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Cultural aspects of menstruation and menstrual hygiene in adolescents

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The topic of genital hygiene practices in adolescent girls is under-represented in the literature, despite the fact that poor genital hygiene has a significant potential to negatively impact adolescent health. Moreover, douching (a hygiene practice relatively common among adolescent girls) is linked to numerous serious gynecological problems. Menstruation brings with it a significant hygiene challenge, but in many cultures it is also an important social milestone, surrounded by many cultural practices that profoundly alter a girl's life. The ability to practically manage menstruation may also impact a girl's life, depending on the availability of appropriate absorbent products and access to private sanitation facilities. Despite the fact that menstruation is shared by more than half the world's population, it is a topic that virtually all cultures are uncomfortable discussing at some level, and most girls are ill-informed with regard to menstruation and are unprepared for menarche. Better preparation for menstruation, however, has been consistently associated with a better outlook on menstruation and a better competence in managing menstrual hygiene. Girls regard parents, other adult females, schools, community health organizations and health professionals as appropriate sources of information, which suggests numerous ways in which girls could be more effectively prepared about menarche and menstrual hygiene.

Keywords: adolescent • cultural practices • feminine • genital hygiene • hygiene • menarche • menstrual • menstrual hygiene • protection • religious beliefs • sanitary pads • tampon

Adolescents make up one fifth of the total world population [1], a statistic that only serves to amplify the dearth of information available on hygiene practices of adolescent girls, particularly with regard to genital health. Recommended practices for genital hygiene have often been made by necessity, without any real empirical foundation. It has been consistently recommended with regard to perineal hygiene, for example, that girls wipe from front to back to prevent vaginal colonization by enterobacteria, despite the fact that this common recommendation is as yet not supported by evidence [2].

Effective management of hygiene in adolescent girls, however, is an important public health issue [3]. Hygiene practices depend on cultural norms, parental influence, personal preferences and socioeconomic pressures. Maintaining a girl's perineal hygiene, however, can be a challenge as parent supervision decreases, particularly as menstruation ensues at a time when girls become less willing to accept parental involvement [3].

Genital hygiene & health in adolescent girls

Poor hygiene can lead to an accumulation of smegma, a pasty agglomeration of epithelial cells and sebum that collects in moist areas of the genitalia such as the clitoral folds. Smegma can harden over time, causing itch or pain often exacerbated by scratching [3].

It is probable that vaginitis is occasionally caused by poor genital hygiene, but may also represent other undiagnosed dermatological complaints [3]. For example, a major cause of contact dermatitis in the vulvar area is irritation due to soaps and other personal hygiene products [4].

Puberty typically brings with it an increased interest in hygiene as a whole in adolescent girls, including genital hygiene. Some girls, however, will continue to exhibit poor genital hygiene habits well past menarche; and with showering instead of bathing, genital cleanliness in adolescence may even deteriorate. Interviews with 295 adolescent women who visited primary health clinics in Indianapolis (IN, USA) found

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that 29% of the young women used feminine sprays, 27% used feminine wipes and 25% douched (some subjects reported use of more than one product) [5]. A telephone survey of 2602 US women found that women who douched were much more likely to also use vaginal sprays, wipes, powder and bubble bath [6]. A study of 104 girls aged 12–18 years who had been admitted to a correctional facility found that 40% reported using sprays, 33% feminine wipes and 9% feminine suppositories; 79% reported a history of douching. Most used store-bought douching solutions, although baking soda, Betadine®, Pine-sol® and Lysol® were also used [7].

Douching: good hygiene gone bad

Douching, in particular, is a common practice among American adolescents and is more popular among teens of low socioeconomic status as well as black and Hispanic individuals and other ethnic minorities [8]. Despite the fact that this practice is statistically associated with numerous other reproductive health issues (including pelvic inflammatory disease [9] [particularly for teens [10]], infertility [11], ectopic pregnancy [12], cervical cancer [13], preterm delivery [14], low birthweight [15], bacterial vaginosis [16,17] and sexually transmitted infections [18], with compelling data for a causal relationship between pelvic inflammatory disease and bacterial vaginosis), many teens still believe that douching is an important component of genital hygiene.

Girls reported douching for a variety of reasons, as follows: to feel fresh, to rid themselves of perceived odor, to wash the vagina clean of blood after menstruation and to prevent pregnancy or disease. Interestingly, some girls report douching because their partner wanted them to [7]. In fact, a survey of at-risk youth in Texas public schools found that 25% of girls practiced douching because their boyfriend wanted them to, while 75% of male students expressed the desire for their female partners to practice douching [19]. Girls surveyed reported that their mothers (40%) and other female relatives (47%) encouraged them to do so [19].

Belief that douching is necessary for good genital hygiene is prevalent in the adult population in the USA [20], particularly in the Southeast, among black individuals, Latino women, and women with lower educational status [21]. The practice is culturally influenced: a survey of 870 women in Alabama and its adjacent southern states found that 64.8% of the women believed that douching was a good hygienic practice; moreover 39.8% felt that is was essential for good hygiene [21]. Both beliefs were more common among black women than white women [21]. It is also a learned behavior; attitudes with regard to appropriate genital hygiene are passed down from mother to daughter. Results from the 1995 National Survey of Family Growth found that 55% of black women reported douching compared with 21% of white women, while 37% of black adolescent girls douched compared with 11% of white adolescent girls [21].

Age at first douche correlates strongly with age at first intercourse [20], as well as with age at menarche [22]. Frequency of douching varies widely; some girls only douche occasionally, some once a month (typically after menstruation), some more often [7]. In an HIV initiative conducted with at-risk youth in Texas public schools, the Hispanic students surveyed were more likely to douche once a week than black individuals, who were more likely to douche once a month [19].

Douching is being initiated at earlier ages than ever before [23]. As douching often follows the beginning of sexual activity in girls, douching is more common among adolescents who are at an increased risk for sexually transmitted infections [18].

Adolescents & menstruation

The onset of menstruation is an important biological milestone. It also presents a significant challenge in hygiene for adolescent girls. The timing of an adolescent girl's first menstruation, known as menarche, varies around the world, as well as among nationalities and other socioeconomic-dependent stratifications within specific regional areas [24]. However, across well-nourished populations in developed countries, age at menarche is fairly consistent, usually between 12 and 13 years of age [25]. Average age at menarche has fallen steadily over the last two centuries in the USA, although the rate of decrease has tapered off over the last 50 years [25]. Similar patterns, particularly in urban populations, have been observed more recently all over the world, as changing socioeconomic environments have produced better nutritional status. Average age at menarche in China, for example, has decreased from 16.5 to 13.7 over the last 40 years [26]. A 'normal' menstrual cycle in American females begins at 12.43 years of age, has a mean 32.3-day cycle interval (in the first year), and lasts a maximum of 7 days [25]. Depending on age at onset, today's adolescent girls will be required to manage up to 3000 days of menstruation over their lifetimes [27].

Women who do not regularly cleanse their perineal region during menstruation have increased risk of reproductive tract infection (odds ratio of 1.66 compared with those with better menstrual hygiene) [28]. Reproductive tract infections produce increased risk for adverse reproductive health outcomes such as infertility, recurrent abortions and ectopic pregnancies [29].

Challenges in menstrual management can impact far more than gynecological health. It has been observed that as many as 60% of girls at least occasionally miss school because of the inability to manage basic menstruation hygiene (e.g., change and disposal of absorbent materials and washing hands) in an educational setting [30].

Adolescent menstrual hygiene practices around the world

Practices in the Western world

General practices among Western women

Disposable sanitary pads have been available commercially in North America since 1921; commercially available disposable tampons with applicators were introduced in 1936. Across the Western industrialized world (e.g., Europe, Australia and the USA) most adult women use tampons, disposable sanitary pads and panty liners. Although initially controversial owing to concerns about sexual purity and the potential to negatively impact genital health, tampons are now the choice of most women in industrialized countries for menstrual protection [3]. Most

American women have adequate access to the sanitation facilities required for appropriate hygiene, yet regional and racial variations in menstrual hygiene habits have been observed (Table 1). In a Texas study, 30% of 193 urban women in Texas (mean age 23 years) intentionally limited bathing during their menstrual period [31], compared with only 11% of comparable age in California [32]. In addition, 70% reported washing hands after changing their menstrual pad in Texas, while 94% did so in California [32].

Practices among adolescents in the industrial world

Up to 70% of adolescents in the industrial world use tampons alone or in combination with pads [33], as do 81% of college students (Table 1) [34].

Today, American girls adopt tampons at an earlier age than their mothers did, a choice driven by increased levels of physical activity in modern girls, particularly by involvement in athletics [35]. In an Australian study, more girls reported trying tampons than consistently used them [36].

A reported 77% of girls who tried tampons had difficulty inserting them (girls experienced pain, were not sure where the appropriate orifice was, or did not know how to insert). Others feared injuring their vagina, damaging the hymen, forgetting the tampon, having difficulty in removing it or developing toxic shock. Those successfully using tampons tended to be among the older subjects, with more acquired knowledge of menstruation and more at ease discussing the issue [36].

Practices in the developing world

Options for menstrual protection

In the developing world, commercial menstrual products are less likely to be available, and cloth and other absorbent household materials such as tissue, gauze, cotton or wool are often used for menstrual protection, particularly among rural or economically disadvantaged populations. Where available, commercial products are also likely to be prohibitively expensive. The use of commercial sanitary protection in Uganda was determined to represent approximately a tenth of a poor family's monthly income [101], and in some countries (e.g., Kenya) these products are heavily taxed as luxury items [37].

Rural women, therefore, often choose easily accessible, inexpensive and reusable materials. In some areas (such as Sudan) families often have insufficient resources to even provide old cloths for protection. Other materials reported as menstrual absorbents used by the rural poor in developing countries include banana leaves, newspaper, sponges, jute sacks, papyrus, tissue paper, toilet paper rolls, sand and ashes [37]. In Uganda (Kanlangala district in central Uganda), menstruating girls lacking other absorbent materials were reported to manage menstruation by sitting immobilized, on a pile of sand, for the four or so days of menstruation [102]. Traditional beliefs discourage tampon use in many cultures, since women often believe that unimpeded blood flow is necessary to maintain health [38–40], or that use of tampons represent a loss of virginity, a fact that particularly discourages use among adolescents [41].

Many women in developing countries do use commercial sanitary napkins, especially in urban areas. For example, an estimated one-third of women in urban areas of India use pads [42], while only 5.1% of 225 women used sanitary napkins in a rural area (Haryana) [103]. Significant predictors of use of sanitary pads were availability of mass media at home, economic status and urban residence [43]. Use of cloth predominates among both urban and rural schoolgirls, and one survey of urban girls cited lack of confidence as the main reason for not choosing commercial pads (Table 2).

Choice of menstrual protection

The purpose of menstruation is widely believed to be to rid the body of toxic old blood, with impedance of blood flow as well as excess blood flow considered unhealthy. These beliefs can create suspicion of any menstrual protection that appears to influence menstrual patterns [44].

Table 1. Women's choices between menstrual protection options in the USA.

Location	Population studied	Tampons only (%)	Pads only (%)	Both (%)	Ref.
CA, USA	713 women aged 18–57 years	72	38	NR	[32]
MA, USA	Adolescents 224 girls, mean age 11.63 years	None	76	24	[68]
TX, USA	193 young women, mean age 23 years, mostly white	48	19	18	[31]
TX, USA	(Aged 13–60 years) 1601 postmenarchal women, including white, African–American and Latino women	60 used at least occasionally, 36 alone or with pads	40	NR	[69]
	699 white women	26 exclusively, 36 alone or with pads	NR	NR	[69]
	477 African–American women	16 exclusively, 27 alone or with pads	NR	NR	[69]
	425 Mexican–American women	11 exclusively, 21 alone or with pads	NR	NR	[69]
USA	250 college students aged 17–21 years	29	19	52	[34]

NR: Not reported.

Table 2. Women's choices between menstrual protection options in the developing world.

Location	Population studied	Cloth (%)	Pads (%)	Other (%)	Ref.
India					
Tamil Nadu urban and rural	800 girls aged 12–17 years	77.1	5.2	11.3 both, 6.5 only underwear	[46]
Andhra Pradesh rural	65 girls mostly aged 14–15 years	98.5, 38 reuse	0	2 cotton	[70]
West Bengal periurban	260 girls mostly aged 14–18 years	32.1	67.9	NR	[1]
West Bengal rural	160 girls aged 14–17 years	42.5 old, 6.25 new	11.25	40 both	[47]
Bangladesh urban poor		90 rags, 80 reuse	NR	NR	[27]
Asia					
Nepal rural (Chitwan district)	150 girls aged 13–15 years	98, 88.7 reuse	2	NR	[49]
Nepal urban and rural (4 districts) Dhading, Morang, Lalitpur, Kathmandu	204 girls aged 12–20 years (mean age: 16 years)	40	33 (50 urban, 19 rural)	NR	[104]
Africa					
Nigeria urban (Ile Ife)	352 girls aged 9–20 years	12	22	54 paper, 3 tampons	[55]
Nigeria urban (Enugu)	495 girls (mean age: 14.9 years)	9	69	22 toilet roll	[107]
Egypt urban (Mansoura)	664 girls aged 14–18 years	15.9 reusable, 12 discardable	66.8	NR	[43]

NR: Not reported.

Cultural taboos against the disposal of blood-soaked materials also make washing and reuse of cloth preferable. In addition, because cloths are washed by the user herself, it is often perceived that rewashing cloths provides better control of hygiene and can ensure avoidance of odor and infection [3]. Typically, menstrual cloths are either washed or disposed of in a pond or river bank used for public laundry [3]. The repeated use of unclean cloth and improper drying before reuse, however, has been suggested to have a potential to create a reservoir of microorganisms and spread of vaginal infections among adolescent girls [45].

Availability of sanitation facilities

Although most girls (urban and rural) use old cloths, places where cloths are stored may differ according to socioeconomic status. Urban girls are more likely to have an enclosed permanent structure for use as a bathroom that can be used to wash and store cloths in privacy; in rural areas, however, this option typically does not exist [46]. One study of menstruating girls in India found that more than half (51.25%) of the girls did not have a sheltered permanent toilet area [47]. Washing the cloths is also problematic because girls without permanent facilities must often walk to distant spots near rivers or lakes, increasing their chances of becoming victims of sexual aggression or other violence [37]. Many poorer urban girls wash rags in dirty water and without soap [27].

Drying washed clothes is also a challenge. Due to a strong cultural prohibition against men seeing any sign of menstruation, nearly 50% of rural girls reported drying or hiding cloths between periods in unhygienic places such as cowsheds, fields and holes in trees (compared with 30% of urban girls). As hidden cloths do not easily dry, girls are often forced to rewear them while still damp [37]. Approximately half of urban girls stored their cloths in their bathrooms [46].

A widespread lack of adequate sanitation facilities exists in public places in the developing world, and often men and women share toilet facilities. This environment allows for little privacy, and in urban areas does not provide a place to dispose of used sanitary products. In an Iranian study among adolescents in Tehran suburbs, 27% did not cleanse the perineal area regularly during menstruation, citing a lack of privacy [48]. For a lack of readily available privacy, as well as water, many girls do not routinely wash the perineal area [49]. Many girls do not bathe or shower during menstration either, because it is commonly believed that that practice will stop menstrual flow [41].

Schools in particular often lack appropriate sanitation facilities. Postmenarchal girls, therefore, face tremendous difficulty attending school after puberty because there is no privacy, running water or any place in which it is possible to change a menstrual absorbent, and in addition, there is not a place to wash or dispose of soiled materials. This lack of adequate sanitation facilities is a frequent barrier to girl's education. In one Nepalese study, 53% of adolescent girls had missed school because of menstruation, primarily citing lack of privacy for menstruation management of as the reason [104]. In Africa, the participation of girls in secondary grades lags far behind that of boys, primarily due to the fact that girls often stay home when they are menstruating, missing 3–5 days a month [102]. In addition, research by the

Iranian government through the University of Tehran found that 15% of girls aged 15–18 years missed school up to 7 days per month because of issues related to menstruation [37]. A project by Water Aid Bangladesh, which provided separate sanitation facilities for boys and girls, found that female school attendance rose by 11% [101].

Preparing adolescents for menarche

Menstruation is a basic physiologic function common to all healthy adult women and therefore shared by more than half the population. Onset of menstruation is an important point in development with implications for overall health. Most research on female adolescence focuses on gynecological problems but ignores the psychosocial and cultural context [105]. Management of menstration, however, varies significantly across cultures dependent on the availability of commercial products, religious beliefs, folk cultures and other societal norms [3]. Indigenous practices in rural areas (folk practices handed down from generation to generation) reflect traditional beliefs and also vary across cultures [41].

Psychological impact of menarche

The sum of experiences surrounding menstruation can significantly influence a developing girl's view of herself and her competence in management of menstrual hygiene [46]. Menarche is an intensely experienced event, all the more so because its specific time of arrival cannot be predicted [50] and because it is not merely a physiological event. It is also a social one, representing a clear demarcation between childhood and adulthood. With varying degrees (dependent on the cultural context), menarche marks girls' entrance in to adult society, particularly their readiness to be married, carrying with it an expectation of assuming the social role of a mature woman. In that context, menarche often abruptly initiates altered expectations in terms of manner of dress and permitted social interactions [51].

Shrouds of secrecy

Despite being a pivotal event shared by more than half of the population, menstruation is in much of the world still shrouded in secrecy and cultural taboos, and even in the Western world, not freely discussed [52]. Many cultures harbor deep-seated cultural prohibitions regarding the discussion of menstruation and other topics of a sexual nature, even between parents and their adolescent daughters, particularly with regard to the physiological basis of menstruation and the practical aspects of managing menstruation in a hygienic manner [53]. Prohibitions tend to be stronger in more rural and/or tribal communities [54]. In fact, Water Aid Bangladesh reported that plans to incorporate menstrual hygiene into sanitation projects in Bangladesh were delayed for almost a year by the reluctance of local sanitation experts to discuss the topic, reflecting the strength of local taboos [27]. Even in Australia, where information regarding menstruation is readily available, 80% of young urban girls (residents of Sydney, aged 14–19 years) surveyed felt that menstruation was an unacceptable topic of conversation [36].

In cultures of silence, many girls around the world receive virtually no information about menstruation prior to their own menarche (Table 3). Girls in India expressed embarrassment and reluctance to approach mothers [52]. In addition, many traditional cultures often strongly discourage conversations regarding sexuality between parents and children [55]. Reticence about giving relevant information (data from Mumbai) is widespread and continues past menarche [56]. Cultures in which relatively low numbers of mothers prepare their daughters for menstruation may also reflect poor literacy, which strengthens traditional taboos and heighten maternal feelings of inadequacy with regard to physiological knowledge [47]. Girls whose mothers had completed high school received more information on menstruation and hygiene than had girls from less-educated families [55].

Those who do receive information overwhelmingly receive it from their mothers, then friends and other female relatives, although there are some cultural distinctions. Relatively few receive any useful information from school or medical personnel. Media is also an important information source, where girls have access to them (Table 3). Mothers and friends are the biggest influences on choosing tampons [34–57]. In a Western population, those who discussed impending menarche with their mothers overwhelmingly (91%) viewed it as helpful [50].

Inadequate preparation

Even when girls receive information from parents and other sources, the information received is often incomplete or inaccurate [54]. In traditional cultures, mothers and other informants, rather than imparting relevant information on management of menstrual hygiene or understanding of biological processes, focus on ritual prohibitions [46]. Information programs at school are not universally available, despite the fact that girls considered health personnel as good sources of information and expressed a desire to have frank discussion on the topic [52]. In a Chinese survey, 44% of girls surveyed wanted formal education [58].

Because of local taboos in developing countries or the discomfort or self-perceived inadequacy of mothers in Western countries, adolescents across virtually all cultures enter puberty largely unprepared and ill informed. In a Saudi study, although 60.2% of girls were informed about menarche and menstrual hygiene by their mothers, their level of understanding was poor (Table 4) [30]. Since it is probable that their mothers had little *a priori* information themselves, they can only pass on what they know. In addition, cultural prohibitions and the belief that menstruation is pollutive make such discussions uncomfortable. Physicians should be an authoritative source of information, but in some cultures often are uncomfortable as well [30].

In a study in Nepal, a girl's general knowledge of the physiology of menstruation received a grade of 40.6%, while appropriate management practices of menstruation earned only 12.9%; virtually all (98%) of these girls felt that they were not well informed [49]. However, in a study of tribal girls in India, despite the fact that 64% received at least some information before menarche, girls uniformly believed that menstruation's purpose was to remove dirty blood from the body [54]. Even in a Western population

Table 3. Reported sources of girls' information on menstruation.

Population	Relatives (%)	Friends (%)	Educational resources (%)	Medical professionals (%)	Ref.
USA, 157 girls (mean age: 14.9 years)	90 mother, 27 sister, 9 father, 4 brother	78	67 school, 68 magazines, 61 pamphlets, 44 TV	46% nurses, 42% doctors	[50]
India					
Rural, 65 girls mostly aged 14–15 years	74 mother, 12 grandmother	NR	NR	NR	[70]
Rural Gujjar tribe, 200 girls aged 13–15 years	5 mother, 6.5 other relatives	83	10 movies, 5 magazines, 3 TV	NR	[54]
Rural, 160 girls aged 14–17 years	37.5 mother, 1.25 other relatives	28.75	NR	NR	[47]
Africa					
Nigeria urban (Ile Ife)	20.5 mother, 17.8 father, 19.1 sister	NR	NR	NR	[55]
Nigeria	74.4 mother, 13.2 other relatives		47.1† teachers	47.1† health workers	[107]
Nepalurban and rural, four districts (Dhading, Morang, Lalitpur, Kathmandu), 204 girls aged 12–20 years	51 mother, 41 sister, 0.8 other relatives	36	17 teacher, 17 radio/TV, 16 textbook 7, newspaper	NR	[104]
Middle East					
Saudi Arabia, 600 girls aged 11–18 years	34.2 mother	2.0	3.7 school, 16.5 religious books	NR	[41]

†47.1% was reported for teachers/health workers.
NR: Not reported.

(Australia), one study that evaluated subject understanding of the physiological causes as well as the normal symptoms and discharge of menstruation, found that the average menstrual knowledge score achieved by adolescent girls was 10 out of a possible 30 points. The questionnaire covered when and why ovulation occurred, when pregnancy was most likely to occur, factors that could interfere with menstrual regularity, possible physical symptoms and the contents and volume of normal menstrual discharge [36]. In these girls, 93% had received information about menstruation before their first period, but 51% felt the information was insufficient [36]. Another group of Western girls (USA), despite the fact that this group overwhelmingly (95%) felt that they had been adequately prepared for menstruation, still expressed a desire for more information on how to obtain products and use them, how often to change them, and when to choose specific types of protection [50].

Cultural components of girls' experiences of menstruation

Many cultures associate menstruation with both physical and spiritual uncleanness, a belief not exclusive to Third World countries. As late as 1878, the *British Medical Journal* printed the opinions of physicians who believed that menstruating women could cause bacon to become rancid [106]. These beliefs produced myriad cultural restrictions placed on menstruating women. Specific taboos vary from culture to culture (often dependent on prevailing religious thinking), although there are consistent thematic elements across cultures (Table 5) [106].

The secrecy and shame that commonly surrounds the event of menarche, combined with altered cultural expectations and restrictions and the fact that many girls are not adequately informed about the realities of menstruation, can cause the adolescent to feel subnormal, diseased and/or traumatized [105]. When information is provided, the tendency for mothers to accentuate positive aspects while minimizing information about negative aspects can produce feelings of betrayal as well as inadequacy and shame in the young girl [50].

Unprepared girls are frightened and confused by menarche [107] and are more likely to develop negative attitudes toward menstruation in general [53]. Girls across cultures viewed menarche as a negative experience and reporting being horrified, frightened, confused and embarrassed by the experience [30,36,58,104].

Cultural influences in the Western world

Effective preparation is consistently associated with a more positive response [50], including a reduction in perceived menstrual pain [107]. Western adolescents typically have more awareness of menarche before puberty and could therefore be predicted to be more positive about menstruation than their counterparts from the eastern hemisphere. However, girls in industrialized countries, particularly, harbor very negative feelings towards menstruation. In fact, 80% in one Australian survey said they would choose to stop menstruating if there was a safe and reversible method of preventing it [36], 70% considered it an inconvenient nuisance, and 51% judged the real experience to be worse than they had been led to believe [36].

Table 4. Cultural preparation for menarche in the developing world.

Population	Received no prior information (%)	Knew that menstruation was physiological process (%)	Knew cause of menstruation (%)	Knew the uterus was source of bleeding (%)	Ref.
Australia	7	NR	NR	NR	[36]
Asia					
China	63.8	NR	NR	NR	[58]
Nepal rural (Chitwan district)	76	6†	NR	25	[49]
Nepal, four districts urban and rural	8	81	55	13	[104]
India					
Haryana rural	NR	1/130 (0.8)	NR	NR	[71]
Gujjar tribe rural	36	NR	NR	NR	[54]
West Bengal rural	32.5	86‡	NR	NR	[47]
Andhra Pradesh rural	NR	66§	NR	NR	[70]
Rajasthan	92	NR	NR	NR	[72]
Middle East					
Teheran urban	23	NR	NR	NR	[48]
Saudi Arabia urban	43.7	NR	NR	NR	[41]
Africa					
Nigeria urban (Ile Ife)	NR	72	NR	NR	[55]
Nigeria urban	44.8	NR	NR	NR	[107]

†82% thought it was a curse, 12% thought it was disease.
‡6.25% thought it was a curse, 5% thought it was disease, 2.5% thought it a result of sin.
§18% thought it was a curse, 7.7% thought it was disease.
NR: Not reported.

The pervasiveness of media in industrialized societies is a principal cultural influence and may explain Western adolescents' attitudes. Studies of media messages in both Canada and Australia found that the predominant message in advertisements for forms of menstrual protection is that, menstruation is a crisis in hygiene that must be managed successfully; success is defined by being kept secret at all costs [59,60]. Advertisements present the conflicting messages that menstruation is perfectly normal, but no one should ever know that it occurs. In addition, advertisements for between-period products (e.g., feminine sprays) reinforce the idea that girls need some sort of protection every day, an emphasis on feminine odor subtly suggesting that the feminine body is dirty every day and perpetually offensive [60].

Cultural influences in the developing world

Systemic restrictions

Cultural taboos regarding menstruating girls and women are still pervasive across the developing word, particularly in rural areas. Many cultures (e.g. India) in the developing world (as well as in the USA during the early 20th Century) believe that the touch of a menstruating woman is toxic, and women are prohibited from cooking or coming in contact with crops or food stores [37]. A 2005 study found that these types of prohibitions are adhered to significantly more in rural areas compared with urban (21.6 vs 4.3%; $p < 0.01$) [105]. Cultural taboos in India and other countries also recommend against the participation of menstruating girls in religious activities, particularly contact with religious articles [52]. Cultural taboos in India and other developing countries often insist that levels of physical activity be restricted in menstruating girls as well [47,52,105]. Interestingly, an Indian study (2005) found that the prohibition against menstruating girls coming in contact with food stores is significantly higher in urban girls, whereas restriction of activity is significantly higher in rural girls ($p < 0.05$) [105].

Cold drinks are to be avoided, since they are believed to thicken the blood. In 1983 and again in 2008, papers observed that menstruating girls were required to restrain from bathing or washing their hair, as these practices were also believed to impede blood flow [44,106].

Food taboos

Menstruating girls are also often expected to adhere to specific taboos regarding food and drink [106]. Sour bananas, radish and palm are proscribed for many Indian girls [106]. The primitive Gujjar tribe in India restricts consumption of rice, curd,

Table 5. Adherence to traditional taboos across cultures.

Population	Separation from males (%)	Prohibition from touching (%)	Restriction on activity (%)	Prohibited from religious activity (%)	Ritual bath (%)	Restricted public appearance (%)	Food taboos (%)	Ref.
India Andhra Pradesh rural	46	NR	75	86	80	20 school, 78 weddings	31 dairy, 22 vegetables†, 11 prasadam‡	[70]
India, rural and urban	32	70 plants, 40 food	NR	86	NR	NR	NR	[46]
India, West Bengal rural	NR	NR	42.6 playing, 33.8 housework	70.6	NR	16.2 school, 10.3 weddings	50 sour foods, bananas, radish, palm	[47]
India, Gujjar tribe rural	NR	NR	100 looking in mirror, 98 bathing, 91 away from flowing water, 23 visiting other homes	100	NR	NR	NR	[54]
Nepal, four districts urban and rural	§	46 food, 24 males	NR	68	NR	4 school	13	[104]
Saudi Arabia	NR	NR	NR	NR	NR	NR	68.5	[41]

†Brinjal (eggplant) and cabbage.
‡A holy food offered to God.
§Members of the Bahun, Chhetu and Newar caste groups are secluded from the sun and male relatives during menstruation.
NR: Not reported.

milk, lassi (chilled yogurt drink), potato, onion and sugarcane [54]. In a 2007 Saudi study, most girls were observed to refrain from eating eggs, chicken and other meat as these foods are believed to cause nausea and vomiting during menstruation. Foods containing vitamin C are also believed to stop menstrual flow [30].

Sexual prohibitions

Prohibition of sexual activity by the menstruating women is nearly universal [106]. Menstruation is culturally associated with sexual desire, which is, like menstruation, believed to make a girl spiritually unclean. It is believed in many cultures that sexual intercourse with a menstruating woman will drain and weaken a man [106].

Isolation

Many cultures separate menstruating women from the general population, or more specifically, from men [106]. Menstrual huts at the edge of the village to be inhabited by menstruating women are prevalent among Native American cultures and existed throughout much of the eastern hemisphere and persist in some of these cultures to the present day. A 2008 paper observed that menstruating girls are often also excluded from social gatherings, including family dinners and weddings [47,106]. The strength of this taboo in areas where it exists is reflected in the observation in a 2007 paper that female teachers must remove themselves from the classroom when they begin a new cycle (once a month), impacting the education of all of the children under their charge [37]. In the Huala tribe of Indonesia (a hunter–gatherer society) women go to the menstrual huts, refrain from eating game and are forbidden from walking on hunting trails – practices which are believed to prevent them from adversely affecting men [61]. It is worth noting, however, that women may approve of the custom of menstrual separation and resist its eradication. One study that evaluated the use of Depo-Provera® (medroxyprogesterone acetate) as a birth-control method in a tribal culture found that many women rejected its use. The primary reason given was because the cessation of menstruation with use of Depo-Provera removed the enjoyable opportunity for the customary break from family responsibilities.

Influence of religion on cultural practices

Islamic societies

Practices in the Middle East are largely driven by religious dictates, and information regarding menstruation comes from mothers and other female relatives, as well as religious teachings.

Islamic societies exhibit a diversity of cultural and religious conservatism according to both the country involved and whether the girl lives in a rural or urban setting. The Quran prohibits menstruating women from participating in sexual intercourse, from praying or fasting during Ramadan, touching the Quran or reciting its contents [62]. In conservative areas, menarche also demands adoption of modest dress and enforced gender separation [63,106]. Sexual intercourse is forbidden for

7 days following the onset of menstruation, which in women with cycles less than the average 28 days may significantly impact fertility [106].

Jewish societies

Orthodox Jewish women are considered spiritually unclean for 7 days as dictated by the book of Leviticus, although further interpretation in the Mishnah defines a woman as unclean just before the expected onset of flow, during menstruation, and for 7 days afterwards, again with the potential to substantially impact fertility [64]. Menstruating women avoid sexual contact with their husbands and undergo a ritual cleansing (called the Mikvah, involving scrupulous cleansing of all body areas, including the genital region) 7 days after the cessation of flow, which restores spiritual cleanliness and the ability to participate in sexual activity. More conservative groups may prohibit contact of the menstruating women with food, wine or sacred objects [3].

Prohibitions include any touch, sharing a bed, sitting together on the same cushion of a couch, eating from her plate, looking at her clothing, or listening to her sing. Women are considered 'Niddah' or ritually unclean from the time of menstruation until the Mikvah [65]. Since the first Mikvah is performed right before a girl's wedding, every unmarried postmenarchal girl is considered ritually unclean and boys are therefore forbidden to touch them [106].

Buddhist societies

Menstrual practices are influenced by the perceived need to balance the Yang (the positive male force) and the Yin (the negative female force) [66].

Buddhist & Hindu in Tamil Nadu & Sri Lanka

In contrast to many areas of the world where menstruation is shrouded in great secrecy, Buddhist and Hindu tribes in these areas practice an elaborate ritual surrounding menarche. Although specific rituals vary by region and by whether girls are Buddhist or Hindu, they have three obligatory steps as follows:

- Girls are secluded at first sign of blood, often in a hut (kudia) made with fresh leaves, which may be within the house or outside;
- She may be attended by neighbors and served special foods (i.e., eggs, lentils ground into flour and ginger oil, meat and spices forbidden), but is expected to adhere to the catalog of things forbidden to a women in her state;
- When menstruation ceases, a ritual bath is performed which permits a return to public life. The girl is clothed in a special bathing dress which is worn during the public bathing ceremony. The bath is officiated over by her mother, maternal uncle, and other older female relatives and each attendee pours water over the girl's head. The bath is followed by a celebration that serves to introduce her to the community as a full woman, eligible to be married, rather like the 'coming out' tradition in some Western cultures [46]. As part of the celebration, the girl is showered with gifts of new clothing; her old clothing, including the dress worn for the ritual bath, are destroyed.

Expert commentary

Genital hygiene in adolescent girls is a subject deserving of more serious research. Studies have largely focused on issues of teen sexuality, ignoring basic genital hygiene and its influence on adolescent gynecological health. Douching (even though it can have adverse effects on reproductive health) is widely believed by women to be beneficial and is still recommended by some physicians, a situation that public-health programs must work toward clarifying.

Management of menstrual hygiene is an issue throughout the world. Although tampons or pads are readily available in the industrialized world, problems of adolescent girls with menstrual hygiene are still under-recognized and not optimally managed. Rigid school schedules, with limited time between classes, make menstrual hygiene more problematic for adolescents than adults [25]. Menstrual hygiene in developing countries is a substantial global public health issue. Girls require gender-specific, private bathrooms with running water and the means of appropriate disposal of cloths or sanitary napkins, as well as the accessibility and affordability of acceptable absorbent products [37]. In addition, building awareness in parents of the medical aspects of menstruation and proper menstrual hygiene as well as the importance of talking to their daughters before menarche is critically important [37].

It is somewhat striking that despite considerable variation among global cultures as to the variety of ways that girls learn about menarche, the openness of societies to permit dialog about menstruation, the hygiene options available to them, and the cultural restrictions that bind them, virtually all populations studied did not adequately prepare girls for the experience of menarche, and virtually all girls (from every type of culture) expressed negative views of the experience. Attitudes toward menstruation as well as menstrual hygiene practices established at menarche or shortly after often persist throughout life.

As the mean age of menarche is dropping, both in industrialized countries and the rest of the world, the question of how to better prepare adolescents for the experience is a timely and practical one. Girls look primarily to their mothers for information and guidance, but mothers, particularly from poorer or more uneducated populations, often feel inadequate or uncomfortable in discussing menstruation. Many family physicians do not approach the topic proactively with their adolescent patients. Girls who do not receive adequate information from parents or doctors will often seek it from unreliable sources. In addition, lack of effective education regarding menstruation in the developing world allows superstition and groundless restrictions for menstruating girls to be perpetuated.

Intervention programs have proven that taking these steps can substantially improve girls' lives [67]. Targeting school girls at the time of adolescence is appropriate since it is the time when most of them feel a need to understand bodily changes and achieve competence in managing the process of menstruation.

It is important for young women to know that menstruation is a normal part of development and know what is considered normal in terms of menstrual flow [25]. Some girls seek medical care for normal cycle differences. However, some do not seek healthcare

for abnormal bleeding patterns that can have potential long-term health consequences because they are unaware that their experience is outside clinically relevant normal [25]. It is also important for young girls and women to understand their options for genital hygiene, including menstrual hygiene, to understand what constitutes healthful hygiene practices, and to be competent and confident in their ability to manage genital hygiene throughout all stages of their reproductive lives. Although traditional beliefs and prohibitions have maintained a culture of shame and secrecy (which tends to be perpetuated in Westernized countries through advertising), young women have a reason to take pride in the reproductive capabilities of the healthy female body and embrace womanhood for all that it entails. A healthy approach to genital hygiene must include medical, psychosocial and practical aspects. Parents, schools, medical providers, public-health programs and media outlets can all play a part.

Five-year view

Research into the experience of menstruation in girls is sparse, even in the industrialized world, and the taboos that surround the issue in the developing world have kept practices there cloaked in secrecy as well. It is only recently that international aid organizations have begun to publicize the substantial burden that issues of menstrual hygiene present to the adolescent female in developing countries, often preventing girls from continuing their educations, isolating them from society for substantial periods of time, and wrapping them in shame based on cultural traditions of ritual menstrual defilement.

The next 5 years will hopefully bring continued efforts to provide adequate sanitation facilities for girls in developing countries, particularly at school. Schools also need to recognize the needs of female students, providing adequate break times for girls to handle menstrual hygiene and appropriate disposal options to do so. Another important goal would be to continue focused efforts to adequately prepare girls for menstruation through practical training in hygiene as well as effective instruction on the physiological process of menstruation, its role in reproduction, and recognition of events that would constitute a possible gynecological illness. Another goal, but probably one that will prove to be difficult to achieve in 5 years, would be to work for a change in cultural environments that tend to shroud the experience of menstruation in secrecy and shame. Thus, helping girls all over the world to feel confidence and pride in their healthy female bodies and not feel ashamed.

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Key issues

- Genital hygiene is an important health issue in adolescent girls and women.
- Poor hygiene and counterproductive hygiene practices could negatively impact reproductive health.
- Menstrual management is a particular issue for adolescent girls and women.
- Menstrual management practices vary dramatically across the world and are influenced by the types of absorbent products and/or sanitation facilities available, as well as socio-cultural influences such as traditional taboos, media messages and religious beliefs.
- Despite the variability in social norms, girls across cultures are ill-prepared for menarche and nearly universally view menstruation as a shameful and embarrassing situation.
- Adolescent girls need to be taught that menstruation is a normal and important function of a healthy body.
- Intervention programs have demonstrated that programs that preparing girls for menstruation by communicating the physiological role of menstruation in female health and by teaching menstrual hygiene improve girl's attitudes toward and experiences with menstruation.
- Families, schools and medical professionals can better prepare girls for menarche.
- Positive cultural and educational approaches can help girls embrace their femininity and all it entails.

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