

# Menstrual Health and Hygiene Education in Secondary Schools: A Cross-sectional Analysis

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## ABSTRACT

**Introduction:** Menstrual Health and Hygiene (MHH) education is critical for adolescent girls' wellbeing; however, socio-cultural taboos and inadequate school-based programs in India hinder its effective implementation.

**Aim:** To evaluate MHH education practices across secondary schools affiliated with the Secondary School Certificate (SSC), Central Board of Secondary Education (CBSE), Indian Certificate of Secondary Education (ICSE), and International Baccalaureate (IB) boards in Pune, Maharashtra, India.

**Materials and Methods:** This cross-sectional study was conducted across all four zones of Pune district (North, South, East, and West), Maharashtra, India, from March to June 2022. The sample included 40 English-medium, co-educational secondary schools (12 SSC, 18 CBSE, 9 ICSE, and 1 IB). Schools were selected using disproportionate stratified random sampling from 68 approached institutions, yielding a response rate of 58.8%. A validated questionnaire (Cronbach's alpha=0.82) was administered to one science or biology teacher per school to assess curriculum integration, teaching methods, content delivery, male sensitisation, and session frequency. Data were analysed using descriptive statistics with Statistical

Package for the Social Sciences (SPSS) version 25.0, with significance set at  $p$ -value  $<0.05$ .

**Results:** Among the 40 schools, CBSE demonstrated the highest consent rate (18 schools; 90%) and the greatest management committee involvement (12 schools; 66.67%), whereas ICSE excelled in male student inclusion (eight schools; 88.89%). Overall, MHH education was compulsory in 23 schools (57.5%). Extracurricular activities were conducted in only two schools (5%). Lecture-based teaching predominated in SSC (four schools; 33.33%), CBSE (six schools; 33.33%), and ICSE (four schools; 44.44%), while the IB school relied exclusively on discussion-based teaching (one school; 100%). Most schools (30; 75%) conducted one to two sessions annually and 16 schools (40%) allocated no time for practical demonstrations.

**Conclusion:** MHH education in Pune's secondary schools primarily emphasises biological aspects but lacks practical training, extracurricular engagement, and assessment strategies. Board-specific strengths—such as CBSE's administrative support and ICSE's gender inclusion—offer valuable models for improvement. Standardised curricula, interactive teaching approaches, and enhanced male sensitisation are essential to improve MHH literacy and reduce stigma.

**Keywords:** Adolescents, Educational practices, Menstrual hygiene

## INTRODUCTION

Menstruation is a natural physiological process involving the cyclic shedding of the uterine lining through the vagina and is a critical aspect of female reproductive health, typically beginning at menarche between the ages of 10 and 16 years [1,2]. Despite its biological inevitability, inadequate education and poor menstrual hygiene practices pose significant risks to women's physical and mental wellbeing. Unhygienic practices—such as using unclean materials or improper disposal methods—are associated with Reproductive Tract Infections (RTIs), Urinary Tract Infections (UTIs), bacterial vaginosis, and pelvic inflammatory disease, which can result in long-term health consequences [3-6].

In India, menstruation remains shrouded in socio-cultural taboos, myths, and restrictions that exacerbate these risks, often portraying menstruation as impure or shameful [7,8]. These misconceptions lead to restrictive practices such as prohibitions on cooking, religious participation, or bathing during menstruation, thereby fostering negative attitudes and adverse health outcomes [9-11]. Adolescent girls, who spend a significant portion of their formative years in educational settings, are particularly vulnerable to the consequences of inadequate MHH knowledge. Studies indicate that poor menstrual hygiene practices and lack of access to adequate sanitation facilities in schools contribute to absenteeism, with girls missing up to 10-20% of school days annually due to menstruation, negatively impacting academic performance and self-esteem [12-14]. Psychological effects, including anxiety, embarrassment,

and depression, are also common, driven by societal stigma and insufficient education [15,16].

Schools serve as crucial platforms for shaping health behaviours and have the potential to provide accurate, scientifically grounded MHH education to address these challenges [17-19]. However, gaps persist in curriculum integration, teaching methodologies, and gender-inclusive approaches—particularly within India's diverse educational framework, where multiple boards operate with varying pedagogical priorities [20]. A cross-sectional study is warranted to assess the current status of MHH education across different educational boards in India. Previous research has highlighted inconsistencies in implementation, with urban schools often demonstrating better infrastructure but limited practical training compared to global standards [8,21]. This design offers a snapshot of prevailing practices and helps identify gaps in curriculum content, instructional methods, and institutional support across boards, thereby informing policy and targeted interventions [22].

By focusing on English-medium, co-educational secondary schools in Pune, Maharashtra, this study captured a diverse yet comparable population while addressing the lack of board-specific data in the Indian context. Additionally, the inclusion of male sensitisation reflects the growing recognition of gender-inclusive education as a strategy to reduce stigma and promote supportive environments [11,23]. This study aimed to examine existing MHH education practices, identify disparities across educational boards,

and generate evidence to guide improvements in menstrual health literacy and hygiene practices among adolescents.

## MATERIALS AND METHODS

A cross-sectional study was conducted in co-educational secondary schools across all four zones of Pune district (North, South, East, and West), Maharashtra, India, from March to June 2022, after obtaining approval from the Institutional Ethics Committee (IEC-SIOR/Agenda-068). Permission was obtained from the administrative authorities of each participating school. Informed consent was secured from all participating teachers, who were briefed on the study objectives, voluntary nature of participation, and confidentiality of responses. No personally identifiable information was collected, and all data were anonymised during analysis to ensure privacy.

**Sample size calculation:** The study employed a disproportionate stratified random sampling method to select schools, with stratification based on educational board affiliation (SSC, CBSE, ICSE, and IB). The sample size was determined to reflect the relative prevalence of these boards in Maharashtra, where SSC and CBSE schools are numerous, followed by ICSE, while IB schools are the least common.

Rather than calculating sample size based on statistical power, a pragmatic approach was adopted, targeting a total of 40 schools to balance feasibility with representation across boards. Disproportionate stratification ensured greater inclusion of SSC (12 schools) and CBSE (18 schools), followed by ICSE (9 schools), and IB (1 school), consistent with their distribution in the region. Initially, 68 schools were approached (20 SSC, 20 CBSE, 20 ICSE, and 8 IB) using random sampling within each stratum. Consent was obtained from 40 schools, yielding a response rate of 58.8% (40/68). The final sample comprised 12 SSC, 18 CBSE, 9 ICSE, and 1 IB school. One science or biology teacher per school who was involved in teaching MHH-related topics was selected as the respondent.

This sample was considered sufficient for descriptive analysis to identify trends in MHH education practices, with limitations acknowledged regarding the underrepresentation of IB schools.

### Inclusion criteria:

- Co-educational secondary schools affiliated with SSC, CBSE, ICSE, and IB boards;
- Schools located in Pune district with at least 10 years of establishment;
- English-medium schools offering a science or biology curriculum;
- Teachers actively involved in teaching MHH-related topics.

### Exclusion criteria:

- Single-sex schools;
- Schools established for less than 10 years;
- Non English-medium schools;
- Teachers not involved in MHH education.

## Study Procedure

A self-structured questionnaire was developed following an extensive literature review and consultations with five experts (three public health specialists and two educationists with over

10 years of experience in adolescent health and school curricula). Content validity was established through a two-round expert review process. Experts rated each item for relevance, clarity, and comprehensiveness using a 4-point Likert scale (1=not relevant to 4=highly relevant). Items scoring below 3 were revised or removed based on consensus, resulting in a content validity index of 0.85 [24].

The questionnaire consisted of four sections:

1. School management and infrastructure (e.g., management committees, availability of sanitary products, disposal facilities)
2. Curriculum content
3. Teaching-learning methods
4. Male sensitisation and extracurricular activities

It included closed-ended questions (yes/no and multiple-choice).

The tool was further validated through a pilot study involving five science teachers from non participating schools in Pune who shared demographic similarities with the study population. Although limited in size due to logistical constraints, the pilot assessed clarity, response time (average 15 minutes), and internal consistency, leading to minor revisions such as rephrasing ambiguous items. The Cronbach's alpha coefficient was 0.82, indicating good internal consistency and reliability for descriptive research purposes [24].

**Data collection procedure:** Data were collected between March and June 2022. The questionnaire was administered electronically via Google Forms to one science or biology teacher per school. Participants were given one week to respond, with follow-up reminders sent via email or phone. All 40 questionnaires were returned fully completed, resulting in a 100% completion rate among consenting schools.

## STATISTICAL ANALYSIS

Data were collected, entered, coded, and analysed using SPSS version 25.0 (IBM SPSS Statistics for Windows, Version 25.0, Armonk, NY: IBM Corp). Responses were stratified by educational board (SSC, CBSE, ICSE, and IB). Quantitative data were presented as frequencies and percentages.

## RESULTS

The sampling process and board-wise distribution of participating schools are presented in [Table/Fig-1].

Schools	Boards			
	SSC	CBSE	ICSE	IB
Number of schools approached (n=68)	20 (29.41%)	20 (29.41%)	20 (29.41%)	8 (11.76%)
Number of schools who gave consent (n=40)	12 (30%)	18 (45%)	9 (22.5%)	1 (2.5%)
Number of sample/questionnaire collected (n=40)	12 (30%)	18 (45%)	9 (22.5%)	1 (2.5%)

[Table/Fig-1]: Sampling process.

With respect to school management and teaching practices, Yes/No responses to seven questions related to MHH education—covering the presence of management committees, curriculum integration, extracurricular activities, and male student inclusion—were recorded [Table/Fig-2].

Questions	Boards							
	SSC		CBSE		ICSE		IB	
	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)
Presence of a school management committee	6 (50)	6 (50)	12 (66.67)	6 (33.33)	2 (22.22)	7 (77.78)	0	1 (100)
Is Menstrual Health and Hygiene (MHH) a compulsory part of the curriculum	8 (66.67)	4 (33.33)	8 (44.44)	10 (55.56)	6 (66.67)	3 (33.33)	1 (100)	0
Arrangement of extracurricular activities on Menstrual Health and Hygiene (MHH)	0	12 (100)	1 (5.56)	17 (94.44)	1 (11.11)	8 (88.89)	0	1 (100)

Voluntary participation of students in the extracurricular activities	0	12 (100)	2 (11.11)	16 (88.89)	3 (33.33)	6 (66.67)	0	1 (100)
Lectures by healthcare professionals	9 (75)	3 (25)	15 (83.33)	3 (16.67)	6 (66.67)	3 (33.33)	0	1 (100)
Inclusion of male students	6 (50)	6 (50)	9 (50)	9 (50)	8 (88.89)	1 (11.11)	1 (100)	0
Sensitisation of male students by common session	4 (33.33)	8 (66.67)	7 (38.89)	11 (61.11)	7 (77.78)	2 (22.22)	1 (100)	0

**[Table/Fig-2]:** Teaching-learning methods responses regarding Menstrual Health and Hygiene (MHH) in secondary schools.

For MHH content delivery, Yes/No responses to five areas—including anatomy, physiology, socio-cultural taboos, menstrual products, and assessment methods—were documented [Table/Fig-3].

## DISCUSSION

The findings depict an MHH education landscape that primarily emphasises biological content across secondary schools affiliated

Questions	Boards							
	SSC		CBSE		ICSE		IB	
	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)
Education about anatomy of female reproductive system	10 (83.33)	2 (16.67)	17 (94.44)	1 (5.56)	9 (100)	0	1 (100)	0
Education about physiology of menstruation	11 (91.67)	1 (8.33)	16 (88.89)	2 (11.11)	8 (88.89)	1 (11.11)	1 (100)	0
Education about taboos related to menstruation	10 (83.33)	2 (16.67)	14 (77.78)	4 (22.22)	6 (66.67)	3 (33.33)	1 (100)	0
Various menstrual products	10 (83.33)	2 (16.67)	15 (83.33)	3 (16.67)	5 (55.55)	4 (44.44)	1 (100)	0
Assessment of sessions/Tests conducted for knowledge level	0	12 (100)	0	18 (100)	0	9 (100)	0	1 (100)

**[Table/Fig-3]:** Teaching-learning content delivery responses regarding Menstrual Health and Hygiene (MHH) in secondary schools.

The primary teaching modes used for MHH education (lecture-based, discussion-based, audiovisual aids, and others) were also analysed [Table/Fig-4].

Topics addressed under MHH—such as proper disposal, personal cleanliness, disease prevention, comprehensive coverage, or none—were reported [Table/Fig-5]. Additionally, the frequency of MHH educational activities and the time allocated annually for theoretical lectures and practical demonstrations were recorded [Table/Fig-6].

Modes	Boards n (%)			
	SSC	CBSE	ICSE	IB
Lectures	4 (33.33)	6 (33.33)	4 (44.44)	0
Discussion based	4 (33.33)	5 (27.78)	2 (22.22)	1 (100)
Audiovisual aid	4 (33.33)	5 (27.78)	2 (22.22)	0
Others	0	2 (11.11%)	1 (11.11)	0

**[Table/Fig-4]:** Primary mode of teaching the topic of Menstrual Health and Hygiene (MHH).

Topics	Boards n (%)			
	SSC	CBSE	ICSE	IB
Proper disposal techniques for menstrual products	3 (25)	5 (27.78)	2 (22.22)	0
Cleanliness of intimate parts	6 (50)	4 (22.22)	1 (11.11)	0
Diseases caused due to unhygienic practices	2 (16.67)	5 (27.78)	4 (44.44)	0
Others - all	1 (8.33)	3 (16.67)	2 (22.22)	1 (100)
Others - none	0	1 (5.56)	0	0

**[Table/Fig-5]:** Topics covered under Menstrual Health and Hygiene (MHH).

'Others - all' denotes schools covering all MHH topics comprehensively;

'Others - none' denotes schools covering none of the listed topics

Questions		Boards n (%)			
		SSC	CBSE	ICSE	IB
Frequency of educational activities (In a year)	0 sessions	1 (8.33)	1 (5.56)	1 (11.11)	0
	1-2 sessions	10 (83.33)	13 (72.22)	7 (77.78)	0
	2-3 sessions	1 (8.33)	4 (22.22)	0	1 (100)
	More than 3 sessions	0	0	1 (11.11)	0
Time allotment for theory lectures (In a year)	0 hour	0	1 (5.56)	1 (11.11)	0
	1 hour	7 (58.33)	11 (61.11)	4 (44.45)	0
	2 hours	4 (33.33)	3 (16.67)	2 (22.22)	1 (100)
	3 hours	1 (8.33)	2 (11.11)	0	0
	More than 3 hours	0	1 (5.56)	2 (22.22)	0

with the SSC, CBSE, ICSE, and IB boards in Pune, Maharashtra, India. It aimed to elucidate existing practices, highlight disparities among boards, and generate evidence to guide targeted improvements in menstrual health literacy and hygiene practices among adolescents.

Overall, the findings depict an MHH education landscape that primarily emphasises biological content—particularly anatomy and physiology—while revealing significant gaps in practical training, extracurricular engagement, and assessment strategies. Board-specific strengths were observed, including stronger administrative involvement in CBSE schools and greater male student inclusion in ICSE schools. The single IB school's reliance on discussion-based teaching suggests the potential for more holistic approaches; however, its limited representation restricts generalisability.

Regarding the presence of school management committees focused on MHH, the majority of CBSE schools reported having such structures, compared with approximately half of SSC schools, fewer ICSE schools, and none of the IB school. This variation indicates differing levels of institutional prioritisation. These findings align with Sharma N et al., who noted that urban schools with structured governance tend to place greater emphasis on MHH [2], but they also highlight inconsistencies in support. Possible explanations include CBSE's centralised guidelines promoting oversight, ICSE's emphasis on integrated curricula, and IB's more flexible administrative frameworks that may not prioritise formal committees.

Curriculum integration revealed that MHH education was compulsory in most SSC and ICSE schools but optional in many CBSE institutions, reflecting board-level differences in instructional mandates. This reflects board-level differences in instructional mandates, consistent with documented variations in Indian educational policy. The

Time allotment for practical demonstrations (In a year)	0 hour	6 (50)	7 (38.89)	3 (33.33)	0
	1 hour	4 (33.33)	9 (50)	4 (44.45)	1 (100)
	2 hours	1 (8.33)	0	0	0
	3 hours	1 (8.33)	0	0	0
	More than 3 hours	0	2 (11.11)	2 (22.22)	0

**Table/Fig-6:** Frequency and time duration allocated for teaching the topic of Menstrual Health and Hygiene (MHH) in a year.

disparity may stem from SSC's state-regulated requirements versus CBSE's school-level flexibility, allowing customised but uneven implementation.

Extracurricular activities related to MHH were infrequent across all boards, indicating minimal engagement beyond classroom instruction. This trend corresponds with findings by Dasgupta A and Sarkar M, who reported limited community-based initiatives in West Bengal schools [5], likely attributable to resource constraints and academic pressures prioritising core subjects.

Notably, formal assessments of MHH knowledge were absent in all participating schools, pointing to a lack of evaluation mechanisms. This contrasts with the findings of Arora A et al., who demonstrated improved knowledge retention through structured assessments [18]. The absence of evaluation may be due to MHH topics not being examinable under most boards, reducing institutional accountability.

Content delivery predominantly focused on anatomy and physiology across nearly all schools, with inclusion of socio-cultural taboos but comparatively less emphasis on practical aspects such as menstrual product use and hygiene practices. This biological focus was consistent with observations by Santhanakrishnan I and Athipathy V in Tamil Nadu schools [17], while the identified gaps in practical knowledge mirror the deficiencies noted by Dasgupta A and Sarkar M [5]. These shortcomings may result from examination-oriented curricula that prioritise theoretical content, with ICSE's integrated approach potentially dispersing focus across multiple health topics.

Male student inclusion and joint sensitisation sessions were more common in ICSE schools than in other boards, indicating more progressive gender practices within this system. This inclusive approach echoes Langer et al.,'s identification of cultural barriers to male involvement, particularly in rural settings [10]; however, ICSE's emphasis on inclusive pedagogy may more effectively counteract such challenges. Teaching methods relied predominantly on lectures in SSC, CBSE, and ICSE schools, while discussion-based approaches were favoured in the IB school. The dominance of lectures reflects findings on traditional pedagogical methods in South Indian education [6], whereas the IB approach supports Srinivasan et al.,'s call for interactive strategies to enhance student engagement [11]. These differences may be attributed to entrenched teacher training practices that emphasise rote learning in most boards, contrasted with IB's inquiry-driven educational philosophy.

Topic coverage was fragmented, with elements such as proper disposal, personal cleanliness, and disease prevention addressed inconsistently, and only a few schools covering all aspects comprehensively. This variability parallels Thakre SB et al., reports of uneven hygiene education [8] and may stem from the absence of standardised guidelines across educational boards, resulting in selective topic emphasis.

The frequency of MHH sessions was generally low, with most schools conducting only one or two sessions annually and many allocating no time for practical demonstrations. This limited exposure aligns with concerns raised by Langer B et al., regarding insufficient instructional duration in rural schools [10], potentially driven by crowded academic schedules and a lack of trained facilitators for hands-on activities.

In summary, the study highlights a strong focus on the biological dimensions of MHH education but reveals significant deficiencies

in practical training, extracurricular engagement, and assessment mechanisms, with notable variation across educational boards. Strengths such as CBSE's administrative involvement and ICSE's gender-inclusive practices are evident, while the IB school's holistic, discussion-based approach—though limited in representation—offers a potential model for enhancement. Accordingly, health professionals and educators should advocate for standardised and comprehensive MHH curricula that incorporate practical instruction on menstrual product use and disposal, formal assessment frameworks to ensure accountability, and increased male sensitisation to promote gender-inclusive attitudes. Community-based extracurricular initiatives and teacher training in interactive methodologies (e.g., discussions and audiovisual tools) may further improve student engagement and address prevailing cultural taboos, ultimately enhancing menstrual health outcomes and reducing stigma among adolescents.

### Limitation(s)

Although this study provides valuable insights into MHH education practices across secondary schools in Pune, Maharashtra, several limitations should be acknowledged. The extremely small sample size for the International Baccalaureate (IB) board ( $n = 1$ ) significantly limits the generalisability of findings for this group. Moreover, the exclusive focus on English-medium, co-educational schools with a minimum of 10 years of establishment excludes rural institutions, vernacular-medium schools, and newer educational settings, thereby restricting broader applicability. Future research should adopt mixed-methods approaches, larger and more representative samples, and longitudinal designs to strengthen the robustness and depth of findings.

### CONCLUSION(S)

This study demonstrated that MHH education in secondary schools predominantly emphasised biological aspects while inadequately addressing practical training, extracurricular involvement, and formal assessments. Board-specific variations were evident, including stronger administrative support in CBSE schools and greater male inclusion in ICSE schools, while traditional lecture-based instruction and infrequent sessions prevailed across most boards. The interactive, discussion-oriented approach observed in the IB school presents a promising alternative, though its limited representation constrains wider inference. Persistent systemic challenges—including institutional under-prioritisation and cultural resistance to inclusive practices—particularly within SSC and CBSE contexts, further hinder effective implementation. These findings underscore the urgent need for unified and comprehensive MHH curricula that integrate hands-on skills, evaluation mechanisms, and community engagement to enhance learning outcomes and challenge entrenched taboos. Additionally, prioritising teacher training in dynamic instructional techniques, increasing session frequency, and strengthening gender sensitisation initiatives will help cultivate supportive educational environments and improve menstrual health literacy among adolescents.

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