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WOMENA FAQS: IS THERE ANY CONNECTION BETWEEN MENSTRUAL CUPS AND INFECTIONS?

WoMena receives many questions about the use of menstrual cups, from the women and girls we reach out to, from our trainers and from our partners. Therefore, we have created a series titled "WoMena FAQs" where we address these questions and answer them based on the best available scientific literature, consultation with experts, health authority guidelines and manufacturer advice.[1]

WOMENA SUMMARY AND RECOMMENDATIONS

Many women develop urogenital infections, such as bacterial vaginosis or yeast infections, at some point in their life. Prevalence rates of 20-30% or more have been documented in both high-, middle- and low-income countries. Many infections are asymptomatic, meaning that those who have the infection do not know.

Menstruation is a normal, physiologic process that does not, by itself, cause infection.

However, the products or practices used to absorb or contain menstrual blood could potentially increase the risk of infection. The key questions are: How serious is that risk? Are any products or practices, particularly using menstrual cups, more or less likely to cause infection?

There are only few studies which evaluate this.

Some products that need to be washed and dried (washable pads or cloth) seem slightly more likely to be associated with infection. This may depend on the product type and content,[2] as some washable pads dry in 2 hours, others in 4 hours or longer. It also depends on how girls and women use the products, for example, if single-use disposable pads are washed and reused (to save money), this could increase exposure to infections. It is therefore important to distinguish between *ideal* use (according to manufacturer guidelines) and *typical* use (how products are actually used).

For menstrual cups, we found no studies indicating that they are associated with increased risk of infection. The opposite is true: one study shows that using cups is associated with lower levels of infection than disposable pads, and providing free products - cups or pads - is associated with lower levels of sexually transmitted infections.

This is the best evidence we could find.[3] Comments warmly welcome! *http://womena.dk/faqs/*

[1] This FAQ was developed by the WoMena Knowledge Management Team (Andisheh Jahangir, Anna Bezruki, Alex Farley, Laura Hytti, Katinka Inger, Jennifer Rasanathan, Marianne Tellier, Siri Tellier). Comments by Janie Hampton, Penny Phillips-Howard and Sophia Grinvalds are gratefully acknowledged. Suggested citation: *WoMena (2018): FAQ – is there any connection between menstrual cups and infections? Available at http://womena.dk/faqs/*

[3] See also FAQ on Toxic shock syndrome

INTRODUCTION: Q1: What is the link between menstruation and infection?

WoMena staff are frequently asked by health providers and policy professionals whether different menstrual hygiene products or practices cause infections. In other words, is one product or practice more 'hygienic' than another?

Which infections? We will focus on infections located in the female urinary and reproductive tracts[4] ('urogenital infections'), since those are most plausibly[5] connected with menstruation.

What are the causes and risk factors? There are many different urogenital infections, including bacterial vaginosis, yeast infections, gonorrhea and syphilis. The World Health Organization (WHO) groups them by possible transmission routes:

1. Infections caused by organisms normally present in the reproductive tract (endogenous);
2. Infections introduced through medical procedures (iatrogenic); and
3. Infections introduced by sexual activity (STIs) (WHO 2005).

Menstruation itself is a normal physiologic process that does not cause urogenital infections in women. Notably, WHO does not suggest that menstruation, menstrual products or practices are a route of transmission for urogenital infections.

In theory, it is *biologically plausible* that the products and practices that women use to absorb or contain their menstrual blood once it exits the uterus could alter the vaginal microbiome, thereby potentially increasing the risk of *endogenous* infection. Products and practices could increase the likelihood of infection introduced through other means (*medical procedures or sexual activity*), for example by creating microabrasions in the vaginal tissue, thus providing a pathway for bacteria to enter the body. However, the *likelihood* of this occurring and, indeed, whether this *actually* happens, are unknown.

Q2: How common are urogenital infections?

The Global Burden of Disease Study does not give an estimate of the global burden of urogenital infections (GBD 2016); and to the best of our knowledge, there is no large-scale study on this.

Studies with narrower geographic scope show high prevalence. For example, in the US, one study estimated that 29.2 percent of women between the ages of 14 and 49 had bacterial vaginosis (Koumans et al. 2007). A study by Torondel et al (2018) in India found that, among 558 women, 41% had laboratory confirmed infections of bacterial vaginosis, and 34% had candidal infections. A study from Uganda found that among 6359 women, 23.8% were infected with trichomonas and 50.9% had bacterial vaginosis. Over 80% of those infected had no symptoms (Paxton et al, 1998).

[4] The reproductive tract refers to the fallopian tubes, uterus, vagina.
[5] We use the term '*plausible*', meaning that an association cannot be ruled out, to distinguish from '*likely'*, referring to the observer's assessment, or '*actual'*, meaning that the association has been observed

The quality and comparability of these estimates are compromised by the great variation in methodology. We do not aim to present a systematic review of urogenital infection rates, but statistics such as those above indicate that these infections are globally high, and that a large proportion may be asymptomatic.

Q 3: Is there evidence that different menstruation products and/or practices are associated with urogenital infections?

We will address both *products* and *practices* that absorb or collect menstrual blood, distinguishing between *ideal* use (using a product according to manufacturer guidelines) and *typical* use (how they are actually used).[6]

Menstrual hygiene practices are taken to encompass both personal hygiene (cleansing hands and external genitalia with soap and water while using products to manage menstruation) and product hygiene (washing and drying the product as per manufacturer instructions).

However, there seems to be no standardized definition or norm for what constitutes 'adequate' versus 'poor' menstrual hygiene (Das Gupta, 2008, Mishra 2015). Some cultural norms may make it difficult to follow standards for 'adequate' hygiene, for example where females are discouraged from bathing during menstruation (House et al., 2012). Other practices which are presented as 'hygienic', for example douching (squirting liquid inside the vagina to make it 'clean and fresh') is significantly associated with bacterial vaginosis (Koumans et al. 2007; Holzman et al. 2001; Fonck et al. 2001; Brotman et al. 2008) as well as sexually transmitted infections (Tsai et al. 2011).

This makes it more difficult to draw conclusions.

Also, as mentioned above, different infections have different risk factors. Therefore studies that group them together may not provide the level of detail needed to identify the 'causes' of a specific infection. This limits the strength of currently available data.

A number of studies from India conclude that the infection risk associated with different products, while generally low, is highest for reusable cloth or rags, followed by reusable pads, with the lowest risk for disposable pads. However, the specific type of product and practice used (for example how reusable pads are dried) is not specified (Das et al. 2015, Mishra 2015, Bhilwar et al. 2015). Those studies generally conclude that disposable pads are the most 'hygienic', that girls should be informed of this, and recommend as a solution that pads should be available at lower price.

The aforementioned study by Torondel B et al. from India is one of the few to look at practices in more depth. Women with Candida (yeast) infection had slightly lower frequency of personal washing, were more likely to use reusable absorbent material (cloth) and more often dried this materials inside their house rather than in the sun or open space. Women with bacterial vaginosis were more likely to change the absorbent materials outside a toilet facility, and to change them infrequently (twice a day).

[6] Because we focus on products that absorb or collect blood, we do not cover vaginal douching (which involves plunging liquid into the vagina) in depth. However, there is growing evidence of the causal links between douching and bacterial vaginosis as well as STIs including HIV and HPV (e.g. Zhang, J., Thomas, A. G., & Leybovich, E. 1997 and Hilber, et al. 2010).

Systematic reviews have not been able to make robust conclusions. Sumpter et al. (2013), in a review of 14 articles found seven reporting an association between menstrual hygiene and urogenital infections, but the association was weak and the methodologies varied. An unpublished review of the association between reproductive tract infections and menstrual products found infection rates to be slightly higher for products that need to be not only washed but also dried. Again, evidence was weak, and distinctions between different reusable materials and their use were not clear (Zarkin-Scott et al. 2017). A SHARE review by Balls et al. (2017) concluded that the evidence base is weak, and called for context specific research (including in emergency settings, for vulnerable groups such as minorities and women with disabilities). The authors reiterated a conclusion by Sumpter et al: "*It is biologically plausible that unhygienic MHM practices can affect the reproductive tract but the specific infections, the strength of effect, and the route of transmission, remain unclear.*"

It would seem that, although it is plausible that menstrual hygiene plays a role in the overall burden of urogenital infections, the contribution is limited and poorly documented.

Q 4: Is there evidence that cups increase the risk of infection?

We could find only two studies, both from Kenya, evaluating the use of menstrual cups and urogenital risk factors or infection. An observational study nested in a randomised controlled feasibility study involving 604 school girls found no significant difference in levels of S. aureus or TSS toxin-1 in girls provided either menstrual cups, disposable pads or 'usual practice' (Juma et al 2017). The prevalence of S. aureus was about 10% for all groups, both before and after the intervention. Two girls using pads tested positive for TSS toxin-1, but were clinically healthy.[7]

Philips-Howard (2016) in a cluster randomised pilot study in Kenya found that bacterial vaginosis was less common (12.9%) among girls using cups compared to those using disposable pads (20.3%). The authors note that the higher levels for pad users could be due to an obligation girls may feel to give some of their disposable pads to friends or family, and therefore wearing their own pads longer than recommended. Anecdotal reports are that girls may wash their disposable pads and re-use them in order to make them last longer.

It is *biologically plausible* that cups could cause microabrasions during insertion or removal, especially in typical use by an inexperienced user (for example, attempting to remove the cup by pulling it out by its tail without first breaking the vacuum seal). This could in theory increase the risk of acquiring an infection, however, there is no evidence to support this.

Q 5: Is there evidence that links menstrual products and sexually transmitted infections?

In theory, any menstrual practice or product that breaks the skin's barrier could increase the risk of acquiring an STI during sexual contact, but we could find no evidence that this occurs.

Cervical cancer is caused by a sexually transmitted virus called the human papillomavirus (HPV). There is no evidence that the risk of acquiring HPV is increased by a particular menstrual product or practice. HPV can be prevented by vaccination.

[7] S. aureus or TSS toxin are often present in the vagina without it leading to illness.See also FAQ on TSS

In some contexts, inaccessibility of menstrual products, for example due to high cost, drives behaviors that increase the risk of STIs. One study of 3418 school girls in Kenya found that two-thirds of pad users received them from sexual partners (Phillips-Howard et al., 2015). 10% of 15-year-olds reported engaging in transactional sex to pay for pads (Phillips-Howard et al., 2015) and similar patterns are also described in other studies (Oruko et al., 2015; Amornkul et al., 2009; Mason et al., 2013). In Uganda, one study by the Ministry of Health found that a quarter of adolescents reported engaging in transactional sex, although menstrual products were not specifically identified as a reason for doing so (Ministry of Health et al 2016). This again points to the importance of poverty and economic conditions in driving increased infection rates, irrespective of product used.

Indeed, when menstrual cups and disposable pads were provided to 644 school girls in Western Kenya for approximately one school year, girls had lower levels of sexually transmitted infections than those who continued 'usual menstrual practice' (Phillips-Howard et al., 2016). The authors suggest this could be due to a reduced need for transactional sex.

Suggestions for further Research:

Many questions remain on the connection between infections and menstrual products and practices. For all of them, we note the importance of defining concepts, distinguishing between different types and brands of products (traditional, homemade and commercial, as well as infection routes. A distinction should be made between 'typical' and 'ideal' use of products.

What is the overall contribution of menstrual hygiene to urogenital infections?
Which (if any) menstrual products and practices are the most significant sources of urogenital infections or other irritations in the genital area?
What innovations in menstrual products are needed to further reduce the risk of associated infections?
How can menstruators (including marginalised groups) be supported to use menstrual products in ways that limit the risk of infection?
How would rates of urogenital infections change if women were provided with universal access to affordable menstrual management products?
Is there an effect on urogenital infections with different ways of cleaning or using menstrual cups?

For infections in general we note that much is also missing:
What is the global prevalence of urogenital infections, their social and economic impact? Their age distribution (before menarche, during reproductive ages, or post-menopause?) Do levels vary according to sexual activity, or sub-group (for example economic)?

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