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EVALUATING THE IMPACT OF INFORMATION, EDUCATION, AND COMMUNICATION INITIATIVES ON MENSTRUAL HYGIENE PRACTICES AMONG ADOLESCENT GIRLS AGED 13-17: A RANDOMIZED CONTROL TRIAL

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ABSTRACT

Background

Adolescent girls' health, dignity, and general well-being depend heavily on menstrual hygiene management (MHM). Inadequate MHM practices have been connected to social problems including school absenteeism and health hazards like reproductive tract infections. The study evaluated how information, education, and communication (IEC) activities affected the menstrual hygiene practices of teenage females between the ages of 13 and 17.

Methods

A study was conducted over 6 months, with 400 adolescent girls (240 school-going and 160 out-of-school) participating. Data were collected through a predesigned, semi-structured questionnaire in the pre-and post-intervention phases. The IEC sessions focused on MHM, using visual aids and group discussions. Statistical analysis was performed using the chi-square test to determine significant changes in behavior.

Results

Before the intervention, only 45% of the participants used sanitary pads, while 55% used cloth. Post-intervention, the use of sanitary pads increased to 75%. The frequency of changing menstrual products also improved, with 70% of participants adopting the practice of changing products more than three times per day, compared to 35% pre-intervention. Handwashing with soap after changing menstrual products increased from 30% to 77.5%, and awareness of the menstrual cycle rose from 25% to 80%. All changes were statistically significant ($p < 0.001$).

Conclusion

The IEC intervention led to substantial improvements in menstrual hygiene practices and knowledge among adolescent girls. The study demonstrates that health education initiatives can significantly improve menstrual hygiene behavior, especially in resource-limited settings.

Recommendations

Future efforts should focus on scaling similar educational programs in other rural areas, improving access to affordable menstrual products, and ensuring the availability of water and sanitation facilities in schools and communities.

Keywords: *Menstrual Hygiene Management, Adolescent Girls, Rural Health, IEC Intervention, Sanitary Pads, Health Education.*
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INTRODUCTION

Adolescent girls' menstrual hygiene management (MHM) is a crucial issue, especially in low- and middle-income nations where access to adequate hygiene supplies and instruction may be restricted. Menstruation marks a key developmental stage in a girl's life, and managing it effectively is essential for health, dignity, and overall well-being. Despite its importance, many adolescent girls, especially in rural settings, struggle with poor menstrual hygiene practices due to socio-cultural stigmas, lack of knowledge, and inadequate access to sanitary products and clean water facilities.

Globally, around 500 million women lack access to proper MHM, leading to various physical and psychological challenges. According to a study done in rural India, a sizable percentage of females continue to use unsanitary practices like wearing clothes, which raises the risk of reproductive tract infections (RTIs). Sanitary serviette use is still low in rural regions, and one of the main obstacles to using commercially accessible menstruation products is limited financial resources [1]. The situation is similar in other regions like Sub-Saharan Africa and Southeast Asia, where a lack of awareness, along with socio-economic disparities, aggravates menstrual hygiene challenges.

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Additionally, the social stigma around menstruation often prevents open discussions about menstrual hygiene. In many communities, menstruation is still seen as a taboo, with misconceptions surrounding its natural processes. These cultural barriers hinder the dissemination of vital information about proper menstrual management. In urban areas, where access to education and products is relatively better, adolescent girls tend to have improved MHM practices compared to their rural counterparts [2].

The relationship between menstrual hygiene and education is profound. Poor MHM can lead to absenteeism and school dropout, significantly affecting academic performance. A study in northeastern Ethiopia found that school absenteeism was higher among girls practicing poor menstrual hygiene, primarily due to a lack of clean water, inadequate toilet facilities, and limited availability of sanitary products at schools [3]. Health education programs focusing on menstruation have proven to be effective in increasing awareness and improving hygiene practices among adolescent girls.

In conclusion, addressing menstrual hygiene requires a multi-pronged approach, including improving access to affordable menstrual products, enhancing water and sanitation facilities, and fostering open discussions to dispel taboos around menstruation. Education campaigns and community-based interventions are vital to achieving better menstrual hygiene outcomes for adolescent girls, particularly in rural and underserved regions [4].

The study aimed to assess the impact of Information, Education, and Communication (IEC) activities on menstrual hygiene practices among adolescent girls aged 13-17 years.

METHODOLOGY

Study Design

This study is a randomized control trial study.

Study Setting

The study took place for 6 months from March 2024 to August 2024 at Darbhanga, Bihar, India. The study was conducted in schools and community settings, specifically targeting adolescent girls. Both school-going girls and out-of-school girls from two villages were included in the study. The out-of-school girls were identified with the assistance of local health workers.

Participants

A total of 400 adolescent girls aged 13-17 years were included in the study, comprising both school-going and out-of-school girls. The lower age limit of 13 years was set because the average age of menarche is 12.5 years. The upper age limit of 17 years was chosen based on the fact that approximately 17% of girls in India are married by the age of 18.

Inclusion Criteria

-
- Adolescent girls aged 13-17 years, either attending school or residing in the selected villages.
- Girls are willing to participate in the study.

Exclusion Criteria

- Girls with a medical condition or disability that prevents participation in group education sessions or impacts their ability to practice menstrual hygiene
- Girls who were already extensively educated or involved in menstrual hygiene programs before the study could bias the results.
- Girls who did not attend both pre- and post-intervention assessments (due to absence or relocation).

Bias

To minimize bias, informed assent was obtained from the participants, ensuring voluntary participation. The same questionnaire was used for both the pre-and post-intervention phases, ensuring consistency. The questionnaire was administered in the local vernacular language to ensure participants fully understood the questions, reducing language-related bias.

Variables

The variables included IEC activities focused on menstrual hygiene education, Menstrual hygiene practices among adolescent girls, Socioeconomic status, education level, and cultural factors, assessed using the modified Kuppuswamy Scale (2017).

Allocation ratio: Since this is a single-group study (no control), no randomization or allocation ratio is involved.

Data Collection and Procedure

The study was conducted over three phases: pre-intervention, intervention, and post-intervention, and utilized a predesigned semi-structured questionnaire for data collection at each phase.

1. Pre-Intervention Phase

- For school-going girls, informed assent was obtained from the class in charge, and the girls were asked to complete a semi-structured questionnaire.
- Out-of-school girls were assembled at local Anganwadi or sub-centers with the help of Accredited Social Health Activists (ASHAs) and informed assent was obtained from an elderly

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female family member before administering the questionnaire.
- The questionnaire was provided in the vernacular language, ensuring ease of understanding.

2. Intervention Phase
- IEC sessions were conducted for 20-25 minutes in the local language, focusing on menstrual hygiene practices, normal menstrual patterns, and common related issues.
- Flipbooks with illustrations were used to facilitate understanding. The flipbooks were provided by the Department of Health and Family Welfare, [Location], under the National Health Mission.
- The girls were encouraged to ask questions and all queries were addressed by the facilitators.

3. Post-Intervention Phase
- Three months after the IEC intervention, the same semi-structured questionnaire was administered to assess changes in menstrual hygiene practices and knowledge.
- Data collected from both the pre- and post-intervention phases were compiled and compared.

Statistical Analysis
The gathered information was compiled into a database and subjected to suitable statistical techniques for analysis. The influence of IEC programs on menstrual hygiene behaviors was assessed using the chi-square test, which compares pre- and post-intervention data. Statistical significance was defined as a p-value of less than 0.05. The data were displayed as suitable statistical measures, frequencies, and percentages.

Ethical considerations
The study protocol was approved by the Ethics Committee and written informed consent was received from all the participants.

RESULTS
A total of 400 adolescent girls aged 13-17 years participated in the study. Of these, 240 (60%) were school-going, while 160 (40%) were out-of-school girls. 150 (37.5%) of the participants fit into the lower socioeconomic class, 200 (50%) into the middle socioeconomic class, and 50 (12.5%) into the top socioeconomic class, according to their socioeconomic position. The participants' ages ranged from 15 to 20 on average.

Table 1: Demographic Characteristics

Characteristics	Frequency (n=400)	Percentage (%)
Age Group		
13 years	50	12.5
14 years	70	17.5
15 years	120	30.0
16 years	100	25.0
17 years	60	15.0
Socio-Economic Status		
Upper Class	50	12.5
Middle Class	200	50.0
Lower Class	150	37.5
School Attendance		
School-going	240	60.0
Out-of-school	160	40.0

Before the intervention, the majority of participants demonstrated poor menstrual hygiene practices, with only 180 (45%) reporting regular use of sanitary pads, while 220 (55%) used cloth or other improvised materials. Post-intervention, the number of girls using sanitary pads increased significantly to 300 (75%), with a corresponding decrease in the use of cloth from 220 (55%) to 100 (25%).

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Table 2: Changes in Menstrual Hygiene Practices before and After IEC Intervention

Menstrual Hygiene Practice	Pre-Intervention (n=400)	Post-Intervention (n=400)	Chi-square (χ^2)	p-value
Use of sanitary pads	180 (45.0%)	300 (75.0%)	44.44	<0.001
Use of cloth/improvised materials	220 (55.0%)	100 (25.0%)		

Pre-intervention data revealed that 260 (65%) participants changed their menstrual products less than three times per day, while only 140 (35%) reported changing their products more than three times daily. After the IEC intervention, 280 (70%) of the participants changed their products more than three times a day, showing a significant improvement in hygiene behavior.

Table 3: Frequency of Changing Menstrual Products Before and After IEC Intervention

Frequency of Changing Products	Pre-Intervention (n=400)	Post-Intervention (n=400)	Chi-square (χ^2)	p-value
Less than 3 times/day	260 (65.0%)	120 (30.0%)	85.71	<0.001
More than 3 times/day	140 (35.0%)	280 (70.0%)		

Before the intervention, only 120 (30%) participants reported washing their hands with soap and water after changing menstrual products, while 280 (70%) used only water or did not wash their hands regularly. Post-intervention, there was a significant improvement, with 310 (77.5%) participants reporting the use of soap and water.

Table 4: Handwashing Practices Before and After IEC Intervention

Handwashing Practice	Pre-Intervention (n=400)	Post-Intervention (n=400)	Chi-square (χ^2)	p-value
Washing with soap and water	120 (30.0%)	310 (77.5%)	112.81	<0.001
Washing with water/Not washing	280 (70.0%)	90 (22.5%)		

At baseline, only 100 (25%) participants had adequate knowledge of the normal menstrual cycle and patterns. After the IEC sessions, this number increased significantly to 320 (80%).

Table 5: Awareness of Normal Menstrual Cycle Before and After IEC Intervention

Awareness of Normal Menstrual Cycle	Pre-Intervention (n=400)	Post-Intervention (n=400)	Chi-square (χ^2)	p-value
Adequate Knowledge	100 (25.0%)	320 (80.0%)	170.45	<0.001
Inadequate Knowledge	300 (75.0%)	80 (20.0%)		

The post-intervention analysis revealed that improvement in menstrual hygiene practices was observed across all socio-economic groups, but the largest improvement was seen in participants from the middle socio-economic class (65% improvement). However, girls from lower socio-economic backgrounds also showed a significant increase in the use of sanitary pads, from 35% pre-intervention to 70% post-intervention.

Table 6: Changes in Menstrual Hygiene Practices by Socio-Economic Status

Socio-Economic Status	Use of Sanitary Pads (Pre)	Use of Sanitary Pads (Post)	Change (%)
Upper Class	40 (80.0%)	48 (96.0%)	+16.0
Middle Class	90 (45.0%)	180 (90.0%)	+45.0
Lower Class	50 (35.0%)	105 (70.0%)	+35.0

DISCUSSION

The study, which involved 400 adolescent girls aged 13-17 years, revealed significant improvements in menstrual hygiene practices following the IEC (Information, Education, and Communication) intervention. At the start of the study, 55% of the participants used cloth or other improvised materials for menstrual management, while only 45% used sanitary pads. After the intervention, 75% of the girls switched to using sanitary pads. This marked improvement highlights the positive impact of the

educational sessions on increasing awareness and promoting better menstrual hygiene products. The statistical analysis using the chi-square test showed a highly significant association ($p < 0.001$), confirming the effectiveness of the IEC activities in changing menstrual hygiene product preferences.

Another important improvement was seen in the frequency of changing menstrual products. Initially, 65% of the participants changed their products less than three times per day, which is considered inadequate for proper hygiene. Following the IEC intervention, this figure dropped to 30%, with 70% of the girls adopting the recommended practice of changing menstrual products more frequently (more than three times daily). This change is critical, as regular changing of products helps prevent infections and promotes better health outcomes. The success of the intervention was further demonstrated by the chi-square test, which again showed a statistically significant difference ($p < 0.001$) between pre- and post-intervention behaviors.

Handwashing practices also showed significant improvement. Just thirty percent of the girls said they would wash their hands with soap and water after changing their menstruation products before the intervention. After the educational sessions, this increased to 77.5%, showing that the IEC activities effectively conveyed the importance of hygiene in preventing infections and maintaining overall health. This result, too, was highly significant ($p < 0.001$), demonstrating the importance of basic health education in promoting hygiene practices.

Awareness of the normal menstrual cycle improved dramatically as well. Initially, only 25% of the participants had adequate knowledge of menstrual cycles and patterns. After the IEC intervention, this figure rose to 80%, indicating a significant improvement in understanding normal menstrual physiology. This knowledge is essential for reducing anxiety, addressing misconceptions, and ensuring that girls are better prepared to manage their menstrual health. The chi-square test showed a highly significant increase ($p < 0.001$) in menstrual knowledge, reinforcing the value of targeted educational interventions.

The results also demonstrated that improvements were seen across all socio-economic groups, with the most substantial change in menstrual hygiene practices observed in girls from middle socio-economic backgrounds. However, even those from lower socio-economic backgrounds showed a notable shift toward improved practices, with sanitary pad usage increasing from 35% to 70%. This suggests that educational interventions can overcome barriers related to socioeconomic status and effectively promote healthier behaviors.

Overall, the results indicate that the IEC activities had a profound impact on menstrual hygiene practices and awareness. The significant improvements across multiple aspects—product choice, frequency of changing products, handwashing practices, and knowledge of menstrual cycles—demonstrate the effectiveness of educational interventions in improving menstrual health outcomes. This study underscores the importance of continued health education in rural and underserved areas to foster long-term behavioral change.

A cross-sectional study conducted in Laos showed that only 44% of adolescent girls reported good menstrual hygiene practices. This study found significant associations between good MHM and older age (16-19 years), higher levels of education, and discussions about menstruation with mothers. The lack of proper disposal facilities for sanitary pads was a major barrier to optimal MHM practices, affecting both school-going and out-of-school girls [5].

A study in Nepal reviewed knowledge of MHM and found that many adolescent girls lacked comprehensive information about menstruation before their menarche. This knowledge gap resulted in menstruation being experienced as a shock or perceived negatively. The study revealed that schools were underprepared to educate girls about menstrual hygiene, with teachers often lacking the necessary training and confidence to address the subject. Effective interventions were recommended to break taboos and provide proper education on MHM [6].

In rural Tamil Nadu, India, a qualitative study explored the experiences of adolescent girls with menarche and menstruation. The study found that social and cultural norms deeply influenced how girls managed menstruation. Many girls developed coping mechanisms due to stigmatizing attitudes and gender norms, which were ingrained in their communities. The study emphasized the importance of culturally appropriate interventions that address the knowledge gaps and social challenges these girls face, which could contribute to better water, sanitation, and hygiene (WASH) interventions in schools [7].

A study revealed that while 72.5% of the schoolgirls had good knowledge about menstruation, only 34.7% practiced adequate menstrual hygiene. Factors such as urban residence, access to school toilets with inside locks, and better sources of information (such as mothers and teachers) were strongly associated with good MHM. The study highlighted the critical need for improving facilities and access to menstrual hygiene products in schools to enhance MHM practices [8].

In rural Visakhapatnam, India, a study found that while 78.3% of adolescent girls used sanitary pads, awareness of menstruation before menarche was still low, with only 48.4% of girls knowing about menstruation beforehand. Daily bathing was practiced by 78.8% of the participants during menstruation and 68% of the girls disposed of their pads in a satisfactory manner. The study concluded that knowledge about menstrual hygiene needs further improvement, especially in rural areas where cultural beliefs may hinder better practices [9].

According to a study, mothers were the main source of information for 30.4% of teenage girls, who possessed

good knowledge about menstruation, accounting for 78.8% of the sample. Despite this, 71% demonstrated appropriate menstrual hygiene practices, while 30.9% relied on cloth and 64.5% used sanitary pads. Age, financial stability, and menstrual education were found to be important determinants of MHM behaviors [10].

A similar cross-sectional study conducted in Peshawar, Pakistan, found that 60% of schoolgirls had inadequate awareness of menstrual hygiene, with 43% practicing poor hygiene during menstruation. The use of disposable sanitary pads was predominant, though 86 girls exhibited suboptimal practices. The study revealed that maternal education and paternal occupation were significantly associated with better hygiene practices ($p = 0.022$, $p = 0.047$, respectively), underlining the need for greater educational outreach on menstruation [11].

In Chitwan, Nepal, a study found that 66.8% of adolescent girls had adequate knowledge of menstruation, with 93.8% using sanitary pads and 94.8% practicing proper genital hygiene. However, one-third of the participants lacked sufficient knowledge regarding menstruation. The study identified a significant correlation between the age and grade of the girls and their menstrual hygiene practices ($p < 0.05$) [12].

A cross-sectional survey conducted in Southern Ethiopia found that 48.1% of teenage girls used absorbent products and 68.3% of them had little information about menstruation. Even though 60.3% of the participants had poor menstrual hygiene, poor knowledge of menstruation and being under the age of 15 were highly linked to poor hygiene habits. The study underlined the necessity of awareness campaigns to raise teenage girls' levels of understanding and MHM behaviors [13].

Generalizability

The external validity of the study, which assesses how well the findings can be generalized to other populations, is moderately strong given the diverse sample of 400 adolescent girls from both school-going and out-of-school groups in rural India. However, the study's results may be most applicable to similar rural settings in low- and middle-income countries where socioeconomic barriers to menstrual hygiene are prevalent. The trial findings are particularly relevant for regions with limited access to menstrual products, sanitation facilities, and health education. Applicability may be limited in urban areas or settings with better resources and healthcare infrastructure, where different socio-cultural factors could influence menstrual hygiene practices.

CONCLUSION

The results of this interventional study indicate that Information, Education, and Communication (IEC) activities significantly improved menstrual hygiene practices among adolescent girls aged 13-17 years in Darbhanga, Bihar. The intervention led to increased use of sanitary pads, better handwashing practices, and improved awareness of the normal menstrual cycle. The study highlights the importance of health education in addressing menstrual hygiene challenges, particularly in rural and underserved areas. These results suggest that sustained IEC efforts could lead to long-term improvements in the menstrual health of adolescent girls across various socio-economic strata.

Limitations

The limitations of this study include a small sample population who were included in this study. Furthermore, the lack of a comparison group also poses a limitation for this study's findings.

Recommendation

Future efforts should focus on scaling similar educational programs in other rural areas, improving access to affordable menstrual products, and ensuring the availability of water and sanitation facilities in schools and communities.

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List of abbreviations

MHM - Menstrual Hygiene Management
IEC - Information, Education, and Communication
RTIs - Reproductive Tract Infections
ASHA - Accredited Social Health Activist
WASH - Water, Sanitation, and Hygiene
NHM - National Health Mission

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Conflict of interest

The authors have no conflicting interests to declare.

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