundaries of Shyamnagar, preventing statistical generalization, it allows for analytical transferability to other deltaic regions facing similar climate-induced WASH challenges. To support interpretation, the study integrated socio-ecological and gender frameworks, recognizing that MHM is shaped by interactions across individual, interpersonal, community, institutional, and environmental levels, all mediated through gendered power relations and vulnerability.

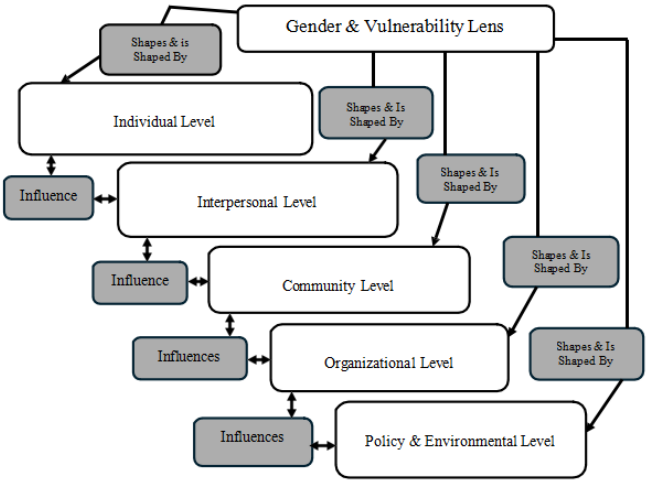

Figure 2: Integration with Theoretical Perspectives

Study Area

The research was conducted in Shyamnagar Upazila of Satkhira District, southwestern Bangladesh, one of the country's most climate-vulnerable coastal regions. The area is characterized by severe salinity intrusion, recurrent cyclones, water scarcity, and fragile sanitation infrastructure. Proximity to the Sundarbans and the Bay of Bengal exposes communities to tidal surges and flooding, while saline contamination limits access to freshwater for hygiene (Islam *et al.,* 2025). Frequent

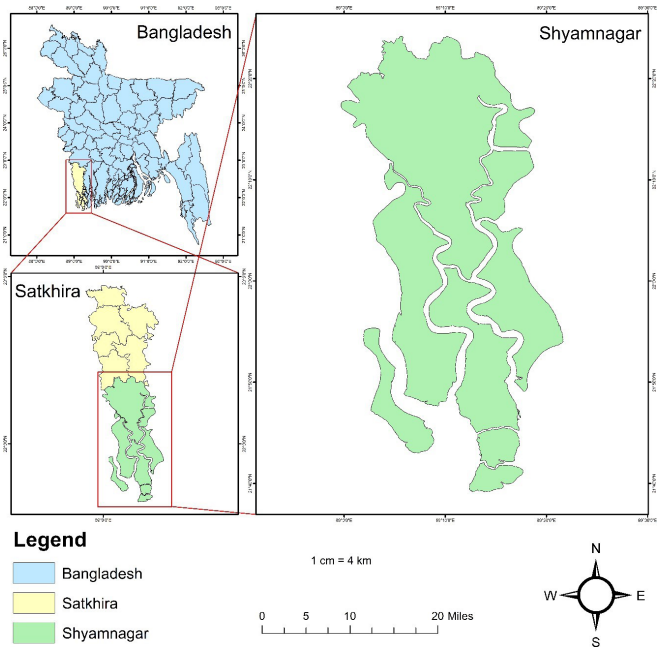

Figure 3: Study Area Map

disasters such as Cyclones Sidr, Aila, and Amphan have resulted in displacement and reliance on overcrowded cyclone shelters with inadequate WASH facilities, intensifying menstrual hygiene challenges. These specific environmental conditions define the study's boundaries; consequently, while findings are not statistically generalizable to non-coastal contexts, they possess analytical transferability to other salinity-affected deltaic regions facing similar climate vulnerabilities.

Study Population and Sampling

The primary study population consisted of women of reproductive age (12–49 years) living in salinity-affected villages or temporarily displaced in cyclone shelters. Key informants, including health officials, NGO workers, and community leaders, were included to provide institutional perspectives. Purposive sampling was employed to recruit information-rich participants with direct experience of MHM under environmental stress. To mitigate participant selection bias, the researchers actively sought diversity across socio-economic status, age, and residential locations (remote vs. town center), ensuring a balanced representation of perspectives. While snowball sampling was used cautiously to reach harder-to-access participants, multiple distinct referral chains were initiated to prevent over-reliance on a single social network. Data collection continued until thematic saturation was achieved (Guest *et al.,* 2006). The final sample size was determined by the qualitative depth required to adequately answer the research questions regarding the complex intersection of salinity, stigma, and infrastructure, rather than by statistical representativeness. This resulted in 32 in-depth interviews (IDIs), four focus group discussions (FGDs) with 6–8 participants each, and nine key informant interviews (KIIs).

Data Collection Methods Multiple qualitative methods were used to ensure depth and triangulation. Semi-structured IDIs explored personal experiences, menstrual practices, health concerns, cultural norms, and disaster-related challenges. FGDs captured shared norms, collective coping strategies, and community perceptions. KIIs focused on service provision, disaster preparedness, and institutional gaps related to MHM. Non-participant observations documented water sources, sanitation facilities, privacy, and menstrual waste disposal conditions in households and cyclone shelters. All interviews were conducted in Bengali by trained female researchers to ensure cultural sensitivity and participant comfort. To actively manage researcher positionality, the team engaged in continuous reflexivity, acknowledging their status as educated outsiders which could influence power dynamics. Daily debriefing sessions and reflexive journaling were utilized to bracket personal assumptions, ensuring that data collection remained grounded in the participants' lived realities rather than the researchers' expectations.

Data Analysis and Trustworthiness Data were analyzed using thematic analysis following Braun and Clarke's (2006) six-step approach. Transcripts were coded inductively using NVivo software, and codes were grouped into themes reflecting environmental, socio-cultural, institutional, and gendered dimensions of MHM. Rigor was ensured through triangulation across methods, inter-coder reliability checks, member checking, and maintenance of a detailed audit trail. In establishing the study's boundaries, it is recognized that while these qualitative findings are not statistically generalizable to the wider national population, they possess analytical transferability, offering critical insights into the "Vortex of Vulnerability" applicable to other salinity-affected, disaster-prone coastal regions.

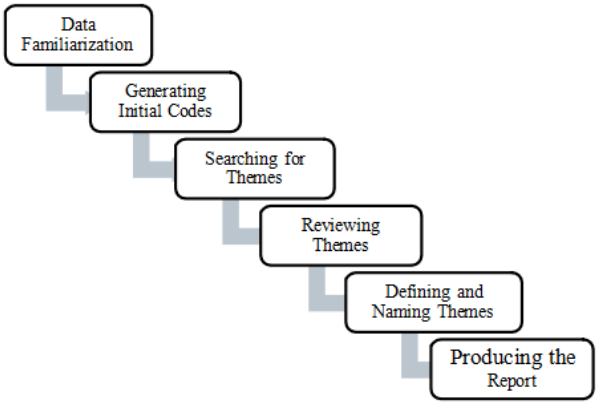

Figure 4: Steps in Data Analysis Process

Steps in Data Analysis Process

Ethical Considerations Ethical approval was obtained prior to data collection. Informed consent (and assent for adolescents) was secured, confidentiality maintained through anonymization, and participation remained voluntary. To address potential power imbalances inherent in the researcher-participant relationship, the research team adhered to reflexive ethical standards, treating consent as an ongoing process rather than a one-time formality. Measures were taken to minimize distress, ensure privacy, and respect local cultural norms throughout the research process.

RESULTS AND DISCUSSION

This section presents the empirical findings from the qualitative fieldwork conducted in Shyamnagar Upazila. Findings are organized thematically to reflect participants' lived experiences of menstrual hygiene management (MHM) within a context shaped by salinity intrusion, poverty, cultural stigma, and recurrent cyclones. The results are descriptive and grounded in participants' narratives, observational data, and key informant insights.

Participant Characteristics and Socioeconomic Context

A total of 32 women of reproductive age and nine key informants participated in the study. Women were purposively selected to reflect diversity across age, marital status, education, occupation, and residential context (permanent village residence versus temporary displacement in cyclone shelters). Participants ranged from adolescents (12–18 years) to perimenopausal women (36–49 years), with married women constituting three-quarters of the sample. Educational attainment was generally low, with nearly half of participants having no formal education. Most women were homemakers or agricultural day laborers, occupations that require extensive physical labor and time spent collecting water, activities that became significantly more burdensome during menstruation.

Approximately one-third of participants were living in cyclone shelters at the time of data collection due to displacement following Cyclone Amphan. This group experienced acute, crisis-level challenges that contrasted with the chronic but persistent difficulties faced by women residing in permanent homes. Overall, the demographic profile reflects a population experiencing intersecting structural vulnerabilities related to poverty, gender norms, environmental stress, and disaster exposure.

Table 2: Socio-Demographic Characteristics of Study Participants (n = 32)

Characteristic	Category	Frequency (n)	Percentage (%)	Notable Observations
Age Group	Adolescents (12–18 years)	8	25.0	All unmarried; 5 were students.
Age Group	Reproductive Adults (19–35 years)	15	46.9	Primarily married; high burden of household and income-generating work.
Age Group	Perimenopausal (36–49 years)	9	28.1	Held significant influence over household practices; more set in traditional methods.
Marital Status	Married	24	75.0	Decision-making power for product purchase often depended on husbands or mothers- in-law.
Marital Status	Unmarried	8	25.0	All were adolescents; relied entirely on mothers for MHM materials and information.
Education Level	No formal education	14	43.8	Strong correlation between no education and exclusive use of cloth, with less awareness of health risks.
Education Level	Primary (1–5 years)	11	34.4	Slightly more open to new information but still heavily constrained by economics.
Education Level	Secondary (6– 10 years)	7	21.9	All seven had at least tried sanitary pads; more likely to report school absenteeism due to poor facilities.
Primary Occupation	Homemaker	20	62.5	Time spent on water collection significantly impacted daily routines, especially during menstruation.

Primary Occupation	Daily labourer (agricultural)	7	21.9	Reported extreme difficulty managing menstruation during long hours of work in fields with no facilities.
Primary Occupation	Student	5	15.6	Absenteeism was a major issue; fear of leakage was a primary concern.
Residence Context	Permanent village home	22	68.8	Faced chronic challenges related to water scarcity and sanitation.
Residence Context	Temporary cyclone shelter resident	10	31.2	Faced acute, crisis- level challenges; all were displaced due to Cyclone Amphan (2020) aftermath.

Menstrual Hygiene Materials: Access, Choice, and Economic Constraints

Dominance of Reusable Cloth

The findings reveal an overwhelming reliance on reusable cloth as the primary menstrual absorbent. Twenty-eight of the 32 women (87.5%) reported using cloth, typically repurposed from old saris or lungis rather than purpose-made menstrual materials. The number of cloth pieces owned per woman was limited, usually between two and four, necessitating repeated use across cycles. Women described prolonged use of worn and thinning cloths, even when these caused discomfort or irritation, due to economic hardship.

One participant summarized this constraint starkly:

"Feeding my children for a day or buying pads for one cycle, the choice is made for me." (IDI, age 38)

Barriers to Sanitary Pad Use

Awareness of commercial sanitary pads was widespread; however, regular use was rare. Only four women, all with secondary education, reported consistent pad use. For the majority, pads were viewed as occasional luxuries rather than sustainable options. The cost of a packet of pads represented a substantial share of daily wages for agricultural laborers, making monthly purchase unrealistic. Availability further constrained access, particularly after cyclones disrupted market supply chains.

Participants reported that following Cyclone Amphan, pads disappeared from local markets for weeks, and when available, prices increased. As one focus group participant explained:

"Even those of us who usually save for pads had to go back to using cloth." (FGD, age 19–35)

Absence of Alternative Technologies

None of the participants had prior knowledge of alternative menstrual products such as menstrual cups or reusable sanitary pads. The idea of internal devices was met with fear and resistance, particularly among unmarried women, due to concerns about virginity and social acceptability.

Menstrual Hygiene Practices under Environmental Stress

Washing Practices in Salinity-Affected Settings

All cloth users reported washing menstrual materials in easily accessible water sources, primarily saline ponds and rivers. Observations confirmed that many of these ponds were contaminated with algae and located near latrines or livestock areas. Although some freshwater tube wells existed, they were often distant, and their water was prioritized for drinking and cooking rather than washing menstrual materials.

Women consistently described washing cloths quickly, often at night or in secluded locations to avoid being seen. Salinity was frequently linked to physical discomfort:

"When I wash my cloth, I can feel the salt. Later, it causes itching and redness." (IDI, age 27)

Drying Practices and Shame

Drying practices were overwhelmingly shaped by shame and fear of social judgment. Twenty-five of the 28 cloth users dried menstrual cloths indoors in dark, poorly ventilated spaces such as under beds or behind doors. Drying cloths in sunlight, known to improve hygiene, was avoided due to the possibility of being seen by male family members.

An adolescent participant stated:

"It is better to hide it inside, even if it stays damp. That is better than the shame." (IDI, age 16)

Menstrual Waste Disposal

Waste disposal practices differed markedly between home and shelter settings. In permanent homes, women employed a range of methods, including burying, burning, or disposing of materials in latrines. In contrast, women living in cyclone shelters faced severe constraints. Eight out of ten shelter residents reported discarding used materials in open spaces due to the complete absence of disposal facilities.

Key informants acknowledged this gap:

"We know it is a problem, but there is no budget for special bins or waste collection." (KII, shelter manager)

Health Symptoms and Coping Strategies

Self-Reported Morbidities

A majority of participants (22 women) reported experiencing health symptoms they associated with their menstrual practices within the past six months. Common complaints included itching, rashes, burning sensations, abnormal discharge, and urinary discomfort. Participants frequently used the local term "nepolia" to describe persistent itching and irritation following menstruation.

"Every month, after my period ends, the itching begins. It is routine now." (IDI, age 34)

Table 3: Primary Methods of Menstrual Waste Disposal Reported by Participants

Disposal Method	In Home Setting (n=32)	In Cyclone Shelter (n=10)	Rationale/Consequence
Burying	14 (43.8%)	0 (0%)	"It hides it from animals and sight."
Disposal Method	In Home Setting (n=32)	In Cyclone Shelter (n=10)	Rationale/Consequence
Thrown into Latrine	10 (31.3%)	2 (20%)	"It is washed away, out of mind."
Burning with trash	4 (12.5%)	0 (0%)	"It destroys it completely."
Discarded in open	4 (12.5%)	8 (80%)	Shelters: "No other option." Creates biohazard and pollution.
Total	32	10	

Healthcare-Seeking Behavior

Despite these symptoms, only five women sought formal medical care. Barriers included embarrassment discussing gynecological issues, lack of female doctors, financial constraints, and poor physical access to health facilities, especially after floods or cyclones. Instead, women relied on informal and often harmful coping strategies, such as excessive washing with saline water, self-medication, or menstrual suppression through unsupervised use of oral contraceptives.

One participant explained:

"If I don't get my period, I don't have to suffer anymore." (IDI, age 29)

Table 4: Self-Reported Menstrual Hygiene-Related Health Symptoms (Last 6 Months)

Symptom Category	Specific Symptom	Number of Reports (n=32) / Percentage (%)
Dermatological	Itching (Pruritus)	18 - 56.3%
Symptom Category	Specific Symptom	Number of Reports (n=32) / Percentage (%)
Dermatological	Skin rash/redness	15 - 46.9%
Dermatological	Burning sensation	8 - 25.0%
Reproductive Tract	Abnormal discharge	12 - 37.5%
Reproductive Tract	Foul odor	9 - 28.1%
Reproductive Tract	Lower abdominal pain	7 - 21.9%
Urinary Tract	Painful urination	8 - 25.0%
Urinary Tract	Frequent urination	5 - 15.6%

Cyclone Shelters: Acute Menstrual Distress

Conditions in cyclone shelters represented an extreme escalation of menstrual hardship. Observations documented severe overcrowding, broken toilets, lack of water, and complete absence of privacy. Women described changing menstrual materials at night, under blankets, or in filthy toilets. The emotional toll was profound, with participants repeatedly emphasizing loss of dignity and safety.

"We feel dirty and ashamed all the time. There is no dignity." (IDI, shelter resident)

Socio-Cultural Norms and Restrictions

Menstruation was universally framed as "napak" (impure), shaping restrictions on women's behavior. Most participants were prohibited from religious activities, cooking, or physical contact during menstruation. Communication about menstruation was limited, often confined to mother–daughter interactions characterized by secrecy and warnings rather than health education.

All adolescent girls reported missing school during menstruation, averaging three to four days per month, due to fear of leakage and inadequate school sanitation facilities.

Summary of Key Patterns

Taken together, the findings reveal that menstrual hygiene management in Shyamnagar is constrained by an interlocking set of environmental, economic, infrastructural, and socio-cultural factors. Salinity intrusion, poverty, stigma, and disaster-induced displacement do not operate independently but reinforce one another, producing chronic and acute menstrual vulnerability that undermines women's health, dignity, and participation in daily life.

Discussion

The Vortex of Vulnerability as an Integrative Framework

This study conceptualizes menstrual hygiene management (MHM) in climate-vulnerable coastal Bangladesh through the Vortex of Vulnerability model, which captures how economic, environmental, infrastructural, socio-cultural, and disaster-related forces interact dynamically rather than operate in isolation. Unlike linear explanations of poor MHM, the model illustrates a downward spiral in which poverty compels reliance on reusable cloth, environmental salinity constrains safe washing, stigma dictates unsafe drying practices, and inadequate WASH infrastructure eliminates viable alternatives. Cyclones act not as independent shocks but as accelerators that intensify pre-existing vulnerabilities, rapidly transforming chronic hardship into acute crisis. This integrative framing explains why narrowly focused interventions often fail and highlights the need for multi-sectoral responses.

Constrained Agency and Structural Determinism

The near-universal reliance on reusable cloth in Shyamnagar should not be interpreted as a matter of personal preference or lack of awareness. Instead, it reflects constrained agency within a system shaped by poverty, weak infrastructure, and social surveillance. Women's practices, washing cloths in saline water or drying them indoors, are rational responses to structural limitations rather than uninformed or negligent behaviors. This finding aligns with critical feminist and public health scholarship that challenges behavior-centric models of health promotion and emphasizes systemic responsibility (Bobel *et al.,* 2019). Recognizing constrained agency shifts policy attention from individual "behavior change" to addressing the conditions that restrict choice.

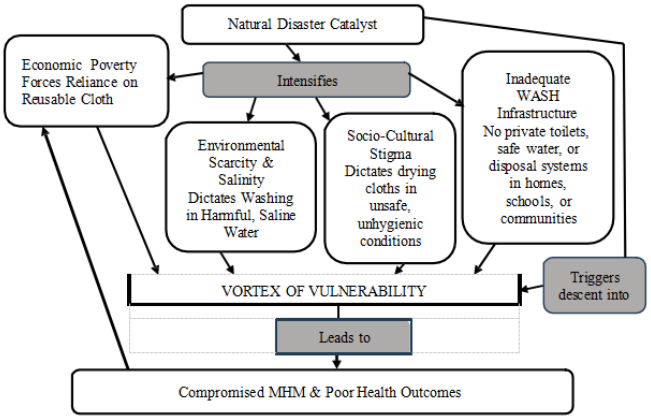

Figure 5: The Vortex of Vulnerability

Environmental Pathways Linking Ecology and Health

The high prevalence of self-reported dermatological and urogenital symptoms provides empirical support for theorized environmental pathways linking poor MHM to adverse health outcomes. Saline and contaminated water used for washing menstrual materials can disrupt vaginal ecology and increase susceptibility to infection, while indoor drying in damp, unventilated spaces encourages microbial growth. These findings demonstrate how macro-level environmental degradation manifests in intimate bodily harm, positioning women's bodies as sites where ecological, gender, and public health crises intersect. This contributes to growing evidence that climate change disproportionately affects women's reproductive health through indirect, everyday exposure pathways.

Cyclone Shelters as Sites of Menstrual Crisis

Conditions in cyclone shelters represent a critical failure of humanitarian planning to address gender-specific needs. The findings reinforce concerns raised in prior disaster research that MHM remains marginalized in emergency response (Sommer *et al.,* 2016). Overcrowding, non-functional WASH facilities, lack of privacy, and absence of waste management systems transform shelters from spaces of protection into environments of indignity. This study extends the concept of "period poverty" into a broader "period crisis," where not only products but the entire system required for MHM collapses. The results underscore the urgency of operationalizing international standards, such as the Sphere Minimum Standards, within disaster preparedness and response mechanisms.

The Enduring Power of Stigma

Finally, socio-cultural stigma emerges as a pervasive and invisible force shaping all dimensions of MHM. The framing of menstruation as napak enforces silence, restricts mobility, and sustains intergenerational misinformation. Its impact on girls' education, evidenced by universal menstrual absenteeism, reveals how stigma translates into long-term gender inequality. Without confronting these deeply embedded norms, infrastructural or material interventions alone are unlikely to achieve lasting change.

Policy Suggestions

The findings demonstrate that menstrual hygiene management (MHM) challenges in salinity-affected, cyclone-prone coastal areas are systemic rather than isolated. Addressing them therefore requires coordinated, multi-sectoral action that simultaneously tackles

environmental, infrastructural, economic, socio-cultural, and health-system determinants. Based on the evidence, this study proposes four integrated strategic pillars aligned with the Sustainable Development Goals (SDGs).

First, WASH infrastructure and environmental resilience must be prioritized. In the short term, cyclone shelters should be retrofitted with gender-segregated toilets, lockable doors, private washing spaces, reliable water supply, and dedicated menstrual waste disposal systems. Portable water filtration solutions can provide temporary relief during acute salinity and disaster periods. Over the longer term, investments in climate-resilient freshwater systems, such as large-scale rainwater harvesting and aquifer recharge, are essential. Gender-sensitive design standards should be mandated for all public facilities, schools, and disaster shelters (SDGs 6 and 13).

Second, product affordability, access, and security must be strengthened. Menstrual hygiene kits should be integrated into standard disaster relief packages to ensure immediate access during emergencies. Community-based, subsidized distribution points can help stabilize supply in remote areas. Long-term strategies should support local social enterprises to produce low-cost, reusable, and environmentally appropriate menstrual products, alongside advocacy for removing taxes on sanitary products to improve affordability (SDGs 1 and 12).

Third, eradicating cultural stigma and strengthening knowledge is critical. Comprehensive, evidence-based MHM education should be mandatory in schools for all genders to disrupt intergenerational misinformation. Community-wide awareness initiatives, using radio, mobile platforms, and local leadership, should actively engage men, boys, and religious leaders to normalize menstruation. Integrating MHM education into national climate adaptation and disaster risk reduction training can build long-term preparedness and social acceptance (SDGs 4 and 5).

Finally, health systems strengthening and policy integration are necessary to address the health consequences of poor MHM. Community health workers and frontline providers should be trained to offer stigma-free MHM counseling, recognize common menstrual-related infections, and discourage harmful practices such as unsupervised menstrual suppression. In the long term, MHM must be institutionalized within national sexual and reproductive health policies and disaster management protocols, ensuring consistent service delivery through cross-sectoral partnerships (SDGs 3 and 17).

Table 5: Policy Recommendations for Improving Menstrual Hygiene Management (MHM) in Salinity-Affected, Cyclone-Prone Areas

Level of Intervention	Short-Term Actions (0–2 Years)	Long-Term Strategies (2-10 Years)	Linked SDGs
WASH Infrastructure & Environmental Resilience	Immediately retrofit existing cyclone shelters with gender-segregated toilets featuring lockable doors, private washing cubicles with water supply, and dedicated, safe disposal bins for menstrual waste. Distribute portable water filters to households to provide a buffer against saline water for hygiene during periods of acute scarcity.	Invest in large- scale, climate-resilient water infrastructure, such as extensive rainwater harvesting systems and managed aquifer recharge projects, to combat salinity intrusion at its source. Mandate gender-sensitive design principles in all future construction of schools, public facilities, and cyclone shelters.	SDG 6 (Clean Water & Sanitation), SDG 13 (Climate Action)
Product Affordability, Access & Security	Integrate MHM kits (containing a variety of absorbents like pads and cloth, along with soap) into the standard emergency relief distributed by the government and NGOs following a disaster. Establish a network of subsidized, community- based vending points to ensure reliable access to affordable commercial pads in remote villages.	Support local social enterprises to manufacture and distribute low-cost, reusable, and environmentally friendly menstrual products (e.g., reusable pads) suitable for the local context. Advocate for the removal of Value Added Tax (VAT) or other taxes on sanitary products to improve long-term affordability.	SDG 1 (No Poverty), SDG 12 (Responsible Consumption & Production)

Eradicating Cultural Stigma & Strengthening Knowledge	Implement mandatory, comprehensive, and evidence-based MHM education in schools for all students, regardless of gender, to break the cycle of misinformation from a young age. Launch targeted radio and mobile-based awareness campaigns to disseminate accurate information and challenge harmful taboos within the wider community.	Fund and facilitate community-wide dialogues that actively engage men, boys, religious leaders, and local officials as champions to normalize menstruation and shift deep-seated social norms. Integrate MHM education into national climate adaptation and disaster risk reduction training curricula to build a culture of preparedness.	SDG 4 (Quality Education), SDG 5 (Gender Equality)
Health Systems Strengthening & Policy Integration	Train Community Health Workers and frontline clinic staff to provide basic MHM education, recognize symptoms of common infections (RTIs, UTIs), and distribute products. Ensure local health facilities have consistent stocks of basic treatments for these conditions.	Mainstream MHM into national sexual and reproductive health (SRH) policies and disaster management protocols (e.g., the Standing Orders on Disaster). Build the capacity of local clinicians to provide stigma-free, empathetic care and to identify and counter harmful practices, such as the unsupervised use of contraceptives for menstrual suppression.	SDG 3 (Good Health & Well-being), SDG 17 (Partnerships for the Goals)

CONCLUSION

This study provides a context-specific yet broadly relevant analysis of menstrual hygiene management (MHM) in a climate-vulnerable coastal setting. Rather than presenting MHM challenges as disconnected problems, the findings reveal an interlinked system in which poverty, environmental degradation, inadequate infrastructure, and entrenched stigma reinforce one another to produce persistent menstrual vulnerability. A key original contribution of this research is the Vortex of Vulnerability model, which reconceptualizes MHM as a dynamic, interacting system shaped by both slow-onset environmental stress (salinity) and sudden climate shocks (cyclones). This model demonstrates how macro-level forces cascade downward, eroding women's agency and manifesting in physical ill-health, psychological distress, and loss of dignity.

However, it is necessary to acknowledge the limitations inherent in this single-site qualitative research design. As the study focused exclusively on Shyamnagar Upazila, the findings reflect the specific socio-ecological realities of the southwestern coastal belt of Bangladesh and may not be statistically generalizable to the entire country or inland regions. Despite this limitation, the study possesses high analytical transferability. The mechanisms identified here—specifically the interaction between saline water intrusion and compromised hygiene practices—are likely applicable to other deltaic regions in the Global South facing similar climate stressors. Future research should aim to quantify these impacts across broader geographical areas to further validate the "Vortex of Vulnerability" framework.

Moving from conceptual understanding to operational execution in Shyamnagar requires immediate, localized action that transcends generic policy prescriptions. Operationalizing these findings necessitates a two-pronged approach. First, local government bodies and humanitarian agencies must prioritize the infrastructure retrofit of existing cyclone shelters in Shyamnagar, specifically installing lockable, gender-segregated toilets and private washing corners to address the acute dignity crisis during disasters. Second, supply chain resilience must be built by supporting local social enterprises to distribute affordable menstrual products, ensuring that market access does not collapse during post-cyclone recovery periods.

Ultimately, addressing the "Vortex of Vulnerability" requires shifting from isolated interventions to integrated, gender-responsive climate adaptation. For the women of Shyamnagar, the ability to manage menstruation safely is not merely a sanitation issue but a fundamental indicator of climate justice, public health integrity, and human rights.

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