

Evaluating the Effectiveness of Health Communication in Predicting Menstrual Health Outcomes in India

Amala T. Chacko^{1*}, Jolly Jose², Parul Mehta³

¹ Research Scholar, Amity School of Communication, Amity University, Noida, India. Email: amala.chacko@s.amity.edu

² Associate Professor, Amity School of Communication, Amity University, Noida, India

³ Professor, DME Media School, Delhi, India

*Corresponding Author: Amala T. Chacko

KEYWORDS

Health
Communication,
Menstrual Health,
Health Promotion,
Adolescent Girls,
Health Outcomes,
Communication
Strategies

ABSTRACT

Research on health communication interventions for menstrual health promotion in India remains relatively unexplored. Strategic communication is widely acknowledged as a powerful tool for shaping health behaviors and driving societal change. In India, various initiatives addressing menstrual health and hygiene operate at multiple levels, starting from grassroots efforts. This expanded study builds upon our previous work presented at the International Conference on Sustainable Development Goals (ICSDG). It aims to evaluate a broad spectrum of published research that has examined the effectiveness of communication interventions in shaping menstrual health practices among women and adolescent girls in India. By reviewing studies from databases such as PubMed, Medline, Ovid, Sage Journals, Science Direct, Springer, Taylor & Francis, DOAJ, and Google Scholar, we identify key insights into the outcomes of Social and Behaviour Change Communication (SBCC), Behaviour Change Communication (BCC), Information, Education, and Communication (IEC), and interpersonal communication strategies. The findings indicate that these interventions have successfully enhanced menstrual health awareness among adolescents and women of reproductive age, leading to positive behavioral and attitudinal changes.

1. Introduction

Menstruation is a natural biological process that occurs in women and adolescent girls, typically lasting between five to seven days each month [1]. Around the world, over 300 million women and girls experience menstruation daily [2]. Over the course of her reproductive years, a woman undergoes approximately 400 menstrual cycles before reaching menopause [3]. The maintenance of menstrual health is a critical component of overall public health, as it directly impacts sustainable development goals (SDGs), gender equality, and human rights [4,5].

The onset of menstruation, known as menarche, signifies a significant stage in a girl's life, marking the transition into puberty and womanhood [6]. During this phase, it is essential for young girls to have access to accurate information regarding menstrual health management [7]. Proper menstrual hygiene includes the use of clean and safe materials for absorbing menstrual blood, the availability of soap and water for personal hygiene, and the appropriate disposal of used menstrual products [8,9].

Studies conducted in low- and middle-income countries (LMICs) reveal that more than half of adolescent girls lack adequate menstrual health management (MHM), with rural areas being disproportionately affected [10-13]. Poor menstrual hygiene can result in an increased risk of reproductive tract infections (RTIs), which may lead to severe long-term health complications [10]. Research findings suggest that while some girls have prior knowledge of menstruation before reaching menarche, a large proportion remain uninformed about its biological significance and hygienic practices. A survey conducted in Nepal, for instance, found that 92% of adolescent girls had heard about menstruation, yet the majority felt unprepared for their first experience [14]. Similarly, a study in Rajasthan by Khanna et al. [11] demonstrated that inadequate communication, lack of awareness, and societal taboos contribute to poor menstrual health outcomes. In Egypt, cultural traditions discourage open discussions about menstruation, limiting the availability of accurate and accessible information [12]. Likewise, in Ethiopia, menstruation is frequently misinterpreted as a

disease, a divine punishment, or a lifelong affliction, reinforcing stigma and misinformation [15].

In India, cultural taboos often dictate dietary restrictions for menstruating girls, discouraging the consumption of specific foods such as curd, tamarind, and pickles [16]. While education, parental guidance, and economic status play a role in shaping menstrual health practices, religious and societal norms significantly influence menstrual hygiene behaviors across different communities [17]. A reluctance to discuss menstruation openly among parents and educators further exacerbates knowledge gaps, leaving adolescent girls ill-equipped to manage their menstrual health effectively [18,19]. Although menstrual health is not explicitly mentioned in the UN's Sustainable Development Goals, inadequate menstrual hygiene management negatively impacts several key development targets, including SDG 3 (health and well-being), SDG 4 (quality education), SDG 5 (gender equality), SDG 6 (clean water and sanitation), SDG 8 (decent work and economic growth), and SDG 12 (responsible consumption and production) [20]. Addressing these challenges requires an emphasis on social factors such as education, gender, access to sex education, media exposure, and parental support to assess their influence on menstrual health management. Effective communication interventions are essential in bridging these knowledge gaps and encouraging proper menstrual hygiene practices [21].

The field of health communication has gained traction as a significant approach in public health, aimed at improving health outcomes by disseminating information through strategic communication channels. Over the years, health communication has evolved from traditional Information, Education, and Communication (IEC) strategies to more sophisticated models like Behaviour Change Communication (BCC), Social and Behaviour Change Communication (SBCC), and Risk Communication and Community Engagement (RCCE) [22, 23]. Ali and Rizvi [24] emphasized the importance of a multifaceted approach to menstrual health education, incorporating parental and teacher training, engagement with religious institutions, and the utilization of various media platforms to spread awareness. Communication interventions designed to improve menstrual health and hygiene have been successfully implemented in different regions worldwide, leading to positive behavioral changes and a reduction in menstrual stigma [25-27].

India has a large population of women in the reproductive age group (15-49 years), exceeding 310 million as per Census 2011 [28]. Recognizing the urgent need for improved menstrual health management, the Indian government has incorporated MHM into national health and educational policies to improve the well-being and school attendance of adolescent girls. The "Swachh Bharat: Swachh Vidyalaya" initiative focuses on ensuring that all schools have access to essential water, sanitation, and hygiene (WASH) facilities, including soap, private changing areas, and proper disposal methods for sanitary products [29]. Accredited Social Health Activists (ASHAs) have been deployed under this initiative to distribute sanitary products and conduct interpersonal awareness campaigns on safe menstrual health practices [30, 31]. Despite these measures, several challenges remain in overcoming social and cultural barriers to effective menstrual health management. Implementing well-structured communication interventions, particularly those using Behavior Change Communication (BCC) strategies, can play a crucial role in addressing these gaps and ensuring widespread adoption of healthy menstrual practices.

As an extension of conference proceedings of the International Conference on Sustainable Development Goals (ICSDG) [32], this review provides deeper insights into the role of communication interventions in shaping menstrual health awareness and hygiene practices among women and adolescent girls in India. It highlights key themes, including the effectiveness of various communication channels, the socio-cultural barriers influencing menstrual health discourse, and the role of interpersonal [33] and community-driven approaches in promoting sustainable behavioral change. By expanding on the initial conference findings, this review aims to inform future research directions, intervention strategies, and policy recommendations to improve menstrual health

outcomes at both individual and community levels.

2. Methods

The review serves as an expansion of conference proceedings, aiming to consolidate a wide array of published research that has employed various methodological approaches to evaluate the effectiveness and influencing factors of communication interventions related to Menstrual Health and Hygiene Management (MHHM) among women and adolescent girls in India. By synthesizing existing literature, this extended review provides a comprehensive understanding of how different communication strategies impact MHHM awareness, practices, and behavioral outcomes, thereby contributing to policy formulation and program development.

The review systematically examined multiple sources, including population-based studies, independent research articles, and institutional reports published since 2001. While an extensive range of literature was initially considered, only those studies that aligned with the research objectives and met specific inclusion criteria were selected for the final analysis. This meticulous selection process ensured that the review focused on the most relevant and high-quality research available.

To gather the relevant studies, an exhaustive search was conducted across multiple online academic databases, including PubMed, Medline, Ovid, Sage Journals, Science Direct, Springer, Taylor & Francis, DOAJ, and Google Scholar. The search strategy incorporated a diverse set of keywords, including but not limited to Menstrual Health, Menstrual Hygiene, Communication, Menstrual Communication, Menstrual Health Communication, Health Communication, IEC (Information, Education, and Communication), SBCC (Social and Behavior Change Communication), Interpersonal Communication, Community Health, Adolescent Health, and India. The search results yielded numerous academic articles and reports, with study titles and abstracts being screened based on predefined inclusion and exclusion criteria.

Following this rigorous screening process, a total of 237 articles were initially selected. However, duplicate records were removed, and further scrutiny of abstracts was conducted to assess their relevance and contribution to the review's objectives. Ultimately, 16 research papers were deemed to fully meet the inclusion criteria and were incorporated into the final review.

2.1 Study Selection

A total of 237 papers were retrieved from various databases. After removing 99 duplicate records, the remaining studies were screened based on their titles and abstracts, resulting in the selection of 30 studies. Following further evaluation, 16 papers were finalized for quality assessment and inclusion in this literature review.

2.2 Study Characteristics

The key details of the studies included in this review are summarized in Table 1, covering aspects such as author(s), study location, sample size, communication intervention, and study objectives. The 16 selected studies were conducted across different regions of India. Specifically, three studies were from Uttar Pradesh, two each from Delhi and Maharashtra, and one study each from West Bengal, Assam, Rajasthan, Karnataka, Himachal Pradesh, Punjab, Tamil Nadu, Uttarakhand, and Northern India. The studies were published between 2010 and 2023, with the highest number of publications occurring in 2016 and 2023.

Table 1: Summary of Studies on Health Communication Interventions for Menstrual Health

No.	Author	Location	Study Population	Sample Size	Communication Approach	Study Objective
-----	--------	----------	------------------	-------------	------------------------	-----------------

No.	Author	Location	Study Population	Sample Size	Communication Approach	Study Objective
1	Sood et al. [34]	Uttar Pradesh	Rural Adolescent Girls	2212	Social and Behaviour Change Communication (SBCC)	Assessing the influence of SBCC interventions on menstrual hygiene management (MHM) and societal norms.
2	Ramaiya et al. [35]	Uttar Pradesh	Rural Adolescent Girls	2206	Social and Behaviour Change Communication (SBCC)	Evaluating the effectiveness of the GARIMA SBCC intervention in improving knowledge, attitudes, interpersonal communication, restrictions, and menstrual health and hygiene management (MHHM).
3	Block et al. [36]	Uttar Pradesh	Rural Adolescent Girls	2384	Social and Behaviour Change Communication (SBCC)	Examining the distinct effects of 'Interpersonal Practical Guidance (IPG)' and SBCC-driven 'Mediated Practical Guidance (MPG)' on adolescent girls' knowledge, attitudes, and practices (KAP) regarding menstrual product selection, usage, and disposal.
4	Ghosh & Saha [37]	West Bengal	Non-menopausal Women	1196	Behaviour Change Communication (BCC)	Designing and evaluating a comprehensive communication campaign package focused on reproductive health.
5	Mahanta et al. [38]	Assam	Rural Adolescent Girls	528	Social and Behaviour Change Communication (SBCC)	Investigating the impact of infotainment-based interventions on public perceptions of adolescent reproductive and sexual healthcare.
6	Sharma et al. [39]	Rajasthan	Adolescent Girls	78	Information, Education, and Communication (IEC)	Understanding existing knowledge, attitudes, and practices related to menstruation through a structured peer-led training program (PRAGATI).
7	S et al. [40]	Karnataka	Women	400	Information, Education, and Communication (IEC)	Raising awareness, mobilizing, and involving women in menstrual health and hygiene through IEC strategies.
8	Dongre et al. [41]	Maharashtra	Adolescent Girls	383	Information, Education, and Communication (IEC)	Assessing awareness levels and behavioral changes regarding menstrual health and hygiene management among adolescent girls through IEC interventions.
9	Panda & Sehgal [42]	Himachal Pradesh	Adolescent Girls	290	Information, Education, and Communication (IEC)	Examining adolescents' awareness of their bodies, reproductive health concepts, gender stereotypes, and the reliability of health information sources.
10	Jyoti et al. [43]	Punjab	Adolescent Girls	230	Information, Education, and Communication	Promoting safe menstrual hygiene practices through IEC interventions.

No.	Author	Location	Study Population	Sample Size	Communication Approach	Study Objective
					(IEC)	
11	Dharmalingam et al. [44]	Tamil Nadu	Adolescent Girls	82	Information, Education, and Communication (IEC)	Evaluating the impact of health advocacy and IEC programs on rural adolescent girls' knowledge of menstruation and menstrual hygiene practices.
12	Joshi et al. [45]	Uttarakhand	Adolescent Girls	45	Information, Education, and Communication (IEC)	Providing structured menstrual health education using a video-assisted teaching approach.
13	Gundi & Subramanyam [21]	Maharashtra	Adolescent Girls and Boys	1421	Interpersonal Communication	Investigating the role of menstruation-related interpersonal communication and its influence on adolescent health in India.
14	Rawat et al. [46]	Delhi	Adult Women	180	Interpersonal Communication	Analyzing how interpersonal communication enhances knowledge about menstrual health practices.
15	Pandey [47]	Northern India	—	—	Interpersonal Communication	Exploring the impact of mother-daughter communication on promoting safe menstrual health practices.
16	Kumari [48]	Delhi	Adolescent Girls	199	Interpersonal Communication	Studying adolescent girls' initial physical changes and the guidance received from elders to navigate these transitions.

3. Findings

3.1 Modes of Health Communication

Several communication strategies have been utilized to enhance awareness and promote best practices in menstrual health and hygiene, as evidenced by 16 reviewed studies. These strategies include Behavioral Change Communication (BCC), Awareness and Educational Outreach (AEO), and Direct Engagement Communication (DEC).

3.1.1 Behaviour Change Communication (BCC)

Five of the 16 studies examined the application of SBCC strategies to encourage positive menstrual health practices and dismantle stigmas associated with menstruation in India. The GARIMA initiative, launched by UNICEF in collaboration with local NGOs in Uttar Pradesh, sought to improve knowledge, attitudes, and practices through multimedia platforms. This initiative placed individuals at the center of change while addressing social and political structures at the community level [34].

Ramaiya et al. [35] assessed whether exposure to SBCC interventions could lead to improved menstrual health and hygiene management (MHHM). Another study on GARIMA investigated how interpersonal practical guidance (IPG) combined with SBCC affected adolescent girls' knowledge, attitudes, and practices regarding menstrual product selection, usage, and disposal [36]. A separate behavior change communication (BCC) initiative aimed at marginalized women demonstrated increased awareness of reproductive and general health concerns [37]. Mahanta et al. [38] highlighted that SBCC efforts in Assam's High Priority Districts, particularly through infotainment,

improved adolescent knowledge about health, nutrition, HIV/AIDS, and reproductive tract infections/sexually transmitted infections (RTI/STI).

3.1.2 Awareness and Educational Outreach (AEO)

Seven studies focused on IEC strategies to promote menstrual hygiene among girls and women of reproductive age. Sharma et al. [39] introduced ‘PRAGATI (Peer Action for Group Awareness through Intervention),’ a peer educator training program that leveraged the illustrated comic book ‘Menstrupedia’ as an educational tool. This intervention facilitated discussions on menstrual health and hygiene in rural settings.

A multi-centric action research demonstration study in Karnataka’s Kolar district evaluated the effectiveness of IEC materials in menstrual health awareness. Findings indicated an increase in knowledge about sanitary napkin usage and disposal, as well as improved awareness of menstrual anomalies [40]. Similarly, Dongre et al. [41] developed a handmade flipbook based on Program for Appropriate Technology in Health (PATH) guidelines to communicate essential messages about menstrual health. The study’s trend analysis demonstrated a positive shift in awareness and attitudes toward menstrual health practices.

Panda and Sehgal [42] conducted a sociological study in Himachal Pradesh’s Mandi district to assess adolescent girls’ understanding of reproductive health, gender stereotypes, and the reliability of health information sources. The research underscored the need for professional interactive counseling tailored to adolescents’ health-seeking behaviors. Jyoti et al. [43] implemented an IEC intervention in Amritsar schools, using flipbooks and vernacular-language sessions to educate adolescent girls on menstrual health. The intervention led to an increase in awareness about the negative consequences of poor menstrual hygiene from 63% to 86.63%.

Additional IEC initiatives included an animated video-based awareness program in Tamil Nadu [44] and a video-assisted learning program in Uttarakhand schools, which demonstrated a positive correlation between students’ menstrual health knowledge and exposure to video-based teaching materials [45].

3.1.3 Direct Engagement Communication (DEC)

The role of interpersonal communication in menstrual health was explored through various studies. Gundi and Subramanyam [21] conducted a mixed-method study in Nashik, emphasizing the necessity of gender- and setting-specific communication strategies in India’s patriarchal context to address menstrual health challenges.

Rawat et al. [46] examined communication patterns among college-going women in Northern India, revealing that discussions about menstruation remain rooted in secrecy and stigma. However, increased transparency in communication was found to foster a shift toward positive discourse and behavioral change. Another study highlighted the role of mothers as the primary source of menstrual health information for adolescent girls, demonstrating that mother-daughter communication can serve as an effective intervention to counteract cultural taboos and reinforce safe menstrual practices [47].

Further research underscored the need for policy-driven initiatives to engage adolescent girls in menstrual health management programs, as interpersonal communication plays a crucial role in addressing myths and misconceptions surrounding menstruation [48].

3.2 Outcomes of Communication Interventions on MHHM

3.2.1. Behavioral Outcomes

SBCC interventions implemented in Uttar Pradesh [34-36] significantly influenced behavioral changes regarding menstrual hygiene practices. The GARIMA program [35] encouraged adolescent

girls to adopt healthier menstrual hygiene habits, communicate openly, and challenge societal taboos. Block et al. found that Interpersonal Practical Guidance (IPG) was more effective than Mediated Practical Guidance (MPG) in shaping practical skills related to menstrual product usage and disposal. In Assam, Mahanta et al. demonstrated that entertainment-based SBCC interventions successfully shifted public attitudes toward adolescent reproductive health, reinforcing the idea that engaging content leads to lasting behavioral change.

3.2.2. Knowledge Improvement

Multiple studies confirmed that communication-based interventions played a crucial role in improving knowledge about menstruation. IEC-based training programs [39-43] significantly increased adolescent girls' understanding of menstrual health, hygiene management, and reproductive well-being. The peer educator model (PRAGATI) in Rajasthan [39] effectively disseminated menstrual health information, while video-assisted teaching [45] improved information retention. Ghosh and Saha's study in West Bengal demonstrated that a structured BCC campaign could successfully educate women on reproductive health, leading to more informed decisions.

3.2.3. Attitude Shifts and Social Norms

Several studies highlighted the impact of communication interventions on shifting attitudes and challenging societal norms surrounding menstruation. The SBCC initiatives in Uttar Pradesh [37,38] influenced adolescent girls to question restrictive menstrual taboos and advocate for better hygiene practices. IEC programs in Karnataka and Maharashtra empowered women by normalizing discussions on menstrual health. Additionally, research by Panda & Sehgal in Himachal Pradesh indicated that IEC interventions contributed to breaking gender stereotypes and improving adolescent girls' confidence in discussing reproductive health matters.

3.2.4. Interpersonal Communication and Support Systems

Studies conducted in Maharashtra [21], Delhi [46], and Northern India [47] highlighted that mother-daughter conversations were instrumental in fostering safe menstrual hygiene practices. Rawat et al. emphasized how peer and family discussions significantly influenced knowledge retention and behavioral adaptation. Kumari's study in Delhi underscored the importance of guidance from elders in helping adolescent girls navigate menstruation and other physical changes.

3.2.5. Practical Implementation and Community Engagement

Effective communication strategies facilitated not only knowledge improvement but also active community engagement. IEC programs in Karnataka mobilized women to participate in menstrual health awareness initiatives, while health advocacy campaigns in Tamil Nadu successfully integrated menstrual hygiene education into rural settings. The use of interpersonal and multimedia-based interventions further demonstrated the potential for scalable, impactful menstrual health education.

4. Discussion

This revised discussion incorporates new insights gained from the conference presentation while refining the analysis of peer-reviewed scientific studies on health communication interventions focused on menstrual hygiene and health practices in India. The review highlights a persistent gap in the literature, as limited studies explicitly address the role of communication in fostering menstrual hygiene awareness and practices. While much of the existing research in India primarily investigates knowledge, attitudes, practices, cultural norms, and socially restrictive behaviors related to menstruation, the importance of communication as a transformative tool remains underexplored.

The final review included 16 studies that met the inclusion criteria. Various health communication strategies such as Social and Behaviour Change Communication (SBCC), Behaviour Change

Communication (BCC), Information, Education, and Communication (IEC), and Interpersonal Communication were identified as key interventions. These strategies were found to positively impact menstrual hygiene management (MHM) by influencing behavioral change among adolescent girls and women of reproductive age. Notably, four studies that utilized SBCC as a communication tool demonstrated effectiveness in altering social norms and personal beliefs [34], enhancing knowledge about puberty [35], promoting appropriate disposal of menstrual products [36], and improving recognition of reproductive health disorders [37].

Studies examining IEC and interpersonal communication strategies reported significant outcomes in increasing knowledge about the menstrual cycle [39], raising awareness of reproductive health (RH) and reproductive tract infections (RTIs) [42], and dispelling menstruation-related myths during COVID-19 [48]. The GARIMA evaluation revealed a strong correlation between higher exposure to communication programs and improved social norms, leading to better MHM practices [34]. Similarly, a separate study on the GARIMA intervention found that teenage girls with greater exposure to communication programs demonstrated increased discussion on menstrual health, a deeper understanding of reproductive anatomy, greater awareness of puberty, and more progressive gender attitudes [35].

In the study conducted by Block et al. [36], SBCC interventions significantly influenced participants' perceptions and behaviors regarding menstrual product disposal, with 86.5% of the intervention group reporting positive attitudes compared to 79.4% in the control group. Additionally, PRAGATI (Peer Action for Group Awareness Through Intervention), an IEC-based program, showed a marked increase in the adoption of improved menstrual hygiene habits among teenage girls [39]. The proportion of respondents accurately identifying the typical menstrual cycle length rose from 30.8% to 62.8%. Exposure to health communication and behavior change interventions positively impacted awareness about detecting symptoms of common reproductive health disorders.

An SBCC intervention by Ghosh and Saha [37] employed the 'Fact for Life' (FFL) video program, which focused on adolescent nutrition, sexual health, and reproductive health. This 10-week intervention significantly improved participants' knowledge, attitudes, and behaviors. Furthermore, an IEC initiative in senior secondary schools in Himachal Pradesh highlighted a direct correlation between RH awareness and participants' ascriptive factors such as age, caste, family structure, and place of residence [42]. Similarly, an IEC intervention in Punjab resulted in a substantial increase in awareness of unclean menstruation practices, rising from 63% pre-intervention to 86.63% post-intervention [43].

In Karnataka, an IEC-driven intervention on menstrual hygiene led to a significant improvement in participants' knowledge about the use and disposal of sanitary napkins and pads [40]. Additionally, the study reported increased awareness of irregular menstrual discharge and associated health concerns. A trend analysis of community-based health education initiatives on MHM revealed an increase in the use of ready-made pads from 5.2% to 24.9%, while the practice of washing cloth menstrual products with soap and water and drying them in the sun rose from 86.2% to 94.2% [41].

A notable limitation identified in the reviewed studies was the lack of explicit discussion regarding the conceptual and theoretical frameworks underpinning the design and implementation of communication campaigns. Health communication scholars emphasize that interventions grounded in strong theoretical models are more likely to succeed [49]. Additionally, most studies did not extensively explore the role of multiple stakeholders in constructing effective health communication campaigns. Methodologically, the majority of studies employed experimental research designs with pre- and post-tests to assess intervention efficacy, while only a few used quantitative research designs for statistical evaluation of communication programs [50-53].

Findings from this review align with broader literature on health communication strategies,

reinforcing that well-structured, systematically monitored communication interventions can significantly enhance public health outcomes and contribute to social development. The insights gained from this analysis, along with feedback from the conference presentation, further underscore the need for comprehensive, theory-driven health communication interventions to improve menstrual health and hygiene management in India.

5. Conclusion

This study builds upon and revises the findings presented in the conference proceedings, incorporating a more in-depth analysis and updated insights. Health communication interventions continue to be a crucial tool in India, facilitating the widespread dissemination of information and engagement with diverse populations. Various communication channels serve as effective means to promote health by enhancing awareness and influencing perceptions. This revised study specifically examines health communication interventions focusing on menstrual health and hygiene management for adolescent girls and women of reproductive age. By reassessing and expanding upon the previous analysis, this study includes a broader range of communication strategies aimed at improving knowledge, attitudes, and behavioral changes.

A key takeaway from this study is the participatory nature of these interventions such as stakeholders are actively engaged in needs assessments, the development of educational materials, message dissemination, and evaluation processes. However, despite the growing recognition of menstrual health as a critical issue, there remains a limited body of research on the effectiveness of communication interventions in improving menstrual health practices and managing related programs in India. This underscores the pressing need for further research and more refined strategies to enhance the impact of health communication programs, particularly in developing country contexts.

By revising and refining the scope of the initial conference paper, this study provides a more comprehensive perspective on the role of communication interventions in menstrual health and hygiene, reinforcing the need for continued exploration and programmatic improvements.

Conflict of Interest: None. This article is an extended and enhanced version of our previously published conference paper: Chacko Amala T, Jose Jolly. Health Communication Interventions for Promoting Menstrual Health and Hygiene Management in India: A Review. E3S Web of Conferences, 453, (2023) <https://doi.org/10.1051/e3sconf/202345301014>. The current work includes substantial new findings and previously unpublished results that were not part of the original proceedings. Per publication guidelines, we have ensured that this article contributes significantly beyond the conference version. Additionally, we have cited the original conference paper in this manuscript to acknowledge its prior publication.

Reference:

- [1] Sinha RN, Paul B. Menstrual hygiene management in India: The concerns. *Indian Journal of Public Health*, **62**, (2018)
- [2] George R. Celebrating Womanhood How better menstrual hygiene management is the path to better health, dignity and business. WSSCC, (2013)
- [3] Chiou M-H, Wang H-H, Yang Y-H. Effect of Systematic Menstrual Health Education on Dysmenorrheic Female Adolescents' Knowledge, Attitudes, and Self-Care Behavior. *The Kaohsiung Journal of Medical Sciences*, **23**, 183–190, (2007)
- [4] Sommer M, Hirsch JS, Nathanson C, et al. Comfortably, Safely, and Without Shame: Defining Menstrual Hygiene Management as a Public Health Issue. *American Journal of Public Health*, **105**, 1302–1311 (2015)
- [5] UN WOMEN. SOCIAL PROTECTION SYSTEMS, ACCESS TO PUBLIC SERVICES AND SUSTAINABLE

INFRASTRUCTURE FOR GENDER EQUALITY AND THE EMPOWERMENT OF WOMEN AND GIRLS. UN Women, (2019)

- [6] A. Martin E, A. McFerran T. A Dictionary of Nursing. **6th ed.** Oxford University Press, (2014)
- [7] Sood S, Stevens S, Okumura M, et al. A Systematic Review of Menstrual Health and Hygiene Management (MHHM) as a Human Right for Adolescents Girls. *International Journal of Sexual Health*, **34**, 483–502, (2022)
- [8] Sommer M, Sahin M. Overcoming the Taboo: Advancing the Global Agenda for Menstrual Hygiene Management for Schoolgirls. *American Journal of Public Health*, **103**,1556–1559 (2013)
- [9] WHO/UNICEF Joint Monitoring Programme. Meeting Report of the JMP Post-2015 Global Monitoring Working Group on Hygiene. Washington D.C., (2012)
- [10] Dasgupta A, Sarkar M. Menstrual hygiene: How hygienic is the adolescent girl? *Indian Journal of Community Medicine*, **33**, 77, (2008)
- [11] Khanna A, R.S. Goyal, Bhawsar R. Menstrual Practices and Reproductive Problems. *Journal of Health Management*, **7**, 91–107, (2005)
- [12] El-Gilany A-H, Badawi K, El-Fedawy S. Menstrual Hygiene among Adolescent Schoolgirls in Mansoura, Egypt. *Reproductive Health Matters*, **13**, 147–152 (2005)
- [13] Ekong I. Perception of Menstruation among Adolescent Secondary School Girls in Akwa Ibom State, Nigeria: An Implication For Sexual Health Education for Secondary School Girls. *THE ULUTAS MEDICAL JOURNAL*, **1**, 74 (2015)
- [14] Water Aid in Nepal. Is Menstrual Hygiene and Management an Issue for Adolescent Girls? A Comparative Study of Four Schools in Different Settings of Nepal, Kathmandu. *Water Aid in Nepal*, (2009)
- [15] Sommer M, Ackatia-Armah N, Connolly S, et al. A comparison of the menstruation and education experiences of girls in Tanzania, Ghana, Cambodia and Ethiopia. *Compare: A Journal of Comparative and International Education*, **45**, 589–609, (2014)
- [16] Vaishnavi P. K. Effectiveness of Health Education on Myths of Menstrual Hygiene among Adolescent Girls in Selected Rural Area in Andhra Pradesh, Vizianagaram District. *Indian Journal of Public Health Research & Development*. Epub ahead of print, (2020)
- [17] Kumar A, Srivastava K. Cultural and Social Practices Regarding Menstruation among Adolescent Girls. *Social Work in Public Health*, **26**, 594–604, (2011)
- [18] Crichton J, Okal J, Kabiru CW, et al. Emotional and Psychosocial Aspects of Menstrual Poverty in Resource-Poor Settings: A Qualitative Study of the Experiences of Adolescent Girls in an Informal Settlement in Nairobi. *Health Care for Women International*, **34**, 891–916, (2013)
- [19] Mason L, Nyothach E, Alexander K, et al. ‘We Keep It Secret So No One Should Know’ – A Qualitative Study to Explore Young Schoolgirls Attitudes and Experiences with Menstruation in Rural Western Kenya. *PLoS ONE*, **8**, (2013)
- [20] Sommer M, Torondel B, Hennegan J, et al. How addressing menstrual health and hygiene may enable progress across the Sustainable Development Goals. *Global Health Action*, **14**, (2021) *Crossref*, <https://doi.org/10.1080/16549716.2021.1920315>.
- [21] Gundi M, Subramanyam MA. Menstrual health communication among Indian adolescents: A mixed-methods study. *PLOS ONE*, **14**, (2019)
- [22] Schiavo R. *Health Communication: From Theory to Practice*. 2nd ed. Jossey- Bass, (2013)
- [23] Gupta D, Jai P N, Yadav SJ. Strategic Communication in Health and Development: Concepts, Applications and Programming. *Journal of Health Management*, **23**, 95-108, (2021)
- [24] Ali TS, Rizvi SN. Menstrual knowledge and practices of female adolescents in urban Karachi, Pakistan. *Journal of Adolescence*, **33**, 531–541, (2009)
- [25] Iliyasu Z, Aliyu MH, Abubakar IS, et al. Sexual and Reproductive Health Communication Between Mothers and Their Adolescent Daughters in Northern Nigeria. *Health Care for Women International*, **33**, 138–152, (2012)
- [26] Kissling EA. Bleeding out Loud: Communication about Menstruation. *Feminism & Psychology*, **6**, 481–504, (1996)
- [27] Zakaria M, Xu J, Karim F, et al. Reproductive health communication between mother and adolescent daughter in Bangladesh: a cross-sectional study. *Reproductive Health*, **16**, (2019)

- [28] India - C-13: Single-year age returns by residence and sex, India - 2011. India - C-13: Single year age returns by residence and sex, India – (2011), <https://censusindia.gov.in/nada/index.php/catalog/1436>.
- [29] Prajapati N Laxminarayan. Swachh Bharat Swachh Vidyalaya | Ministry of Education, GoI. Swachh Bharat Swachh Vidyalaya | Ministry of Education, GoI, <https://dse.education.gov.in/sbsv>.
- [30] Health & Family Welfare-Government of India M of. Menstrual Hygiene Scheme (MHS) :: National Health Mission. Menstrual Hygiene Scheme (MHS) :: National Health Mission, <https://nhm.gov.in/index1.php?lang=1&level=3&sublinkid=1021&lid=391>.
- [31] Peterman E. The Impact of Interpersonal And Community Level Indicators On Menstrual Health And Hygiene Management Among Adolescent Girls In Rural India: A Methodological Analysis Of Behavioral Monitoring Tools, (2016)
- [32] Chacko Amala T, Jose Jolly. Health Communication Interventions for Promoting Menstrual Health and Hygiene Management in India: A Review. *E3S Web of Conferences*, **453**, (2023) <https://doi.org/10.1051/e3sconf/202345301014>.
- [33] McGuire WJ. Public communication as a strategy for inducing health-promoting behavioral change. *Preventive Medicine*, **13**, 299–319, (1984)
- [34] Sood S, Kostizak K, Ramaiya A, et al. Measuring the effectiveness of communication programming on menstrual health and hygiene management (MHM) social norms among adolescent girls in India. *Global Public Health*, **16**, 578–589, (2020)
- [35] Ramaiya A, Malhotra A, Cronin C, et al. How does a Social and Behavioral Change Communication Intervention Predict Menstrual Health and Hygiene Management: A Cross-Sectional Study. *BMC Public Health*, **19**, (2019)
- [36] Block SJ, Hauer MK, Ezeh A, et al. Menstrual management among adolescent girls in Uttar Pradesh, India: An examination of interpersonal and mediated communication as delivery mechanisms for practical guidance. *Frontiers in Reproductive Health*, **4**, (2023)
- [37] Ghosh S, Saha M. Health Communication and Behavioural Change: An Exploratory Study among Marginalized Communities in Rural West Bengal, India. *Journal of Health Management*, **15**, 307–327, (2013)
- [38] Mahanta TG, Boruah M, Singh VK, et al. Effect of social and behavior change communication by using infotainment in community perception of adolescent girls for reproductive and sexual health care in high priority districts of Assam. *Clinical Epidemiology and Global Health*, **4**, 133–139, (2016)
- [39] Sharma C, Dwivedi R, Bhardwaj P, et al. Effect of peer educator-PRAGATI (PeeR Action for Group Awareness through Intervention) on knowledge, attitude, and practice of menstrual hygiene in adolescent school girls. *Journal of Family Medicine and Primary Care*, **9**, 3593-3599, (2020)
- [40] S R, Gupta M, Kumar D, et al. An intervention to empower and engage the self help groups for menstrual hygiene in Karnataka, India. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, **1**, (2015)
- [41] Dongre AR, Deshmukh PR, Garg BS. The Effect of Community-Based Health Education Intervention on Management of Menstrual Hygiene among Rural Indian Adolescent Girls. *World Health & Population*, **9**, 48–54, (2007) *Crossref*, <https://doi.org/10.12927/whp.2007.19303>.
- [42] Panda A, Sehgal A. Impact of Information, Education and Communication on Adolescent Reproductive Health. *Journal of Health Management*, **11**, 445–472, (2009)
- [43] Jyoti K, Lal M, Mahajan S, et al. Assessing the impact of information, education and communication activities regarding menstrual hygiene practices among adolescent girls 13-17 years in the rural area of Amritsar. *International Journal Of Community Medicine And Public Health*, **7**, 1470–1474, (2020)
- [44] Dharmalingam GP, M M, S P. Effectiveness of Health Education in Improving Menstrual Hygiene Knowledge and Practices among Adolescent Girls of Rural India. *Healthline*, **13** (130–137), 2022 *Crossref*, https://doi.org/10.51957/health_line_357_2022.
- [45] Joshi P, Anshika A, Arun A, et al. A Study to assess the Effectiveness of Video-Assisted Teaching Programme on Knowledge regarding Menstrual Hygiene among Adolescent Girls at selected school in Rudrapur, Udham Singh Nagar. *International Journal of Nursing Education and Research*, (2021) *Crossref*, <https://doi.org/10.52711/2454-2660.2021.00064>.
- [46] Rawat M, Shields AN, Venetis MK, et al. Women’s Agentic Role in Enabling and Dismantling Menstrual Health

- Taboos in Northern India: A Culture-Centered Approach. *Health Communication*, **38**, 695–704, (2021) *Crossref*, <https://doi.org/10.1080/10410236.2021.1970296>.
- [47] Pandey N. Communicating about menstruation to adolescent girls. *Mass Communicator: International Journal of Communication Studies*, **14**, (2020) *Crossref*, <https://doi.org/10.5958/0973-967x.2020.00009.5>.
- [48] Kumari RK. Interpersonal Communication on Sexual and Reproductive Health in COVID-19 Era: An Analysis of Adolescent Girls in Urban Village of Delhi. *International Journal of Science and Research (IJSR)*; **9**, 52- 60, (2020)
- [49] Sood S, Shefner-Rogers C, Skinner J. Health Communication Campaigns in Developing Countries. *Journal of Creative Communications*, **9**, 67–84, (2014) *Crossref*, <https://doi.org/10.1177/0973258613517440>.
- [50] Olaoye A, Onyenankeya K. A systematic review of health communication strategies in Sub-Saharan Africa-2015-2022. *Health Promotion Perspectives*, **13**, 10–20, (2023) *Crossref*, <https://doi.org/10.34172/hpp.2023.02>.
- [51] Evans RL, Harris B, Onuegbu C, et al. Systematic review of educational interventions to improve the menstrual health of young adolescent girls. *BMJ Open*, (2022) p. e057204. *Crossref*, <https://doi.org/10.1136/bmjopen-2021-057204>.
- [52] Banerjee SK, Andersen KL, Buchanan RM, et al. Woman-centered research on access to safe abortion services and implications for behavioral change communication interventions: a cross-sectional study of women in Bihar and Jharkhand, India. *BMC Public Health*, **12**, (2012)
- [53] Murray E, Burns J, See TS, et al. Interactive Health Communication Applications for people with chronic disease. *Cochrane Database of Systematic Reviews*, (2004) <https://doi.org/10.1002/14651858.cd004274.pub3>