International Journal of Research in Social Sciences
Vol. 16, Issue 5, May 2026,
ISSN: 2249-2496 Impact Factor: 7.081
Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gate as well as in Cabell's Directories of Publishing Opportunities, U.S.A

Menstrual Health and Hygiene among Economically Disadvantaged Adolescent Girls in Urban Bhagalpur, Bihar: A Structured Narrative Review

Divya Kumari, Research Scholar, University Department of Home Science-Food & Nutrition, TMBU, Bhagalpur-7

Dr. Mamta Kumari, Former HOD, University Department of Home Science-Food & Nutrition, TMBU, Bhagalpur-7

Abstract

Background: Menstrual health is shaped not only by access to absorbent materials but also by knowledge, bodily autonomy, privacy, water and sanitation, supportive social norms and access to care. Adolescent girls from economically disadvantaged urban households may experience overlapping barriers that are obscured by aggregate urban statistics. This review examines the evidence relevant to girls living below the poverty line in urban Bhagalpur, Bihar. Methods: A structured narrative search was undertaken in June 2026 using PubMed, journal-publisher databases and official sources from the Government of India, the National Family Health Survey, UNFPA, UNICEF and WHO. Priority was given to peer-reviewed Indian studies, Bihar-specific analyses, research in low-income urban settings and authoritative policy documents. Results: National indicators show marked improvement in the use of hygienic menstrual methods, but substantial inequalities remain by education, household wealth, place of residence and access to information. Bihar continues to lag behind the national average, while evidence specific to Bhagalpur and to younger adolescents aged 10-14 years is limited. The literature identifies five interacting constraints: inadequate pre-menarcheal knowledge; unaffordable or unreliable access to preferred materials; toilets without water, privacy or disposal systems; restrictive norms and stigma; and weak linkage to adolescent-responsive health care. Evidence connecting poor menstrual practices with infection is suggestive but largely observational, and the effect of product distribution alone on attendance is uncertain. Conclusion: An effective urban Bhagalpur strategy should combine age-appropriate education, informed product choice, gender-responsive WASH, stigma reduction, clinical referral and ward-level monitoring. Future local research should use verified primary data and include school-going, out-of-school and 10-14-year-old girls.

Keywords: adolescent girls; Bihar; Bhagalpur; menstrual health; menstrual hygiene management; poverty; urban poor; WASH

1. Introduction

Menstruation is a normal physiological process, yet the conditions under which it is experienced are strongly influenced by social and material inequality. Contemporary scholarship defines menstrual health as complete physical, mental and social well-being in relation to the menstrual cycle, rather than merely the absence of disease. This broader framing includes timely knowledge, access to acceptable materials, privacy, safety, water and sanitation, freedom from stigma, participation in daily life and access to appropriate health services (Hennegan et al., 2021).

In India, menstrual health indicators have improved substantially, but aggregate gains conceal persistent disadvantage. An analysis of NFHS-5 data reported that 78% of adolescent girls aged 15-19 years used at least one method classified as hygienic, compared with 58.3% in NFHS-4. The same analysis found a pronounced urban-rural difference and clarified that NFHS does not collect menstrual protection information for girls aged 10-14 years (UNFPA India, 2022). The national survey therefore provides an important benchmark but cannot describe the experiences

of early adolescents or the practical quality of menstrual management, such as frequency of changing, privacy, pain, disposal or the acceptability of materials.
Bihar has recorded progress, but remains among the lower-performing states for hygienic menstrual protection. NFHS-based studies consistently identify education, wealth, media exposure and sanitation as major determinants in the state (IIPS and ICF, 2021b; Maharana, 2022). Urban residence is associated with better average access, but it should not be treated as synonymous with adequate conditions. Girls in low-income settlements may live in crowded housing, depend on shared toilets, have irregular water supply, lack safe disposal options and face restricted control over household spending. These conditions produce a form of menstrual poverty that is multidimensional rather than purely financial.
The source manuscript on which this paper was developed identified Bhagalpur's below-poverty-line adolescent girls as a priority population. However, locally verified empirical evidence for this specific group is sparse. Accordingly, the present paper is framed as a structured narrative review rather than an original cross-sectional study. It synthesises the most relevant national, Bihar-specific and low-income urban evidence and translates it into an implementation and research agenda for Bhagalpur.

2. Review objectives

- To synthesise evidence on the knowledge, practices and material conditions that shape menstrual health among economically disadvantaged adolescent girls in India, with emphasis on Bihar and low-income urban settings.
- To assess the roles of poverty, education, social norms, menstrual materials, WASH infrastructure and access to health services.
- To critically examine health, psychosocial and educational consequences without overstating causal evidence.
- To review the relevance and limitations of current government programmes for urban Bhagalpur.
- To propose a feasible multisectoral intervention and monitoring framework and identify priorities for local primary research.

3. Methods

3.1 Review design and search strategy

A structured narrative review was conducted in June 2026. Searches were undertaken through PubMed and journal-publisher databases, supplemented by official publications from the International Institute for Population Sciences/NFHS, the Ministry of Health and Family Welfare, the National Health Mission, UNFPA, UNICEF and WHO. Search terms were combined around the concepts of menstruation or menstrual health, adolescent girls, menstrual hygiene management, India, Bihar, urban poverty or slums, menstrual products, WASH, school attendance, stigma and reproductive or urogenital infection.
Peer-reviewed studies were prioritised when they: (i) included adolescents or young women in India; (ii) analysed socioeconomic, urban-rural or WASH-related determinants; (iii) examined low-income settings; or (iv) evaluated health, educational or psychosocial outcomes. Systematic reviews and large NFHS analyses were used to establish broader patterns, while Bihar and low-income urban studies were used to strengthen contextual relevance. Government and United Nations documents were included to describe definitions, measurement and programme architecture. Sources with unverifiable bibliographic details were not used.

3.2 Synthesis and scope

Evidence was organised thematically rather than statistically pooled. The principal domains were knowledge and communication, material access and affordability, WASH and disposal, social norms and psychosocial experience, health outcomes, educational participation and

policy implementation. Because this was not a systematic review, no claim of exhaustive retrieval or formal risk-of-bias grading is made. Particular caution was applied to causal claims: cross-sectional associations were interpreted as associations, and intervention evidence was distinguished from observational evidence.

4. Findings and discussion

4.1 Menstrual knowledge, preparedness and communication

Knowledge before menarche is a foundational component of menstrual health. The Indian systematic review by van Eijk et al. (2016) found widespread deficits in pre-menarcheal awareness and considerable variation in knowledge, absorbent use, restrictions and school absence. A later meta-analysis similarly concluded that menstrual education can improve knowledge and reported practices, although study quality and outcome measures varied (Majeed et al., 2022). In practical terms, a girl who encounters her first menstruation without an explanation may interpret bleeding as injury or illness, experience avoidable fear and adopt practices based on secrecy rather than informed choice.

Mothers and older female relatives are frequently the first source of information, but intergenerational communication can reproduce inaccurate beliefs when adults themselves had limited education. Schools and health workers can correct misinformation, yet many programmes reach only girls who are present in school or attend a scheduled session. For economically disadvantaged urban communities, communication therefore needs multiple delivery points: schools, Anganwadi centres, urban primary health centres, adolescent health days, self-help groups and community outreach. Pre-menarcheal education should begin before age 10-12, be age appropriate and include basic physiology, cycle tracking, pain management, hygiene, red-flag symptoms and the right to seek help.

4.2 Access, affordability and informed choice of menstrual materials

Access to menstrual materials has improved, but 'use of a hygienic method' is not equivalent to reliable, comfortable and autonomous management. NFHS classifies locally prepared napkins, sanitary napkins, tampons and menstrual cups as hygienic methods, while cloth is categorised separately; respondents may report more than one method (UNFPA India, 2022). This indicator is useful for population monitoring but does not reveal whether a product is changed often enough, whether reusable materials can be washed and dried privately, whether a chosen method causes discomfort, or whether girls can obtain supplies every month.

Socioeconomic patterning is consistent across studies. Among rural adolescents, education, wealth and media exposure were strong predictors of exclusive hygienic-method use (Singh et al., 2022). NFHS-based analysis of urban adolescent girls also found that hygienic-method use was socially stratified, demonstrating that urban averages conceal disadvantaged groups (Roy et al., 2024). In low-income urban Delhi, Garg et al. (2022) reported substantial menstrual-management challenges despite proximity to services, supporting the view that affordability, knowledge and living conditions operate together.

Programmes should therefore avoid a one-product approach. Disposable pads may be appropriate for many users, but reliable monthly supply, comfort, quality and waste management matter. Reusable pads can reduce recurrent cost but require adequate water, soap, private drying space and clear cleaning instructions. Menstrual cups may be suitable for some older adolescents when counselling, water, privacy and voluntary informed choice are assured; they should not be imposed as a universal cost-saving solution. The central principle is acceptable, safe and affordable choice rather than distribution volume alone (UNICEF, 2019).

4.3 WASH, privacy and menstrual waste

Menstrual management is inseparable from water, sanitation and hygiene. A functional facility requires more than the presence of a toilet: it should be safe, sex-separated where appropriate, accessible, internally lockable, supplied with water and soap, adequately lit, and connected to a discreet disposal or collection system. Shared community toilets may be technically available but unusable during menstruation if queues are long, doors do not lock, water is absent or users fear harassment.

The WHO/UNICEF Joint Monitoring Programme continues to document major global gaps in school WASH and menstrual-health facilities, including incomplete provision of menstrual education and disposal bins (WHO and UNICEF, 2024). UNICEF's programming guidance likewise treats social support, knowledge, facilities and services, and menstrual materials as mutually reinforcing pillars (UNICEF, 2019). For Bhagalpur, ward-level assessment should therefore examine functionality at the time of use rather than infrastructure on paper. Household, community and school facilities all require attention because a girl may use different locations across the day.

Disposal deserves particular emphasis in dense urban settlements. Burning mixed waste in unsafe devices, flushing pads into toilets, or placing unwrapped materials in open dumps can create environmental and occupational hazards. A local protocol should specify covered bins, collection frequency, worker protection, final treatment consistent with applicable solid-waste rules, and communication that does not shame users. Product procurement and waste planning should be designed together.

4.4 Stigma, restrictions and psychosocial well-being

Menstrual stigma is sustained through euphemism, secrecy, ideas of impurity and restrictions on mobility, food preparation, worship or social contact. Some restrictions may be experienced as routine family practices, while others produce isolation, shame or loss of participation. The relevant public-health concern is not cultural difference in itself but whether girls are denied information, safety, dignity, education, nutrition or freedom from discrimination.

A supportive environment requires more than educating girls. Mothers, fathers, teachers, boys, community leaders, pharmacists and frontline workers influence whether menstruation can be discussed without ridicule. Interventions should normalise menstruation while protecting privacy. Boys' education should focus on respect, biology and prevention of teasing; it should not require girls to disclose personal menstrual information. Counselling and referral pathways are also needed for girls who experience severe anxiety, bullying, coercive restrictions or distress.

4.5 Physical health outcomes: evidence and limits

Poor menstrual management is frequently described as a cause of reproductive tract and urinary infections, but the evidence requires careful interpretation. An early systematic review found that many studies reported associations between poorer menstrual practices and reproductive tract infections, yet methods and outcome quality were heterogeneous (Sumpter and Torondel, 2013). A case-control study in Odisha identified associations among menstrual practices, WASH access and laboratory-assessed bacterial vaginosis or urinary tract infection (Das et al., 2015). A later hospital-based study also found associations between selected unhygienic practices and lower reproductive tract infections (Torondel et al., 2018).

These findings justify promoting clean materials, handwashing, safe washing and drying, and timely clinical care, but they do not support alarming claims that any use of cloth automatically causes infection. Clean reusable cloth or pads may be managed safely when washed, thoroughly dried and stored hygienically. Conversely, a commercially produced pad does not guarantee

good hygiene if it is worn for prolonged periods because supplies are scarce. Health education should distinguish evidence-based risk reduction from fear-based messaging.
Menstrual health services should also address problems that are not primarily hygiene-related. Severe dysmenorrhoea, very heavy or prolonged bleeding, fainting, symptoms of anaemia, persistent irregularity, genital symptoms or suspected endometriosis require assessment. A pad-distribution programme that lacks referral and pain-management guidance may miss the conditions most disruptive to a girl's daily life.

4.6 Education, attendance and participation

Menstruation can affect attendance through pain, fear of leakage, teasing, lack of changing facilities, inability to obtain materials or household restrictions. However, the size and causal direction of this effect vary across studies. Hennegan and Montgomery's (2016) systematic review found promising but insufficient evidence that menstrual-management interventions improve attendance and psychosocial outcomes, with substantial heterogeneity and risk of bias. It is therefore inappropriate to claim that pad provision alone will reliably eliminate school absence.
A more useful approach is to treat attendance as one of several participation outcomes. Schools should provide emergency materials, a private changing space, water, soap, disposal, permission to use toilets when needed, basic pain support and a non-punitive response to menstruation-related absence. Monitoring should include comfort, confidence, classroom participation and ability to manage menstruation at school, not only days absent.

4.7 The Bihar and urban-poor context

Bihar-specific evidence demonstrates that menstrual protection is strongly shaped by structural factors. Maharana (2022) showed that education, wealth, media exposure and improved sanitation explained much of the rural-urban gap in the state. A cross-sectional study among schoolgirls in rural Patna similarly identified gaps in knowledge and practice and highlighted the influence of family and educational factors (Singh et al., 2023). Although Bhagalpur is urban, these determinants remain relevant because low-income urban households may share the constraints typically associated with rural disadvantage while also facing high population density, insecure tenure and dependence on shared services.
The most important local evidence gap is the absence of a verified, representative study focused on BPL adolescent girls in Bhagalpur. State and national surveys cannot answer whether girls in particular wards have continuous water, private toilets, affordable preferred materials, pre-menarcheal education, safe waste disposal or access to treatment. The gap is especially serious for girls aged 10-14 years, out-of-school adolescents, girls with disabilities, migrants and girls not linked to Anganwadi or school platforms.

Table 1. Evidence synthesis and implications for urban Bhagalpur

Evidence domain	Synthesis of evidence	Implication for Bhagalpur
Knowledge and preparedness	Many girls reach menarche with incomplete knowledge; education generally improves knowledge and reported practice.	Provide pre-menarcheal education through schools, Anganwadi centres, community outreach and urban health services.
Materials and affordability	Use is strongly patterned by wealth and education; one-time distribution does not ensure reliable access or acceptability.	Offer a continuous, choice-based supply system with clear quality standards and emergency access.

Evidence domain	Synthesis of evidence	Implication for Bhagalpur
WASH and disposal	Privacy, water, soap, locks, lighting and disposal are integral to menstrual management.	Audit functionality of household, school and community toilets and establish a safe waste chain.
Social norms	Stigma and restrictions can reduce confidence, mobility and participation.	Engage families, teachers, boys and community leaders while protecting girls' privacy and autonomy.
Health	Associations with infection are plausible but mainly observational; menstrual disorders also require attention.	Use balanced hygiene messages and establish referral for pain, heavy bleeding, anaemia and genital symptoms.
Education and participation	Menstruation-related absence has multiple causes; intervention evidence is mixed.	Combine facilities, materials, supportive school rules, pain support and anti-bullying measures.
Data and equity	NFHS excludes 10-14-year-olds from menstrual-method indicators and urban averages mask poverty.	Collect ward-level data including younger, out-of-school, migrant and disabled adolescents.

5. Policy landscape and implementation gaps

India's Menstrual Hygiene Scheme was introduced to increase awareness, access to low-cost sanitary napkins and environmentally appropriate disposal among rural girls aged 10-19 years. The operational guidelines also recognised the need for community participation, ASHA involvement and convergence with sanitation and education programmes (Government of India, 2011). This design was important, but its original rural orientation creates a potential blind spot for poor urban adolescents who may be geographically close to markets while remaining unable to purchase products or use safe facilities.

The Government of India's Menstrual Hygiene Policy for School-Going Girls strengthens a multisectoral approach involving health, education, women and child development, drinking water and sanitation, and urban local bodies (Government of India, 2025). The policy direction is consistent with current global guidance, but implementation quality depends on budgets, supply reliability, facility maintenance, teacher capacity, waste systems and inclusion of girls who are absent or out of school.

For Bhagalpur, existing platforms can be connected rather than creating an entirely separate programme. Schools can deliver routine education and provide facilities; Anganwadi centres can reach younger and out-of-school girls; ASHAs and urban health workers can conduct household and group outreach; urban primary health centres can provide counselling and referral; and the municipal corporation can address public toilets and waste management. A named nodal mechanism is needed because menstrual health responsibilities otherwise become fragmented across departments.

6. Recommended intervention framework for Bhagalpur

A publishable evidence synthesis should lead to testable and measurable action. The proposed framework below is designed for phased implementation in low-income wards and should be refined with adolescents through participatory consultation.

Table 2. Proposed multisectoral intervention and monitoring framework

Component	Priority actions	Delivery platform	Illustrative indicators
Ward-level assessment	Map BPL clusters, schools, Anganwadi centres, toilets, water reliability, product sources and disposal routes.	Municipal corporation, urban health mission, schools and community groups.	Proportion of target wards with completed adolescent-informed MHH assessment.
Education and social support	Provide pre-menarcheal and continuing education; train teachers/frontline workers; engage parents and boys; prevent teasing.	Schools, Anganwadi centres, adolescent health days, ASHA/urban outreach.	Girls receiving education before menarche; trained personnel demonstrating competency; reported teasing.
Materials and choice	Ensure free/subsidised and emergency products; provide counselling on disposable and reusable options; monitor stock-outs.	Schools, Anganwadi centres, UPHCs, community outlets and self-help groups.	Monthly stock-out rate; proportion able to obtain preferred material when needed; user satisfaction.
WASH and disposal	Provide water, soap, privacy, locks, lighting, changing space and covered bins; define collection and final treatment.	Schools, community/public toilets, municipal solid-waste system.	Functional MHH-ready toilets; bin availability and collection adherence; user-reported privacy.
Clinical support	Offer first-line pain guidance, anaemia screening/referral and confidential assessment of heavy bleeding, irregularity or infection symptoms.	UPHCs, adolescent-friendly clinics, school health and referral hospitals.	Referral completion; adolescents receiving appropriate assessment; satisfaction with confidentiality.
Monitoring and accountability	Track outcomes by age, school status, disability and settlement; establish adolescent feedback and grievance channels.	District/municipal convergence committee.	Quarterly dashboard; resolved complaints; change in knowledge, confidence and ability to manage menstruation.

7. Priorities for primary research

A peer-reviewed empirical paper on Bhagalpur will require data generated through a documented protocol, not illustrative or model tables. A future study should use a community-based cross-sectional design with sampling from identified low-income wards and sufficient representation of school-going and out-of-school girls. Eligibility should be clearly defined, and the study should distinguish ages 10-14 and 15-19 because early adolescents are missing from NFHS menstrual-method estimates.

The questionnaire should use validated or transparently developed measures and separate the following constructs: menstrual knowledge; preparedness before menarche; material use and preference; frequency of changing; washing, drying and storage of reusable materials; household and school WASH; disposal; pain and bleeding symptoms; restrictions; psychosocial confidence; attendance and participation; and access to care. Direct observation of school or community WASH facilities can complement self-report. Any composite score should report item content, reliability, cut-offs and justification.

Analysis should begin with weighted descriptive statistics where appropriate, followed by pre-specified tests of association. Logistic or multilevel regression may be used only when the outcome, sample structure, confounders and model assumptions are defined in advance. Results should report effect estimates and confidence intervals, not only p-values. Ethical approval, assent, parental consent as locally required, privacy during interviews and a referral plan for disclosed health or safeguarding concerns are essential.

8. Strengths and limitations

This review integrates peer-reviewed evidence, large national datasets, Bihar-specific studies and current policy guidance, while explicitly separating association from causation. It also addresses a common problem in menstrual-health writing by distinguishing product use from the wider conditions required for menstrual health. The focus on economically disadvantaged urban adolescents highlights an equity gap that can be hidden within urban averages.

The review has limitations. It was structured but not systematic, did not include a formal quality appraisal and was restricted primarily to English-language sources. Evidence specifically from Bhagalpur was not identified, so recommendations are inferential and require local validation. NFHS indicators do not measure the full quality of menstrual management and exclude 10-14-year-olds from the menstrual-protection analysis. Finally, many health and education studies are cross-sectional, use heterogeneous definitions and may be affected by reporting bias.

9. Conclusion

Menstrual health among BPL adolescent girls in urban Bhagalpur should be understood as an issue of health, dignity, education, gender equity and urban services. National progress in hygienic-method use is encouraging, but it does not demonstrate that poor urban girls can obtain their preferred materials every month, change them privately, wash safely, dispose of waste, manage pain or seek respectful care. The evidence supports a combined strategy: accurate pre-menarcheal education, reliable and choice-based material access, functional WASH, safe disposal, stigma reduction and adolescent-responsive clinical referral.

The immediate priority is to establish a ward-level evidence base and implement a coordinated package through schools, Anganwadi centres, urban health services and municipal systems. Evaluation should measure girls' ability to manage menstruation safely and confidently, rather than relying only on the number of pads distributed. A future original research article should be based exclusively on verified field data collected under an approved methodology.

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