

# Beyond menstrual hygiene: addressing vaginal bleeding throughout the life course in low and middle-income countries

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## ABSTRACT

Girls and women experience numerous types of vaginal bleeding. These include healthy reproductive processes, such as menstruation and bleeding after childbirth, but also bleeding related to health conditions, such as fibroids or cancer. In most societies, the management of menstruation is handled covertly, something girls are often instructed about at menarche. The management of other vaginal bleeding is often similarly discreet, although behaviours are not well documented. In many societies, cultural taboos frequently hinder open discussion around vaginal bleeding, restricting information and early access to healthcare. Additionally, the limited availability of clean, accessible water and sanitation facilities in many low and middle-income countries augments the challenges girls and women face in conducting daily activities while managing vaginal bleeding, including participating in school or work, going to the market or fetching water. This paper aims to highlight the key vaginal bleeding experiences throughout a woman's life course and the intersection of these bleeding experiences with their access to adequate water and sanitation facilities, information and education sources, and supplies. The aim is to address the silence around girls and women's vaginal bleeding and their related social, physical and clinical management needs across the life course; and highlight critical gaps that require attention in research, practice and policy around this neglected topic of health and gender equality.

## INTRODUCTION

Attention to women and girls' health risks and outcomes beyond the reproductive years is increasing,<sup>1 2</sup> with life course approaches emphasising that health is dynamic and cumulative, and influenced by genetic, biological, behavioural, social and economic contexts.<sup>3</sup> This paper assesses the range of vaginal bleeding episodes ('episodes' herein used to represent episodic vaginal bleeding, including both menstrual and due to other causes) that girls and women may experience during the life course, and their associated needs for

## Key questions

### What is already known about this topic?

- ▶ Girls and women require water, sanitation, information, education and supplies to correctly manage the numerous types of vaginal bleeding they experience.
- ▶ In most societies, the management of menstruation and other vaginal bleeding is handled covertly as cultural taboos frequently hinder open discussion.

### What are the new findings?

- ▶ Cultural, societal and financial constraints negatively impact girls and women's ability to adequately manage vaginal bleeding, and to differentiate when such bleeds require health intervention.
- ▶ The limited availability of clean, accessible water and sanitation facilities in many low and middle-income countries augments the challenges girls and women face in conducting daily activities while managing vaginal bleeding.

### Recommendations for policy

- ▶ Breaking the silence around girls and women's vaginal bleeding and their related social, physical and clinical management needs across the life course require attention in research, practice and policy, including improved education, training and communication.

information, supplies water and sanitation. Based on the recent, growing knowledge base of the challenges women and girls in low and middle-income countries (LMIC) face during menstruation due to these needs being largely unmet,<sup>4 5</sup> this paper hypothesises that the evidence to date represents the 'tip of an iceberg.' A life course approach is required, one that looks at vaginal bleeding including and beyond menstruation, to comprehensively address the critical needs of girls and women for information, supplies, water and sanitation in LMICs.



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Throughout the life course, girls and women experience numerous episodes of vaginal bleeding, many of which remain hidden due to misinformation, fear, embarrassment, shame and taboo.<sup>6</sup> This features the more widely known bleeding experience of monthly menstruation, as well as other less discussed bleeding episodes, including those related to pregnancy, childbirth and postpartum, miscarriage, cancers and endometriosis (see [table 1](#)). To navigate these experiences, girls and women require factual and supportive information that enables them to differentiate between healthy and abnormal bleeding, to understand and take care of their bodies or those of dependents who may require assisted care, and to seek health advice appropriately. To manage vaginal bleeding hygienically and with dignity requires adequate (clean, safe, private, affordable and accessible at any time) water, sanitation and hygiene (WASH) facilities, and supplies (ie, soap, sanitary products, basins). Basic essentials required to manage menstrual needs have only recently been characterised (see [box 1](#)). The ways in which women and girls manage these bleeding experiences can vary greatly depending on factors associated with the bleeding itself, their particular life course trajectory (age, agency, previous life experiences) and the broader physical and social environments in which they operate. For women living in LMICs, support and WASH services are particularly lacking.

#### Definition of adequate menstrual hygiene management

Women and adolescent girls are using a clean menstrual management material to absorb or collect menstrual blood, that can be changed in privacy as often as necessary for the duration of a menstrual period, using soap and water for washing the body as required, and having access to facilities to dispose of used menstrual management materials. They understand the basic facts linked to the menstrual cycle and how to manage it with dignity and without discomfort or fear.<sup>7</sup>

#### The types of bleeding experienced over the life course

There are numerous types of vaginal bleeding experienced by girls and women. Some are part of a healthy reproductive cycle over the life course, and others are linked to specific disease conditions. The majority of girls and women will experience monthly menstruation. Given the declining age of puberty (and menarche) and decreasing fertility rates in many parts of the world,<sup>8–10</sup> the number of years during which a girl or woman will experience monthly menstrual bleeding has expanded along with the number of episodes. If the average girl reaches menarche around age 12, and the average age of menopause is 51–52 years old, that is over 40 years of monthly bleeding (480 months, estimated 2400 menstrual-related bleeding days for average cycle length of 5 days), with exceptions for disrupted menstruation due to stress, travel, nutrition, pregnancy and breast feeding (although many pregnancies include spotting). A proportion of those will experience some form of menorrhagia

or abnormal bleeding, which can include spotting throughout the month, episodes of very heavy and painful bleeding or months with no bleeding. Women are likely to experience episodes of bleeding for 4–6 weeks after a miscarriage and 4 weeks postpartum.<sup>11</sup> This has particular significance for those in LMIC with high fertility rates (ie, multiple pregnancies and/or miscarriages). In addition, it is estimated that 5%–15% of women of reproductive age globally have abnormal uterine bleeding.<sup>12</sup> Episodes of vaginal bleeding may occur prior to menarche,<sup>13 14</sup> occur during perimenopause<sup>15</sup> and may occur postmenopause due to illness conditions.

Although minimal prevalence data exist across LMIC, there are likely to be significant numbers of women who experience vaginal bleeding related to reproductive health conditions, such as fibroids or endometriosis. One study from Nigeria suggested that 29% of women of reproductive age have fibroids.<sup>16</sup> Both conditions can mean extremely heavy irregular bleeding along with discomfort. A cross-sectional internet study among 21 476 women in eight high and middle-income countries found that 33% of women with fibroids experienced bleeding between periods compared with 14% of women without, and significantly greater proportions of women with fibroids reported heavy menstrual bleeding, prolonged menstrual bleeding, and more frequent and irregular menses as compared with their counterparts.<sup>17</sup> In Senegal and Mali, 52 and 51 (per 100,000) of disability-adjusted life years are estimated for uterine fibroids.<sup>18</sup> The causes of both uterine fibroids and endometriosis are unknown.

As life expectancies increase, women across LMIC are more likely to experience uterine or cervical cancers,<sup>19</sup> both of which cause vaginal bleeding. Cervical cancer, caused by certain strains of human papilloma virus (HPV), is the most common form of cancer currently reported among women in sub-Saharan Africa, with 34 000 out of 100 000 diagnosed each year (and limited screening suggests underdiagnoses).<sup>20</sup> HPV is spread through vaginal, anal and oral sex, meaning that previous life events influence risk.

These issues suggest significant implications for the girls, women and caregivers who may struggle to manage illness-related vaginal bleeding for themselves or their dependents. All vaginal bleeding episodes potentially cause subjective experiences of fear, discomfort and anxiety.<sup>21–23</sup> Physically, frequent or prolonged bleeds add to girls and women's risk of anaemia, particularly for those who are nutritionally compromised, or having comorbidities such as HIV.<sup>24</sup> Concomitant weakness, fatigue and other symptoms may affect their ability to complete the heavy burden of chores,<sup>25</sup> a challenge compounded by insufficient access to safe, private and clean WASH facilities, and mechanisms for disposal of bloody absorbent materials, or private spaces for washing and drying reusable soiled materials, as well as a lack of adequate information and support.<sup>4</sup>

**Table 1** Types of bleeding episodes experienced from menarche to menopause

	Age range	'Normal' amount of blood	'Normal' length of time	Definition/symptoms
Cervical cancer	Any age, median age is 49	Menstruation can be heavy, irregular, painful or spotting	Continues until treated, bleeding likely to occur during MP; varies	Cancer in the cells of the cervix linked to the human papilloma virus; bleeding is often not related to menses
Endometriosis	Most cases diagnosed between 25 and 35 years of age	Menstruation can be heavy, irregular, painful or spotting	Continues until treated, bleeding likely to occur during MP; varies	A condition resulting from the appearance of endometrial tissue outside the uterus; heavy MP, irregular MP, painful MP or spotting, abdominal cramping, constipation or nausea
Menarche	Usually between 8 and 16 years	Can vary but usually lighter spotting	2–7 days is normal; cycles are often irregular for 1–2 years	First menstrual cycle, can be accompanied by cramps, irritability/heightened emotions, tender breasts
Menorrhagia	From age of menarche to menopause (ages ~8–60)	60–90 ml or more	Can be over 7 days	Abnormally heavy menstrual bleeding; MP lasts longer than 7 days or is too frequent (less than 21 days between periods), spotting or bleeding between MPs or during pregnancy
Menstrual bleeding	From age of menarche to menopause (ages ~8–60)	Average blood lost is 30–40 ml, with 90% of women <80 ml	2–7 days is normal	Process of discharging blood and other materials from uterine lining monthly, can be accompanied by cramps, irritability/heightened emotions, tender breasts
Miscarriage	From age of menarche to menopause (ages ~8–60)	Spotting can occur after miscarriage	Can spot for up to 2 weeks after miscarriage; can result in haemorrhage	Expulsion of a fetus from the womb before childbirth; irregular uterine bleeding, pain (abdomen, lower back, pelvis), vaginal discharge, uterine contractions, nausea
Perimenopause/menopause	Usually mid-40s to early 60s; average age 51–52	Spotting or heavy	Average length is 4 years. Ends when 12 months without MP	Time before and during the end of menstruation in the life cycle; absence of MP, spotting, heavy or irregular MP, hot flashes/night sweats, vaginal dryness
Postpartum haemorrhage	Menarche to menopause (ages ~8–60)	Excessive vaginal bleeding (<90 ml)	Up to 6 weeks postpartum	Excessive bleeding after childbirth; vaginal bleeding, fast heart rate or low blood pressure
Sexually transmitted infections	Any age if sexually active	Heavy, spotting	Continues until treated	Diseases passed on through sexual contact (ie, chlamydia, gonorrhoea); pelvic inflammatory disease, menorrhagia, bleeding after intercourse, spotting between periods
Uterine fibroids	Can occur by age 20, usually between 35 and 54	Menstruation can be heavy, irregular, painful or spotting	Continues until treated, bleeding likely during MP; varies	Non-cancerous growths in uterus that can develop during childbearing years; heavy MP, prolonged MP, pelvic pressure/pain, frequent/difficult urination
Uterine polyps	Rare before 20, can occur after menopause	Menstruation can be heavy or irregular	Continues until treated	Usually non-cancerous growths attached to inner wall of uterus; irregular or excessive bleeding and bleeding after menopause can occur

MP, menstrual period.

### The challenges of managing vaginal bleeding in low-resource contexts

Although girls and women living in high-income countries may struggle to understand the nature and length of their menstrual cycle, most will have access to information resources and support (ie, internet, clinics, libraries) to confirm their bleeding is healthy or if clinical care is needed. Nearly all girls and women have access to private, clean, safe toilets with water and disposal at home, school, work and in public places, and a range of sanitary products so they are able to manage regular or unexpected/irregular bleeding and differing blood flows with dignity, privacy and comfort. This may not be the case for homeless<sup>26</sup> or hard to reach girls and women in high-income countries, or those who are otherwise disadvantaged in relation to their access to credible information and adequate WASH facilities, such as prisoners<sup>27</sup> and migrant workers.<sup>28</sup>

Although there exists almost no literature on management of other episodes of vaginal bleeding in LMIC, there is growing evidence on the menstruation-related barriers facing adolescent girls and female teachers in school environments.<sup>4</sup> These include the inadequate provision of guidance and support, supplies and WASH facilities in schools.<sup>29–30</sup> Girls across LMIC are frequently not informed about menarche prior to their first bleeding episode,<sup>31</sup> and studies have highlighted the misconceptions and shame shrouding menstruation in many societies,<sup>4 29 30 32</sup> and the fear and anxiety many girls experience at menarche and when menstruating at school.<sup>21</sup> Even when menarche's arrival is celebrated, girls are taught to hide and manage menstruation discreetly,<sup>33</sup> with some findings illustrating a wider misunderstanding among women and adults in society.<sup>34</sup> Studies are being conducted currently to assess if the provision of improved menstrual hygiene management information and supplies impacts girls' educational, psychosocial, sexual and reproductive health outcomes.

### The importance of water, sanitation, hygiene and supplies for bleeding management in low-income contexts

Sanitation facilities provide a potential private space for managing bleeding including washing, changing and disposal. Yet, over 2.4 billion people living around the world do not have access to improved sanitation.<sup>7</sup> And, on any given day, more than 800 million girls and women between the ages of 15 and 49 are menstruating,<sup>35</sup> suggesting that a significant number of women and girls likely do not have access to a place to manage both light and heavy episodes of bleeding. Moreover, this number is an underestimate given that women do menstruate before age 15 and after age 49 and it does not include women and girls who are experiencing non-menstruation-related bleeding. Non-menstrual types of vaginal bleeding may impact very young girls and women of advanced age who may need supplies and facilities that are more appropriate for their size and needs, but that may be unavailable. Further, even where facilities exist,

some girls and women may avoid managing vaginal bleeding in toilets, if they consider them too dirty, unsafe or lacking necessary supplies. For example, in Niger, only 44% of women,<sup>7 19–45</sup> and in Kaduna State, Nigeria, only 37% of women report having everything they need to manage their menstruation.<sup>36</sup>

There also exists a gap in empirical evidence on the impact of inadequate WASH in the workplace for girls and women experiencing vaginal bleeding,<sup>5</sup> and on the violence-related challenges facing those using communal (and even household) WASH facilities when using outside toilets at night, or going for open defecation.<sup>37 38</sup> Heavy blood flow is particularly difficult to manage where leaking (ie, blood staining the clothes) breaches the taboo of secrecy causing shame, and where inadequate facilities and supplies for bleeding management may disproportionately hinder engaging in daily activities of living.

In some contexts, there may be cultural practices restricting access to water or comfortable environments to manage vaginal bleeding, such as in Nepal where menstruating and postpartum girls and women are confined to sleeping in a cowshed or hut.<sup>39</sup> In some cultures, menstruating girls and women are prohibited from touching water sources or using sanitation facilities given the association of menstruation with impurity.<sup>40</sup> This may have implications for the ability to hygienically manage other vaginal bleeding.

There is also growing attention to the challenges displaced menstruating girls and women face, including those in transit, highlighting the need for increased attention to menstrual management in humanitarian response contexts. This includes, for example, the improved provision of supplies, information and WASH facilities with disposal systems, along with addressing other vaginal bleeding needs (ie, pads in health clinics).<sup>41</sup> Displaced girls and women are often living in crowded conditions, with numerous family members or strangers crowded into shelters, and sharing WASH facilities that may lack locks and water. The hygiene kits handed out to households (ie, cloths or sanitary pads, underwear, buckets) may not adequately account for the numbers of menstruating girls and women in a given household, or for episodes of vaginal bleeding beyond menstruation.

In focusing on the intersectionality of bleeding episodes and WASH, it is important to highlight the need for facilities to wash or bathe, which are not always the same spaces in which girls and women can best manage bleeding-related materials. It is also important to include disposal facilities, so that women and girls do not face stress from blood-stained materials being seen by others.<sup>35 42</sup>

### Education and awareness of healthy and abnormal bleeding in LMICs

The structural realities of girls and women's lives in many LMICs create a gap in information through, for example, minimum media exposure to health messages, the lack of accessible health clinics that are focused on reproductive

health<sup>43</sup>; the low rates of secondary and tertiary education persisting in many countries,<sup>44,45</sup> the lower access to internet and media that girls and women have in comparison to boys and men<sup>46,47</sup>; and health clinic staff who may be insufficiently trained to conduct differential diagnosis or to be adequately supportive of questions about vaginal bleeding.<sup>48</sup> Girls and women's access to services may also differ depending on their age, marital status, geographical location and economic status, along with the prevailing gendered norms in the household influencing the seeking of care.<sup>49,50</sup>

Some studies in LMIC have documented girls and women's questions and concerns about perceived irregularity of their monthly menstrual flow.<sup>51</sup> They may fear disclosing new bleeding from a misconception that they would be punished, as has been found with girls in Ethiopia, Ghana and other countries; or fear disclosing irregular menstruation out of concern they will be perceived as infertile and unmarriageable.<sup>51</sup>

### Ongoing secrecy around vaginal bleeding

Though international development priorities have, to some extent, targeted adolescence and reproductive health related to childbearing, there is a marked silence around vaginal bleeding that girls and women experience over 40–50 years of the life course. This silence hinders attention to the significant information, and WASH-related needs that they face to manage bleeding, and may hinder the seeking out of healthcare as needed.

More specifically, recent studies in India highlighted the 'sanitation-related psychosocial stress' girls and women experience around their sanitation needs (ie, urination, defecation, menstruation).<sup>52,53</sup> While episodes of vaginal bleeding beyond menstruation are not noted, menstruation-related behaviours were considered the most stressful for women.<sup>52</sup> Such stress may be exacerbated by a lack of adequate management guidance, particularly for bleeding episodes that are not openly discussed. For example, it is likely that many girls in low-income contexts are inadequately informed about irregular monthly bleeding, or that women feel inadequately informed about how to manage heavy bleeding and discomfort from fibroids or endometriosis. Given the density of obstetricians across low-income countries ranges from 0.042 to 12.5 per 100 000,<sup>54</sup> with many healthcare workers who may not have quality training in reproductive health conditions and illnesses, girls and women may struggle to access healthcare to understand what is happening in their bodies and to receive treatment for their conditions, and to openly discuss an increased need for hygienic toilet facilities and supplies.

### CONCLUSION

There is a significant empirical gap in the evidence on episodes of vaginal bleeding and the related information

and management needs of girls and women in LMIC. Along with better understanding of the information, supplies and WASH-related challenges that girls and women encounter in different cultural, economic and geographical contexts, there is a need to develop appropriate evidence-based policy and programming to meet their needs. Individuals' experience of health throughout the life course depends on the resources available in the places inhabited, and the agency they are able to exercise given physical and social opportunities and constraints. A first step is breaking the silence around the topic of vaginal bleeding, from the global to the local level, so that girls and women are able to seek out the healthcare and management required with confidence and support.

Key recommendations for addressing support for women and girls in LMIC around vaginal bleeding in the future include the following: (1) a need to systematically evaluate the empirical evidence on vaginal bleeding to understand the extent to which women and girls are impacted and the gaps that need to be addressed with further research; (2) a need to develop global and national policy and strategic plans with guidelines to address these needs and develop relevant programming in LMIC, ranging from health promotion to improved availability of WASH infrastructure and supplies; (3) a need to conduct research with girls and women who experience vaginal bleeding unrelated to menstruation to understand their needs and how these needs may align with or differ from those at menstruation; (4) a need to ensure efforts to strengthen health systems and health worker capacity to improve women's health as part of the post-2015 agenda actively address vaginal bleeding, which may be a symptom of greater health problems; (5) a need to expand 'awareness campaigns' for bleeding-related signs and symptoms of disease in LMIC; and (6) a need to engage new actors, including encouraging sanitary hygiene manufacturers to include easy to read information on difference between normal and abnormal bleeding, and when to seek care.

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## REFERENCES

- Bustreo F, Chestnov O, Knaul FM, et al. At the crossroads: transforming health systems to address women's health across the life course. *Bull World Health Organ* 2013;91:622.
- Azenha GS, Parsons-Perez C, Goltz S, et al. Recommendations towards an integrated, life-course approach to women's health in the post-2015 agenda. *Bull World Health Organ* 2013;91:704–6.
- Halfon N, Hochstein M. Life course health development: an integrated framework for developing health, policy, and research. *Milbank Q* 2002;80:433–79.
- Sommer M, Caruso BA, Sahin M, et al. A Time for Global Action: addressing girls' Menstrual Hygiene Management needs in Schools. *PLoS Med* 2016;13:e1001962–9.
- Sommer M, Chandraratna S, Cavill S, et al. Managing menstruation in the workplace: an overlooked issue in low- and middle-income countries. *Int J Equity Health* 2016;15:86 <http://equityhealth.biomedcentral.com/articles/>.
- Geertz A, Iyer L, Kasen P, et al. *An Opportunity to Address Menstrual Health and gender equity*, 2016.
- House S, Mahon T, Cavill S. *Menstrual hygiene matters: a resource for improving menstrual hygiene around the world*. London: WaterAid, 2012.
- Anderson SE, Must A. Interpreting the continued decline in the average age at menarche: results from two nationally representative surveys of U.S. girls studied 10 years apart. *J Pediatr* 2005;147:753–60.
- United Nations. *World Fertility patterns*, 2015.
- Sommer M. Menarche: a missing Indicator in population health from low-income countries. *Public Health Rep* 2013;128:399–401.
- Visness CM, Kennedy KI, Ramos R. The duration and character of postpartum bleeding among breast-feeding women. *Obstet Gynecol* 1997;89:159–63.
- Harlow SD, Campbell OM. Epidemiology of menstrual disorders in developing countries: a systematic review. *BJOG* 2004;111:6–16.
- Albers JR, Hull SK, Wesley RM, et al. Abnormal Uterine Bleeding. *American Family Physician* 2004;69:1915–26.
- Hill NC, Oppenheimer LW, Morton KE. The aetiology of vaginal bleeding in children. A 20-year review. *Br J Obstet Gynaecol* 1989;96:467–70.
- Bhakta A, Fisher J, Reed B. WASH for the perimenopause in low-income countries: changing women, concealed knowledge? In: Shaw R, Anh NV, Dang TH, eds. *37th WEDC International Conference: sustainable water and sanitation for all in a fast changing world 15th–19th*. Hanoi: National University of Civil Engineering, 2014:2014. 1–7.
- Ekine AA, Lawani LO, Iyoke CA, et al. Review of the clinical presentation of uterine fibroid and the effect of therapeutic intervention on fertility. *Am J Clin Med Res* 2015;3:9–13.
- Zimmermann A, Bernuit D, Gerlinger C, et al. Prevalence, symptoms and management of uterine fibroids: an international internet-based survey of 21,746 women. *BMC Womens Health* 2012;12:6.
- The Global Health Data Exchange. *Uterine Fibroids: International Statistics on Mortality and Affected Populations*, 2013.
- Phillips-Howard PA, Laserson KF, Amek N, et al. Deaths ascribed to Non-Communicable diseases among rural Kenyan adults are proportionately increasing: evidence from a Health and Demographic Surveillance System, 2003–2010. Vol. 9, PLOS ONE. *Public Library of Science* 2014:e114010.
- Barango P, Couillard C. *Cervical cancer common amongst african women*, 2015.
- Sommer M. Where the education system and women's bodies collide: The social and health impact of girls' experiences of menstruation and schooling in Tanzania. *J Adolesc* 2010;33.
- 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* 2013;8:e79132.
- McMahon SA, Winch PJ, Caruso BA, a MS, a CB, et al. 'The girl with her period is the one to hang her head' Reflections on menstrual management among schoolgirls in rural Kenya. *BMC Int Health Hum Rights* 2011;11:7 <http://www.biomedcentral.com/1472-698X/11/7>.
- Adamu AL, Crampin A, Kayuni N, et al. Prevalence and risk factors for Anemia severity and type in malawian men and women: urban and rural differences. *Popul Health Metr* 2017;15:1–15.
- Oruko K, Nyothach E, Zielinski-Gutierrez E, et al. 'He is the one who is providing you with everything so whatever he says is what you do': A Qualitative Study on Factors Affecting Secondary Schoolgirls' Dropout in Rural Western Kenya. *PLoS One* 2015;10:e0144321–14.
- Creighton G, Mcmillan E, Saewyc E, et al. Girls on the Street, period: a qualitative study describing how homeless and street-involved girls manage menstruation. *Int J Qual Methods* 2013;12:849.
- Gershenson O, Penner B, eds. *Public Toilets and gender*. Philadelphia: Temple University Press, 2009:90–104.
- Arcury TA, Weir MM, Summers P, et al. Safety, security, hygiene and privacy in migrant farmworker housing. *New Solut* 2012;22:153–73.
- Sommer M. MHM in ten: advancing the MHM Agenda in WASH in Schools Second annual meeting. *New York, NY* 2015.
- Sommer M, 2016. Third annual meeting. *MHM in Ten: Advancing the MHM Agenda in Schools*
- Chandra-Mouli V, Patel SV. Mapping the knowledge and understanding of menarche, menstrual hygiene and menstrual health among adolescent girls in low- and middle-income countries. *Reprod Health* 2017;14:30.
- Sommer M, Sahin M. Overcoming the taboo: advancing the global agenda for menstrual hygiene management for schoolgirls. *Am J Public Health* 2013;103:1556–9.
- McMahon SA, Winch PJ, Caruso BA, et al. 'The girl with her period is the one to hang her head' Reflections on menstrual management among schoolgirls in rural Kenya. *BMC Int Health Hum Rights* 2011;11.
- van Eijk AM, Sivakami M, Thakkar MB, et al. Menstrual hygiene management among adolescent girls in India: a systematic review and meta-analysis. *BMJ Open* 2016;6:e010290 <http://bmjopen.bmj.com/lookup/doi/>.
- Unilever Domestos W. WSSCC) WS & SCC. *We Can't Wait: A report on sanitation And hygiene for women and girls* 2013.
- Johns Hopkins Bloomberg School of Public Health. *Managing Menstrual Hygiene: Niger, 2016* 2016.
- Jadhav A, Weitzman A, Smith-Greenaway E. Household sanitation facilities and women's risk of non-partner sexual violence in India. *BMC Public Health* 2016;16:1139.
- Sommer M, Ferron S, Cavill S, et al. Violence, gender and WASH: spurring action on a complex, under-documented and sensitive topic. *Environ Urban* 2015;27:105–16 <http://www.scopus.com/inward/record.url?eid=2-s2.0-84927745907&partnerID=tZotx3y1>.
- Robinson H. Chaupadi: the affliction of menses in Nepal. *Int J Womens Dermatol* 2015;1:193–4.
- Mahon Th?se, Fernandes M. Menstrual hygiene in South Asia: a neglected issue for WASH (water, sanitation and hygiene) programmes. *Gender & Development* 2010;18:99–113.
- Sommer M, Schmitt ML, Clatworthy D, et al. What is the scope for addressing menstrual hygiene management in complex humanitarian emergencies? A global review. *Waterlines* 2016;35:245–64 <http://www.developmentbookshelf.com/doi/abs/>.
- House S, Mahon T, Cavill S. Menstrual hygiene matters: a resource for improving menstrual hygiene around the world. WaterAid, editor. *Reprod Health Matters* 2013;21:257–9.
- Mayhew SH, Ploubidis GB, Sloggett A, et al. Innovation in evaluating the impact of Integrated Service-Delivery: the Integra indexes of HIV and Reproductive Health integration. *PLoS One* 2016;11:e0146694.
- UNESCO. *EFA global monitoring Report: education for all: the Quality imperative*, 2004.
- Nations U. *Education First: an initiative of the United Nations Secretary General*, 2012.
- Santosham S, Lindsey D, de DE, et al; *Bridging the gender gap: mobile access and usage in low- and middle-income countries*, 2015.
- Biggs P, Zambrano R. Doubling Digital Opportunities: enhancing the Inclusion of Women & Girls in the Information Society. *Geneva* 2013.
- Black KI, Fraser IS. The burden of health associated with benign gynecological disorders in low-resource settings. *Int J Gynaecol Obstet* 2012;119(S1):S72–S75.
- Oshi DC, Oshi SN, Alobu IN, et al. Gender-related factors influencing women'S HEALTH SEEKING FOR TUBERCULOSIS CARE IN EBONYI STATE, NIGERIA. *J Biosoc Sci* 2016;48:37–50.
- Wado YD. *Women's autonomy and reproductive healthcare-seeking behavior in Ethiopia*: DHS Work Pap, 2013.
- 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. *Comp A J Comp Int Educ [Internet]* 2014;45:1–21 [http://apps.webofknowledge.com.proxy.library.nd.edu/full\\_record.do?product=WOS&search\\_mode=GeneralSearch&qid=2&SID=4EmsbHHIMAYAK4ColiOu&page=1&doc=3&cacheurlFromRightClick=no](http://apps.webofknowledge.com.proxy.library.nd.edu/full_record.do?product=WOS&search_mode=GeneralSearch&qid=2&SID=4EmsbHHIMAYAK4ColiOu&page=1&doc=3&cacheurlFromRightClick=no)
- Sahoo KC, Hulland KR, Caruso BA, et al. Sanitation-related psychosocial stress: a grounded theory study of women across the life-course in Odisha, India. *Soc Sci Med* 2015;139:80–9.
- Hulland KR, Chase RP, Caruso BA, et al. Sanitation, stress, and Life Stage: a Systematic Data Collection Study among Women in Odisha, India. *PLoS One* 2015;10:e0141883.
- Hoyler M, Finlayson SR, McClain CD, et al. Shortage of doctors, shortage of data: a review of the global surgery, obstetrics, and anesthesia workforce literature. *World J Surg* 2014;38:269–80.



# Beyond menstrual hygiene: addressing vaginal bleeding throughout the life course in low and middle-income countries

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