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# A Comparative Study of Menstrual Hygiene Knowledge and Practices among International and Government School going Adolescent Girls in Delhi

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## ABSTRACT

**Introduction:** Menstrual Hygiene Management (MHM) involves using clean absorbents, maintaining body hygiene, and practicing safe disposal methods. This study aimed to compare the knowledge and MHM practices of adolescent school girls from an urban and a slum area in Delhi.

**Methods:** The study included 85 and 168 girls aged 13-18 years from an urban and a slum area school of Delhi respectively. Information was gathered using a pre-designed, pre-tested and structured questionnaire with 12 questions related to the knowledge about menstruation and MHM practices.

**Results:** 92.9% of urban and 85.7% of slum area school girls knew menstruation as a physiological process whereas 3.5% of urban school girls were unaware of the cause of menstruation compared to13.7% of the slum area school girls(p=0.01). All girls identified sanitary pads as their ideal absorbent, and 100% of the participants used them. Satisfactory cleaning practices were 31.8% in urban area verses 4.8% in slum area school girls. (p = 0.0001). 95.3% of urban and 92.8% of slum area school girls were disposing pads in routine waste.

**Conclusion:** The study found significant differences in menstrual knowledge and MHM practices between urban and slum area school girls, with urban girls reporting comparatively better knowledge as well as MHM practices. Both the group of girls reported 100% usage of sanitary pads, but improper disposal practices need attention. Proper disposal facilities in schools are recommended to prevent environmental pollution.

**Key Words:** Adolescent School Girls, Urban area, Slum area, Menstrual Hygiene Management, Delhi, Environmental Pollution

## INTRODUCTION

UNICEF and WHO's Joint Monitoring Program for Menstrual Hygiene Management (MHM) includes ensuring that women and adolescent girls use clean absorbent materials, wash their bodies with soap and water, and have access to safe and hygienic disposal practices.[1]

UNICEF mentions a list of menstrual hygiene absorbents.[1] Several factors determine the choice of menstrual hygiene material by women and adolescent girls, such as unawareness, cultural practices, cost, preferred method of use and concerns about disposal.[2] Hence, there is no single material that can be universally used by all women and adolescent girls.

It is quite surprising to find that, even today, a large population of girls and women still use unhygienic absorbents, including old cloths, rags and cotton, wool pieces, ash, tissue paper, socks, dried leaves and even cow dung.[3,4,5] They have a higher chance of leakage and can lead to reproductive tract infections (RTIs).[6]

MHM additionally includes use of soap and water for cleaning.[1] The availability of private place and proper toilet facilities with water supply is essential for good MHM. Various studies from India and Nepal show that during menstruation, girls hesitate to attend school due to fear of stains and lack of water and proper toilet facilities in school premises.[7,8]

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Safe disposal of menstrual absorbent is also an integral part of menstrual hygiene.[1] In urban areas, disposing it in the dustbin and treating as solid waste is a common practice, while in rural areas, burning and using pit latrines are more common methods.[9] Some sanitary pads contain chlorine bleach which when burned leads to production of dioxin which is a carcinogen.[10,11,12]

Use of biodegradable sanitary pads reduces the burden of environmental harm.[13] It is essential to promote safe disposal in order to prevent environmental damage. Installation of incinerators in the schools would promote safe disposal and encourage girls to change their pads frequently.[14]

This study aims at identifying the differences in the age of menarche, MHM practices, sources of information regarding menstruation, and patterns of disposal among urban international school girls and government school girls in slum area of Delhi. There is a lack of comparative data on this topic in Indian population, making this research particularly significant.

## OBJECTIVE

To assess and compare the menstrual hygiene knowledge and practices among urban and slum area school going adolescent girls.

## MATERIAL AND METHODS

**Study Design and Data Collection:** Our study was a cross-sectional observational study. Data was collected from international school going adolescent girls (ISGAG) from an urban area in Dwarka, Delhi and Government school going adolescent girls (GSGAG) from a slum area in Ashok Nagar, Delhi. Study was conducted from August 2018 to September 2018.

The data collection was initiated after getting approval from the Institutional ethics committee (IEC) for human research (IEC Letter no. LHMC/ECHR/2018/42). We are presenting here a part of research.

**Study population:** The study group comprised of 85 and 168 ISGAG from urban area and GSGAG from slum area respectively. The girls from class 8$^{th}$ to 12$^{th}$ of age between 13-18 years were included in the study.

**Study tool:** A pre-designed, pre-tested and structured questionnaire[15] which included 4 demographic questions and 12 questions related to the perception and knowledge about menstruation and MHM practices was used in this study. Informed consent was taken from the students and they were asked to fill the demographic profile and mark answers of the two parts of the questionnaire after explaining about the type of answer to be given for each part of questionnaire.

**Inclusion criteria:** Healthy school-going girls, who were willing to participate and had given informed consent.

**Exclusion criteria:** Girls suffering from any known major physical and mental illness and those not willing to participate were excluded from this study.

### 6Statistical Analysis:

Data was collected in Microsoft Excel (2016) and was statistically analysed using SPSS software. Student t test was used to analyse the difference in mean age of participants and mean age of menarche of the two groups of participants. Chi-Square test was conducted to determine the association between independent and dependent variable. Probability (p) values were calculated to test for statistical significance at the 5% level.

## RESULTS

Our study included 85 healthy school-going adolescent girls from urban international school and 168 from government school in slum area of Delhi.

**Table 1** demonstrates the demographic characteristics of the study respondents. The mean age of the ISGAG was 15.07±1.36 years and 15.35± 1.19 years for GSGAG (p=0.097). The mean age of menarche was found to be 11.85 ± 0.87 years and 13.11 ± 0.91 years respectively (p value <0.0001) **[Fig 1].** A significant difference in the socio-economic status (p=0.029) was observed between the two groups. Wherein all ISGAG were above poverty line whereas 7.73% of the GSGAG were below poverty line (BPL). [16] For the cut-off for BPL, students and families holding government-issued BPL cards were taken into consideration. The educational status of mothers in international school group was significantly better as compared to government school group (p=0.0001) **[Fig 2].**

**Table 2** shows the difference in awareness before menarche, sources of information, and knowledge about menstruation between the two groups. A large number of students were aware of menstruation before menarche (83.5% in ISGAG and 79.8% in GSGAG). Mothers were the first informants for 77.6% of ISGAG and 66.7% of GSGAG, while friends were the first informants for 17.6% of ISGAG and 16.7% of GSGAG. Most girls knew that menstruation is a physiological process, with 92.9% in ISGAG and 85.7% in GSGAG. However, proper knowledge about menstruation was still lacking, as only 30.6% of ISGAG and 30.9% of GSGAG knew that uterus is the source of menstrual blood. Meanwhile, 61.2% of ISGAG and 60.7% of GSGAG incorrectly identified the urethra/vagina as the source of menstrual blood, indicating a significant gap in knowledge

**Table 3** shows the practices regarding menstrual hygiene. No difference was observed for the use of absorbent material as all the participants in both the groups used sanitary pads during menstruation. Only 4.8% girls of GSGAG and 31.8% girls of ISGAG have reported satisfactory wash practice (>2 times in a day). 95.2% of GSGAG have reported unsatisfactory wash practice (<2 times in a day) as compared to 68.2% of ISGAG (p=0.0001) **[Fig 3].** 30.6% girls of ISGAG and 10.7% girls of GSGAG use only water for cleaning the external genitalia. Soap and water were used by 48.2% of ISGAG and 66.1% of GSGAG, while antiseptics were used by 21.2% of ISGAG and 23.2% of GSGAG **[Fig 4].**

Disposal practices of used absorbents were similar in both groups, with 95.3% of ISGAG and 92.8% of GSGAG disposing of them in routine waste. Burning used absorbents was reported by 1.2% of ISGAG and 1.8% of GSGAG.

74.1% ISGAG and 72.6% GSGAG changed absorbents at school. More than seven pads were used during the last menstrual period by 34.1% of ISGAG and 38.7% of GSGAG. In contrast, 65.9% of ISGAG and 61.3% of GSGAG used 1-6 pads during their last menstrual period. Another important finding was that 3% of GSGAG reported not having toilet facilities at home.

## DISCUSSION

Besides the cultural, religious and socio demographic diversity is very profound in India. Our study includes girls from one of the International schools in the capital of India, while the other group was from a Government school from slum background of Delhi. Data was collected to see the difference in knowledge about menstruation and MHM practices between the two groups.

The mean age of the ISGAG was 15.07±1.36 years and 15.35± 1.19 years for GSGAG. The World Health Organisation (WHO) defines the age group of 10 to 19 as adolescence. During adolescence, in addition to physiological changes, a girl also experiences emotional and developmental changes. These are important determining factors for a healthy adulthood.[17]

In our study, it was observed that ISGAG had an earlier onset of menarche (11.85±0.87 years) compared to GSGAG (13.11±0.91 years) (p=0.0001) **[Table 1]**. This finding is similar to a review report by Leone T. et al.[18] and a recent study done in India by Meher T. et al.[19], which show a strong link between socioeconomic status and the earlier onset of menarche.

A significant difference (p=0.029) with respect to sociodemographic status **[Table 1]** was observed, wherein 7.73% of students in GSGAG belongs to the families who were Below Poverty Line (BPL)[15] whereas all the students were above the poverty line in ISGAG. The educational status of the mothers of ISGAG students was significantly better (p=0.0001) compared to that of the mothers of GSGAG students, with 88.24% of ISGAG students' mothers holding an undergraduate degree or higher. The higher literacy rate among mothers of ISGAG group likely contributes to a healthier discussion about MHM, which can reduce complications such as RTIs. This highlights the importance of promoting women's education in India and globally.

In addition to examining the socio-demographic characteristics of the two groups, questions regarding information about menarche and perceptions about menstruation were asked from study participants in both groups. **[Table 2]** Both groups of girls were quite aware of menstruation even before menarche, with no significant difference between the two groups (p = 0.47). Statistically significant differences were observed when participants were asked about the cause of menstruation. Though most of the girls knew that menstruation is a physiological process in both the ISGAG and GSGAG groups, nonetheless, 3.5% of ISGAG were unaware of the cause of menstruation, compared to 13.7% in the GSGAG group (p=0.01). Previous studies have often reported widespread misconceptions about this normal physiological process.[20,21,22] Our study shows a decrease in misconceptions such as 'Menstruation is a curse of God,' with only 0.6% of participants from GSGAG and 3.6% of participants from ISGAG holding this belief.

When asked about the source of their information regarding menstruation **[Table 2]**, 66.7% in GSGAG and 77.6% in ISGAG mentioned, mothers were their main source of information. Other studies from India by Chanda-Mouli et al., and Anna Maria et al. have also reported mothers as the main source of information.[23, 24] A higher percentage of girls from GSGAG (16.6%) reported getting information from other sources as compared to ISGAG (4.8%). Studies from other parts of the world, like Egypt[25] and Nigeria[26] have reported that a very high percentage of girls (92.2% and 72.4%, respectively) use mass media as their main source of menstruation-related information. In India, the role of mass media cannot be overlooked, given the increasing use of social media and the internet. Studies show Indian youths spend up to 50 hours a week on social networking sites.[27]

The successful use of the 'Aarogya Setu' app by the Indian government during the COVID-19 pandemic to track individuals' vaccine status is well known.[28] In a similar way ideas for developing a systematic mass media platform for Indian school-going girls to promote MHM could be beneficial and a similar app may be designed to distribute knowledge regarding MHM to young school girls, which would enhance their knowledge.

Regarding knowledge about the source of menstrual blood, no statistically significant difference was observed between

the two groups, as they had nearly equal percentages of students stating that the source of menstrual blood is the urethra or vagina. **[Table 2]**. Only 30.5% of ISGAG and 30.9% of GSGAG girls correctly knew that the uterus is the source of menstrual blood. Some of the girls were completely unaware of the source of bleeding, though their numbers were low (8.2% in ISGAG and 8.4% in GSGAG). The observations regarding menstrual knowledge in our study was in concordance with findings from other studies done in various low and middle-income countries (LMICs)[20,29,30] and various states of India[15, 31, 32], where the knowledge about menstruation was often inadequate.

UNICEF lists various menstrual hygiene materials that can be used.[1] None of the previous studies conducted in India have shown 100% use of sanitary napkins as an absorbent either in rural or urban settings.[24] In contrast, our study found that all the subjects in both groups reported using sanitary pads as the absorbent material **[Table 3].** This shows successful implementation of government schemes and various awareness campaigns especially the initiative taken in the year 2011 by the Indian government for the distribution of absorbents in schools.[33]

MHM is not only about using a clean menstrual management material but also includes using soap and water for washing external genitalia. Further questioning in our study regarding satisfactory/unsatisfactory washing, material used for washing, disposal of soiled waste, changing of sanitary pads in school, and the total number of absorbents used during the last menstrual period revealed significant findings. **[Table 3]**

A statistically significant difference was observed (p=0.0001) between the two groups in cleaning practices. In ISGAG, 31.8% of girls reported satisfactory cleaning of external genitalia (cleaning more than twice a day during menstruation), compared to 4.8% in GSGAG. The girls were also asked about the type of material used for washing: 1) only water, 2) soap and water, and 3) antiseptics. A statistically significant difference was observed (p=0.0001) between the two groups. 30.6% of ISGAG used only water for washing as compared to 10.7% of GSGAG. GSGAG had a higher percentage of girls using soap and water (66.1%) compared to 48.2% in ISGAG. The use of antiseptics for washing was reported by 21.2% of ISGAG and 23.2% of GSGAG.

The percentage of students changing absorbents in school was similar, with 74.1% in ISGAG and 72.6% in GSGAG. This indirectly indicates the availability of proper Water, Sanitation, and Hygiene (WASH) [34] facilities in both schools.

Most girls from both groups used 1-6 absorbent materials during their last menstrual period **[Table 3].** The number of absorbents used by participants depends not only on the availability of absorbents but also on individual variations in menstrual flow. Average, normal menstrual flow has a broad range, but above 80 mL per day is considered abnormal heavy menstrual bleeding. Menstrual bleeding typically lasts 4-7 days. [35]

In our study, the most common practice for disposing of sanitary pads was to discard them in routine waste (ISGAG: 95.3%; GSGAG: 92.8%). A small percentage of girls (1.17% from ISGAG and 1.78% from GSGAG) burned the used pads, while 3.5% of ISGAG and 5.4% of GSGAG used other methods of disposal besides throwing in routine waste and burning.

In urban areas, sanitary pads are a popular choice, but they are difficult to decompose due to chemicals such as organochlorines and are non-biodegradable. Incineration is considered a better option for disposing of menstrual waste[13], but incinerators must operate at optimal temperatures to prevent the release of harmful gases.[36]

According to the joint WHO-UNICEF baseline report of 2018 merely 36% of schools in India had functional incinerators for sanitary waste disposal. Mizoram is the only state where more than 50% of schools have an operational incinerator for sanitary waste disposal.[37]

As mentioned above, all the girls in our study were using sanitary pad during their periods, which is a good indication for MHM awareness among the school girls in International as well as Government school background. However, an alarming aspect of our study is the faulty disposal of menstrual absorbents. Efforts should be made to find more eco-friendly alternatives and to implement proper disposal methods in schools as well as in communities. Another concerning finding was that 3% of girls from GSGAG did not have any toilet facilities at home. This is a significant concern, especially in the context of the goal to provide Menstrual Hygiene Management (MHM) facilities to all girls by 2024.[37]

## CONCLUSION

Our study findings highlight the importance of menstruation-related knowledge, the use of hygienic absorbents, and the proper, environmentally conscious disposal of the used absorbents in two socioeconomically diverse groups of adolescent school girls. The use of sanitary pads by all the participants is a definite indicator of increasing MHM awareness and demonstrates the successful implementation of government schemes, particularly the initiative started by the Indian Government in 2011 for the distribution of absorbents in schools. However, this may not be the scenario in every part of India, as this study represents only a small area of Delhi, which itself is the capital of India. For increasing awareness of MHM amongst school going adolescents, social media platform can also be effectively utilized by the government. It is important to draw the attention of environmentalists and policymakers to the need of

the hour: creating a balance between use of absorbents with good absorbing capacity and low environmental impact, as improper sanitary pads disposal can dramatically increase the environmental pollution levels.

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**Conflict of interest:** On behalf of all authors, the corresponding author states that there is no conflict of interest.

**Authors' Contribution:**

**Dr. Swapna Sarangi:** Contributed to the design of the study, acquisition, and analysis of the data. Drafted the initial version manuscript under the co-authors' guidance

**Dr. Mary Vibha Lakra:** Conceived the idea and designed the study. Analyzed the data and contributed to drafting and revising the manuscript.

**Dr. Sujata Gautam:** Analyzed the data and participated in drafting the manuscript and providing suggestions for corrections and improvements.

**Dr. Sunita Mondal:** Reviewed the manuscript and contributed to improving the manuscript.

**Dr. Rajiv Bandhu:** Reviewing the analyzed data and the tests of significance applied on the data.

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**Table 1: Demographic parameters of the study participants in both groups**

| Categories | Subcategories | ISGAG (n=85) | GSGAG (n=168) | p-value |
|---|---|---|---|---|
| **Age in Years (Mean± SD)** | | 15.07±1.36 | 15.35± 1.19 | 0.097 |
| **Economic Status** | | | | |
| | APL | 85 (100%) | 155 (92.26%) | 0.029 |
| | BPL | 0 | 13 (7.73%) | |
| **Education of Mother** | | | | |
| | Illiterate | 0 | 3 (1.79%) | |
| | Primary | 0 | 1 (0.6%) | |
| | Middle | 0 | 22 (13.09%) | 0.0001 |
| | Secondary School | 0 | 49 (29.17%) | |
| | Higher secondary | 10 (11.76%) | 66 (39.29%) | |
| | Degree and above | 75 (88.24%) | 27 (16.06%) | |

**Number (%),*p<0.05 is significant**

ISGAG : International School-going Adolescent Girls; GSGAG : Government School-going Adolescent Girls

**Table 2: Comparison of Information about menarche & Perception about menstruation of the study participants in both groups.**

| | | ISGAG (N=85) | GSGAG (N=168) | Chi Square | p-value |
|---|---|---|---|---|---|
| Age of Menarche (Mean ± SD) | | 11.85± 0.87 | 13.11± 0.91 | ---- | 0.0001* |
| Awareness about Menstruation before menarche | | | | | |
| | Yes | 71 (83.5%) | 134(79.8%) | 0.521 | 0.47 |
| | No | 14(16.5%) | 34 (20.2%) | | |
| Source of Information before menarche | | | | | |
| | Mother | 66 (77.6%) | 112(66.7%) | 7.38 | 0.025* |
| | Friend | 15 (17.6%) | 28(16.7%) | | |
| | Other | 4 (4.8%) | 28(16.6%) | | |
| What is the cause of Menstruation ? | | | | | |
| | Don't Know | 3 (3.5%) | 23 (13.7%) | 9.07 | 0.01* |
| | Physiological Process | 79 (92.9%) | 144(85.7%) | | |
| | Curse of God | 3 (3.6%) | 1(0.6%) | | |
| Source of menstrual blood? | | | | | |
| | Don't Know | 7(8.2%) | 14(8.4%) | 0.002 | 0.99 |
| | Urethra/Vagina | 52(61.2%) | 102 (60.7%) | | |
| | Uterus | 26(30.6%) | 52 (30.9%) | | |
| What absorbent ideally to be used during menstruation? (n,%) | | | | | |
| | Sanitary Pad | 85(100%) | 168 (100%) | -- | -- |
| | Cloth | 0 | 0 | | |

Number (%),*p<0.05 is significant

ISGAG : International School-going Adolescent Girls; GSGAG : Government School-going Adolescent Girls

**Table 3: Practices Regarding Menstrual Hygiene of the Study Participants in both groups.**

| Categories | Sub-categories | ISGAG (n=85) | GSGAG (n=168) | Chi Square | p-value |
|---|---|---|---|---|---|
| Use of absorbent Material During Menstruation | | | | | |
| | Sanitary Pad | 85 (100%) | 168(100%) | | |
| | Old Cloth | -- | -- | -- | -- |
| | New Cloth | -- | -- | | |
| Cleaning of external genitalia | | | | | |
| | Unsatisfactory** | 58 (68.2%) | 160 (95.2%) | 34.52 | 0.0001* |
| | Satisfactory* | 27 (31.8%) | 8 (4.8%) | | |
| Material used for cleaning external genitalia | | | | | |

**Table 3:** ***(Continued)***

| Categories | Sub-categories | ISGAG (n=85) | GSGAG (n=168) | Chi Square | p-value |
|---|---|---|---|---|---|
| | Only water | 26 (30.6%) | 18 (10.7%) | | |
| | Soap and Water | 41 (48.2%) | 111 (66.1%) | 15.91 | 0.0001* |
| | Antiseptic | 18 (21.2%) | 39 (23.2%) | | |
| Method of Disposal | | | | | |
| | Throw it in routine Waste | 81(95.3%) | 156(92.8%) | | |
| | Burn it | 1 (1.2%) | 3 (1.8%) | 0.56 | 0.75 |
| | Others (Don't dispose/ Flush/Hide) | 3 (3.5%) | 9 (5.4%) | | |
| Change of Pad in school | | | | | |
| | Yes | 63 (74.1%) | 122 (72.6%) | 0.064 | 0.8 |
| | No | 22 (25.9%) | 46 (27.4%) | | |
| Number of absorbent used during the last menstrual cycle | | | | | |
| | 1 to 6 | 56 (65.9%) | 103 (61.3%) | 0.505 | 0.477 |
| | >or= 7 | 29 (34.1%) | 65 (38.7%) | | |
| Toilet facility at home | | | | | |
| | Yes | 85 (100%) | 163 (97%) | 2.58 | 0.1 |
| | No | 0 | 5 (3%) | | |

*Satisfactory: Cleaning of external genitalia more than two times in a day during menstruation.

**Unsatisfactory: Cleaning of external genitalia less than or equal to two times in a day during menstruation

Number (%),*p<0.05 is significant

ISGAG : International School-going Adolescent Girls; GSGAG : Government School-going Adolescent Girls

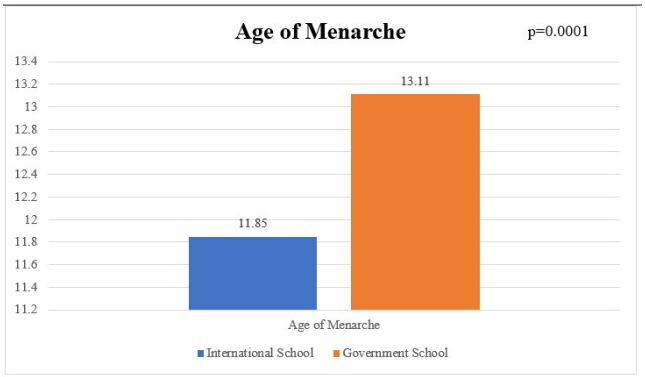


**Figure 1:** Comparison of Age of Menarche between adolescent girls attending International School and Government School

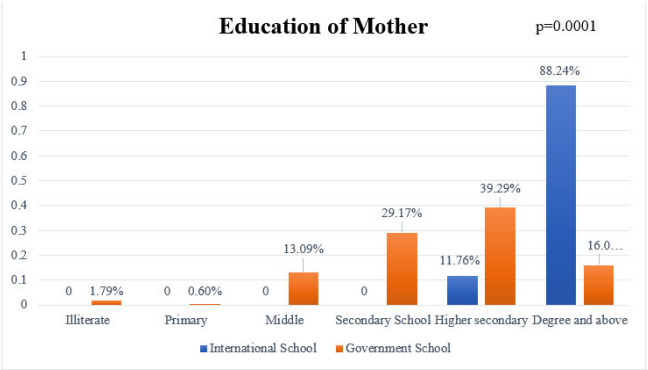


**Figure 2:** Comparison of Education of Mothers of students in International School vs Government School

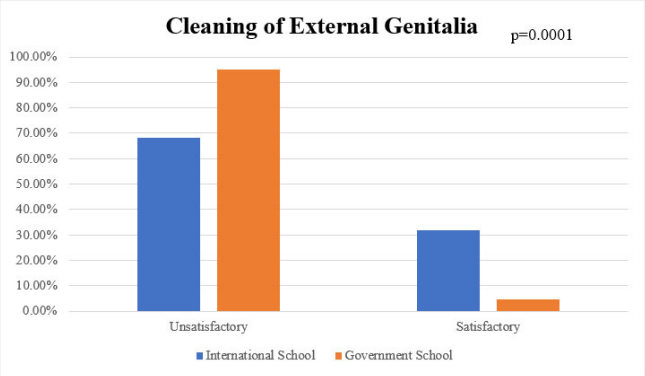


**Figure 3:** Comparison of Cleaning Practices during Menstruation between Girls in International and Government Schools

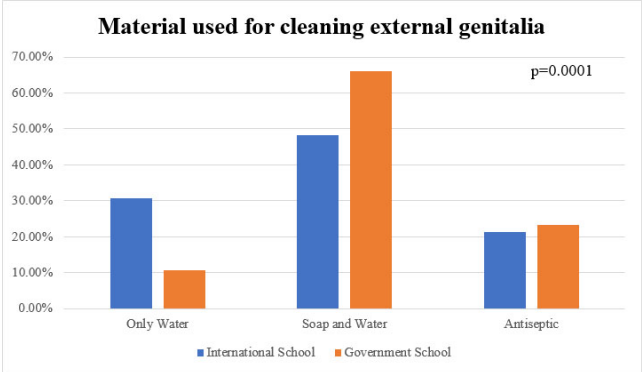


**Figure 4:** Comparison of Materials Used for Cleaning External Genitalia Between Girls in International and Government Schools