

A BLIND SPOT IN GIRLS' EDUCATION: MENARCHE AND ITS WEBS OF EXCLUSION IN GHANA

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Abstract: Despite notable progress in girls' education over the last decade, gender-based differences continue to shape educational outcomes. One of the most overlooked of these differences is the process of maturation itself, including menstruation. This paper presents the findings of a study that assessed the impact of sanitary care on the school attendance of post-pubertal girls, as well as the implications of menarche for their well-being. The study found that the provision of adequate sanitary care represents a relatively unrecognized but potentially fruitful tool in strategies that aim to improve girls' educational outcomes, one that warrants policy consideration among development planners. Copyright © 2013 John Wiley & Sons, Ltd.

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1 INTRODUCTION

Educating girls has widespread benefits, from improved health and reduced population growth to increased productivity and economic growth. Over the last decade, this awareness has moved girls' education to the forefront of national policy and international agreements, and today, achieving gender parity in educational enrolment is, against what once seemed unfathomable odds, within reach for many developing countries (UNESCO, 2010). However, despite notable progress in girls' educational achievement (Lloyd and Young, 2009), differences in educational opportunities for boys and girls persist (Herz and Sperling, 2004). One of the most obvious yet frequently overlooked of these differences is the process of maturation itself, including menstruation.

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Research suggests that the onset of puberty disproportionately affects girls' educational prospects, particularly in developing countries where concerns about girls' safety and modesty, pressures for early marriage and economic imperatives are often barriers to their schooling (Mehrah, 1995; Sommer, 2009; Kristof and WuDunn, 2009; Mahon and Fernandes, 2010). Recently, however, media (BBC, January 2010; Kristoff, 2010) and NGO accounts (FAWE, 2004; Ten, 2007) have claimed that it is not simply puberty but inadequate sanitary care that poses an obstacle to the education of post-pubescent girls, a claim that has galvanised a range of actors—from celebrity activists and multinational corporations to social enterprises and government ministries—to raise menstrual management as a development concern, with several initiatives emerging to increase access to sanitary pads, fund the provision of private changing areas and sanitary facilities, and improve access to water at school. Yet, despite the growing number of initiatives focused on the issue, the relationship between sanitary care and girls' education remains largely unsubstantiated. To date, there has been little academic attention awarded to the issue and no empirical evidence demonstrating that such measures actually improve educational outcomes.

This paper, based on a pilot study in Ghana, offers such evidence. The study assessed the impact of sanitary pads and puberty education on the school attendance of post-pubertal girls, as well as the implications of menarche for their well-being. The findings suggest that provisions for menstrual sanitary care (e.g. privacy for changing, access to water and hygienic materials to manage menstruation) and exposure to puberty education has a positive effect on girls' school attendance and subjective well-being, and may provide a fruitful tool in strategies that aim to improve girls' educational outcomes.

The paper is structured as follows. Section 1 provides an overview of the intersection between gender, education and puberty, and sketches out how menstruation shapes the educational experience of girls. Section 2 describes the study's methodology, which aimed to gain a qualitative understanding of the sociocultural and material implications of menstruation and statistical evidence of the relationship between menstrual management and school attendance through a nonrandomised control trial (hereafter the 'intervention'). Section 3 explores how menarche dovetails with educational attainment in material ways—through the provision of hygiene facilities, the withholding of family economic support, scarcity of private space, pressure for early marriage, and so on. Section 4 presents the results of the intervention, showing the relationship between the provision of sanitary pads and school attendance.

2 THE PUBERTY AND EDUCATION NEXUS

Eliminating educational disparities is widely recognised as an effective way to enhance women's bargaining power and contribute to a range of positive development outcomes (World Bank, 2001). Countries investing in girls' education typically enjoy higher economic growth and reduced poverty (Abu Ghaida and Klasen, 2004), as well as several positive public health outcomes including lower HIV transmission rates, lower infant and maternal mortality, better child nutrition, fewer early pregnancies, and decreased fertility rates (refer to Lloyd and Young, 2009 and Herz and Sperling, 2004 for reviews). These outcomes are more pronounced when the impact of secondary schooling is measured (Murphy and Carr, 2007).

Such economic and health dividends have prompted considerable investment in girls' education, with propitious results. Across the world, the gender parity index (the ratio of boys to girls enrolled in school) has markedly improved, particularly at the primary level (UNESCO, 2010). Measures that equate enrolment with educational improvement, however, present an incomplete picture of the experiences of girls and often obscure the effects of stronger contributors to the long-term societal benefits of education. For instance, levels of school enrolment are often far greater than those of attendance, particularly in contexts of poverty where fluctuations in attendance are often the norm. In sub-Saharan Africa, daily attendance rates in secondary school often fall below 70% and in some cases even lower (e.g. at harvest time) (Ampiah, 2008; Lewin, 2009). Nor do enrolment-based measurements indicate anything about educational attainment or quality—key determinants of education's social and health returns; in Ghana, for example, over 50% women and 33% of men aged 15 to 29 years who had completed 6 years of school could not read a sentence (EFA 2012).

Interpreting progress from enrolment data may also mask other inequalities (e.g. socioeconomic status and geographical variation) that create differential educational outcomes (Kane, 2004; Lewin, 2009). In Ghana, for instance, more than half to two-thirds of all women in the Northern, Upper East and Upper West regions have never been to school, compared with less than one-fifth in the Greater Accra and Ashanti regions (GSS *et al.*, 2009).

This geographical disadvantage is crosscut by economic marginalisation, typically the most powerful determinant of access to and retention in school (UNESCO, 2010), and even in Ghana, where formal primary school fees have been abolished, the costs of uniforms, transport, books and supplies still pose formidable barriers to school entry and completion for poor children. Poverty, in particular, disproportionately reduces the likelihood of girls' schooling as the opportunity costs of girls' education (e.g. loss of their domestic and productive labour) increases the perceived costs of educating girls (Kane, 2004). In Ghana, for example, 62% of women in the poorest quintile have no formal education in contrast to 10% in the wealthiest quintile (GSS *et al.*, 2009), and poor girls are more likely to drop out than other children (Lewin, 2009).

The privileging of enrolment data also sidelines discussion of how cultural, material and biological processes shape girls' educational prospects. Whereas anthropologists have long documented the norms, practices and processes of exclusion associated with menstruation (Douglas, 1966; Buckley and Gottlieb, 1988), and other social scientists have demonstrated how nutrition (Bundy, 2009), health (Clark *et al.*, 2008), school uniforms and fees (Evans *et al.*, 2008), and infrastructural constraints (Coclough *et al.*, 2000) affect attendance and learning outcomes, the connection between sanitary care and education has gone largely unrecognised in education and development studies. A literature search of the top 17 international development journals, as determined by impact factor, for 1995–2011 found that only four of 13,000 articles in the sample addressed the connection between menstruation, facilities at school, limited access to sanitary products and absenteeism (Mahon and Fernandes, 2010; Ivens, 2008; Glick, 2008; Kirk, 2004). Only one, Mahon and Fernandes (2010), mentioned the lack of sanitary products as a potential barrier to education.

Recently, however, several international agencies and NGOs (e.g. Population Council, Plan International, CARE, Oxfam and Unicef) have suggested that infrastructural constraints such as a lack of private latrines, water and sanitary supplies may exacerbate the difficulties associated with girls' schooling (Kirk and Sommer, 2006; Ten, 2007),

and several initiatives in Africa have tackled some of these constraints, making menstrual products more widely available [e.g. Living Goods in Uganda; Governments of Kenya (Gathigah, 2011) and India (Garg *et al.*, 2012); Procter and Gamble; UNICEF], affordable (e.g. FAWE in Uganda and Binti Africa in Kenya) and eco-friendly (e.g. Huru in Kenya and Sustainable Health Enterprises in Rwanda). Although these schemes vary in terms of products (from reusable cloth pads to disposable pads made from banana fiber) and business models (from donation campaigns to micro-finance loans), they all assume that access to sanitary pads will increase school attendance and improve educational outcomes. This conviction, however, is based on two previously unsubstantiated assumptions. First, menstruation, rather than say the nature of school facilities, teacher quality and so on, causes girls to miss school, an assumption that has gained currency through the circulation of several 'authoritative' reports (e.g. Unicef, 2011; World Bank, 2005; GAPS/FAWE Uganda). Unicef (2011), for example, asserts that 10% of school age girls in Africa do not attend school during their periods, whereas the World Bank (2005) concluded that a girl could miss between 10–20% of the school year. The methods of these reports, however, are often unexplained, and few are grounded in empirical observation. Second, providing sanitary pads will improve school attendance. However, empirical research to support this assertion is lacking; to date, there has only been one other study, conducted by Oster and Thornton (2010), to test the relationship between sanitary care and educational outcomes. Their study, based on the provision of menstrual cups in suburban Nepal, found little improvement in the attendance rates of adolescent girls. However, not only was attendance already fairly high (86%) at baseline, suggesting a ceiling effect, but girls in the study enjoyed conditions (water, private bathrooms) the majority of African girls do not experience; only one of the over 20 schools we visited during our study, from remote rural schools to middle class schools in urban Accra, had a girls-only private space for changing and only two had water nearby.

As a whole then, the evidence on the relationship between menstruation and education has been largely anecdotal and/or nongeneralisable. It does, however, point to the need to understand the circumstances and conditions associated with menstruation, and the extent to which it shapes the educational, public health and economic prospects of girls and their communities.

3 RESEARCH METHODS

The government of Ghana has demonstrated a strong commitment to girls' education and is on target for reaching universal primary education (EFA, 2012). However, despite notable progress at primary school levels, there has been a decline in completion rates for girls at the junior high school level and an increased gap in the gender parity index from primary to senior high school (Camfed Ghana, 2011). In 2008–2009, we conducted a two-stage qualitative and quantitative study to investigate whether and how puberty, and menstruation in particular, might contribute to gender asymmetry in attendance in late primary and junior secondary education.

Stage One of the study, conducted in 2008, consisted of qualitative research in Accra, as well as the Western, Central, Upper East and Ashante regions to accommodate for regional variations in cultural norms, geographic constraints, religion and economic opportunities. To acquire a broad understanding of attitudes and practices surrounding

girls' education, puberty and reproductive health, we first conducted focus group discussions (FGDs) with a range of stakeholders (parents, teachers, government officials and civil society organisations). These discussions provided the basis for subsequent FGDs and semi-structured interviews conducted with adolescent schoolgirls and drop-outs (Table 1). Given the sensitive and private nature of the subject matter, young women

Table 1. Summary of qualitative research with schoolgirls, parents and educators

Semi-structured interviews with schoolgirls			Focus groups with schoolgirls and drop-outs		
Date	Place	Number interviewed	Date	Place	Number of girls
02/10/2008	Accra	14	02/10/2008	Accra	10
03/10/2008	Accra	12	22/09/2008	Aframano	15
08/10/2008	Beposo	11	07/10/2008	Aframano	4
09/10/2008	Adidwan	10	10/10/2008	Amansie West	12
10/10/2008	Amansie West	6	08/10/2008	Beposo	10
14/10/2008	Akraman	6	08/10/2008	Beposo	10
14/10/2008	Mankessim	15	27/01/2009	NR Bolga	43
17/10/2008	Accra	1	13/10/2008	Mankessim	15
27/10/2008	Nyorgbawe	9	25/09/2008	Mankessim	12
28/10/2008	NR Bolga	10	13/10/2008	Mankessim	5
28/10/2008	Accra	5			
Total girls interviewed		99	Total girls in focus groups		136
Focus group discussions with parents			Semi-structured interviews with educators		
Date	Place	Number of participants	Date	Place	Number of participants
22/09/2008	Beposo	26	22/09/2008	Beposo	1
07/10/2008	Aframano	20	22/09/2008	Mankessim	2
08/10/2008	Beposo	20	24/09/2008	Mankessim	1
08/10/2008	Beposo	6	07/10/2008	Aframano	1
09/10/2008	Adidwan	25	08/10/2008	Beposo	1
09/10/2008	Adidwan	25	13/10/2008	Mankessim	1
13/10/2008	Mankessim	19	14/10/2008	Akraman	1
27/01/2009	Nyorgbawe	75	30/01/2009	Chochoe	2
28/01/2009	NR Bolga	30	30/01/2009	Winneba	2
Total parents in meetings		246	Total educators interviewed		12
Meetings/focus group discussions with educators			Focus group discussions with educators		
Date	Place	Number Participants	Date	Place	Number Participants
17/09/08	Accra	2	23/01/2009	Brofoyedu	5
25/09/08	Mankessim	105	23/01/2009	Nsuase	6
02/10/2008	Accra	1	27/01/2009	Nyorgbawe	8
22/01/2009	Aframano	2	28/01/2009	NR Bolga	5
27/01/2009	Bolgatanga	3	09/10/2008	Adidwan	6
27/01/2009	Bolgatanga	2	09/10/2008	Adidwan	3
27/01/2009	Northern region	2	25/09/2008	Akraman	6
Total educators in meetings		117	Total educators in focus groups		39

working with our partner NGO interviewed girls. All interviews and focus groups were audio taped and subsequently transcribed into English.

Building on the learnings derived from the qualitative research, we initiated Stage 2: a five-month nonrandomised trial that examined the impact of the provision of sanitary pads and/or puberty education on girls' school attendance. The intervention was conducted in four sites—three peri-urban sites in the Central region (Awutu–Effutu–Senya and Effutu Municipal Districts) and one rural site in the Ashanti region (Sekyere West District). Each of the four sites had a primary and junior secondary school, and we studied *all* schoolgirls of ages 12 years and older, irrespective of menstrual status ($n = 120$). Sites were chosen to ensure ethnic, economic and cultural¹ generalisability and to capture how differences in economic development (presence of retail, employment opportunities, poverty indices, etc.) and infrastructure (roads, telecommunications, availability of sanitary facilities at school, etc.) influenced girls' educational prospects and experiences of puberty, including menstruation. The rural Ashanti site, for example, was selected specifically because of its remoteness; our initial focus groups indicated that the location had no electricity, water or paved roads, and no previous experience with sanitary pads. By contrast, in the peri-urban areas, disposable sanitary pads were available from shops within walking distance from school, and some girls in FGDs reported using pads occasionally. We expected to see differential results between the peri-urban and rural pads sites. Because sanitary pads were a new technology in the latter, any improvements in attendance, participation in daily activities and self-esteem could be attributed to pads. Conversely, we predicted a diminished effect from pads in the peri-urban village because of the availability of sanitary pads and suspected any improvements in attendance, daily activities and self-esteem to speak to the girls' lack of access to sanitary provisions rather than to novelty.

The intervention consisted of three different treatments: two pads-with-puberty education (Pads + Ed) villages and one puberty education-only (Ed-only) village,² which we compared to one control village (Table 2).³ In each treatment village (those receiving pads and/or puberty education), we administered four surveys: a baseline assessment, two interim questionnaires and a final assessment. In the control site, we collected data only at baseline and at the completion of the study.⁴ The following sections describe our findings, focusing firstly on the learning derived from the qualitative research on how the cultural and biological process of menstruation shapes the educational prospects and experience of girls and secondly presenting the results of the intervention on whether the provision of sanitary pads and/or puberty education improve school attendance.

4 THE CONTEXT OF MENARCHE

Our qualitative research paints a picture of menarche as a fraught process, characterised by uncertainty, fear and distress. In contrast to the experience of many young girls in

¹Results from Stage 1 had indicated that religious affiliation was not a key determinant in the nature of menstrual management.

²Puberty education was based on the curriculum used by the Ghana Education Service and material contained in the UNICEF 'Gender and Relationships' Programme (http://www.unicef.org/lifeskills/index_14927.html).

³A pads-only site was not included because we considered it ethically problematic to introduce sanitary pads without education where many girls had no personal experience with them.

⁴We compared official attendance data with actual student attendance at every site visit and found acceptable levels of agreement indicating strong reliability of the school attendance data.

Table 2. Sites, interventions, timing and materials

Treatment	Location	Material	Timing of survey assessments
Pads-with-education (<i>n</i> = 39)	Peri-urban	Sanitary pads, underwear, calendar, pencil, sharpener	Months 1, 3, 4 and 5
Pads-with-education (<i>n</i> = 21)	Rural	Sanitary pads, underwear, calendar, pencil, sharpener	Months 1, 3, 4 and 5
Education only (<i>n</i> = 25)	Peri-urban	Calendar, pencil, sharpener	Months 1, 3, 4 and 5
None (control) (<i>n</i> = 35)	Peri-urban	Nothing	Month 5

Europe and North America, most girls in our study had little or no knowledge of menstruation or the biological processes of maturation prior to the onset of menarche. They claimed that their families rarely discussed puberty and reproductive concerns with them, as social norms inhibited communication about and disclosure of menstrual status. As a woman in one of our rural FGDs said, '[t]here is a culture in Ghana that you and your daughter should not be too close. . . You will be criticised for discussing such issues with your daughter as it would be seen as publicly disclosing private issues' (10/10/2008). Girls whose families informed them about menstruation prior to menarche reported being told little other than to notify a woman in their family (usually a mother, aunt or grandmother). As one 16-year-old girl described, 'I had no knowledge about menstruation and when I first saw it, I thought it was sickness. I was very shy and kept it to myself. My mother got to know about it later and was annoyed because she says according to our culture if I cook while menstruating I will die. She taught me to use cloth but warned me not to be telling people about my menses and to be wary of boys' (Interview, 9/10/2008). As a result, girls' understanding of menstruation was freighted with misconceptions; it connoted fear of their body, of boys and of participating in what were once 'typical' activities (e.g. cooking, praying, fetching water or serving guests). Rather than elevated to 'sacred' status, menstruation was embedded in 'a culture of concealment' (Houppert, 2000), manifested in taboos, euphemisms and secrecy that not only left girls embarrassed, but ashamed, isolated and insecure.

According to girls, this veil of silence not only contributed to their sense of shame and exclusion but also left them with little practical understanding of how to manage their menses. Despite being a 'natural' process, menstruation was not easily understood or accommodated by 'traditional' strategies of menstrual management. Indeed, the research found that an attachment to 'traditional' methods (e.g. cloth) often served as a foil for embedded gender inequalities. For example, while parents deemed traditional methods as adequate, girls told us that cloth and tissue were unreliable means of protection when walking the long distances to school. In the rural site, where cloth is the only available means of menstrual protection and girls had to walk approximately 80 minutes to reach school, over three quarters of girls reported soiling garments during their previous period, an occurrence with emotional as well as educational consequences as most girls own only one school uniform and lack the resources to obtain another. As a 15-year-old respondent in the rural site described, 'I am scared of soiling my dress because I am using the cloth and have to be very conscious about that. I have soiled myself once at school and I went home but never returned' (Interview, 9/10/2008). The possibility of soiling or giving off a scent when wearing cloth not only made attending school a risky proposition but also

rendered concentration while there extremely difficult. Girls discussed their fear of being 'found out' in class and the anxiety of starting their period during school where there was no water and/or private areas in which change. Although it is the policy of the Ministry of Education that schools keep sanitary pads on site for emergencies, no schools we visited had such provisions.

The constraints associated with menstruation were particularly pronounced in the rural site as the use of cloth inhibited a wide range of activities from playing, doing household chores or engaging with boys (Table 3). But girls in all sites described the need to conceal menstruation, often drying used cloth in hiding places, such as under beds, where they remained damp. Because cloth is scarce, many girls wore a damp, dirty cloth all day and also reported sharing cloths with other women in their household. This may have contributed to the skin irritations and pelvic infections girls experienced on a regular basis, an issue that may not only affect their school attendance and performance but also their reproductive health (e.g. fertility) (Adinma and Adinma, 2008).

Even in peri-urban treatment sites, where disposable pads are typically available at local shops, few parents provided them. Some girls would save their pocket money to purchase them, whereas others would engage in transactional sex for sanitary pads, as well as books, uniforms and other necessities. As one girl explained, 'I use some of the money given to me by my boyfriend to purchase the pads and for personal upkeep. I use the cloth when I don't have money for pads. I will sacrifice to buy pads' (Interview, 8/10/2008). Yet while such alliances may facilitate access to sanitary pads, they may also portend the end of a girls' educational future, leading to pregnancy, early marriage and school drop-out. As one girl who dropped out in junior secondary school described, 'I have a nine month old baby... I befriended a boy age 20. He provided me with some finances. He later got me pregnant and I am now married to him. I had no previous knowledge on menstruation before menstruating. I didn't menstruate before getting pregnant so I haven't menstruated before' (Interview 7/10/2008).

Finally, the lack of adequate sanitary protection often magnifies a number of adverse events precipitated by menarche. Menarche was a transitional moment for girls in our study—their world became smaller as they confronted a new set of gender expectations and the prevailing norms surrounding female sexuality. We found that, as a signal of reproductive capacity and hence adulthood, menarche triggered an array of negative practices that together diminished the likelihood a girl would stay in school. This included what girls described as 'eve teasing', harassment and abuse (physical, sexual and verbal) from teachers as well as fellow students, withdrawal of economic support from the

Table 3. Menstruation and participation in daily activities

Does menstruation ever cause you to...	Rural village (% yes)	Peri-urban villages (% yes)
Miss school?	95.2	20.2
Be unable to play with other children?	85.7	33.3
Miss work?	66.7	29.3
Avoid physical activities?	61.9	38.4
Remain indoors?	57.1	22.2
Avoid being around boys or men?	57.1	35.4
Be unable to carry out daily activities?	52.4	29.3

n = 120.

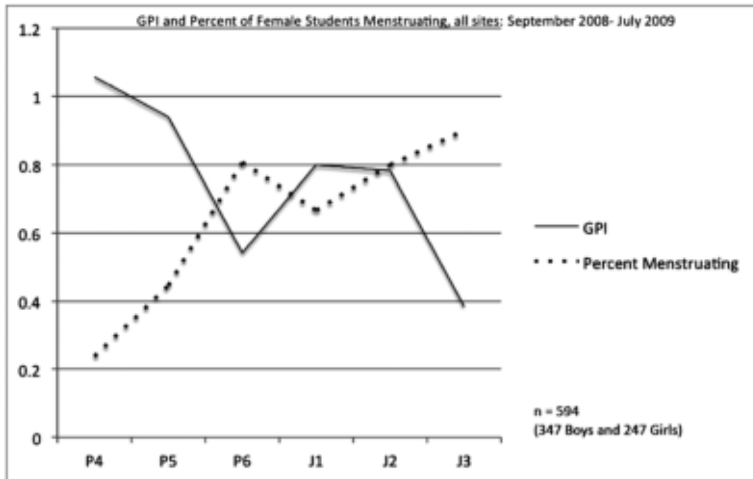


Figure 1. Gender parity index (GPI) and percent of female students menstruating, all sites: September 2008–July 2009

home and pressure from family to marry, take a boyfriend or leave the community to find work in the markets of Kumasi or as a domestic servant in Accra (refer to Mahon and Fernandes, 2010; Kirk and Sommer, 2006; and GAPS and FAWE Uganda, 1999, for similar findings in other contexts.). As a result, many girls were reluctant to disclose their menstrual status, aware of the risks its visibility entailed. However, in a context where cultural taboos effectively broadcast a girls' menstrual status and where the use of cloth leaves them vulnerable to conspicuous soiling, maintaining informational privacy is extremely difficult.

The onset of menarche also appeared to compromise, if not jeopardise girls' educational futures (Chowdhury and Trovato, 1994; Mahon and Fernandes, 2010). This became clear during FGDs with teachers, who described a precipitous drop in girls' enrolment between primary 6 and junior secondary school, a phenomenon that was substantiated by Stage 2 quantitative work, which showed that enrolment parity dropped dramatically (below 0.4)⁵ by the end of junior secondary school (refer to Figure 1, which depicts the relationship between gender parity and the percent of girls in each grade who reached menarche).

Thus, a picture emerges of menarche as much more than a 'natural' biological process; rather, it marks a physiological transition that can dramatically redefine the opportunities of girls and, in particular, their educational futures. Whether the adverse effects of this transition can be moderated by the provision of sanitary care was the focus of the intervention, to which we now turn.

5 STAGE TWO: THE INTERVENTION

The goal of the intervention was to determine whether the provision of sanitary pads and puberty education would potentially mitigate some of the negative events associated with

⁵Using the enrolment data from all the schools in the intervention segment of the study, we calculated gender parity indices for each grade level from primary form 4 to junior secondary form 3 ($n=488$).

Table 4. Percent of school days attended across sites over time

Treatment	Location	Baseline (mean, SD)	Midpoint (mean, SD)	Follow-up (mean, SD)
Pads-with-education	Peri-urban	82.27 (28.05)	90.58 (11.20)	90.93 (19.21)
Pads-with-education	Rural	80.68 (14.73)	91.91 (5.41)	91.09 (9.06)
Education only	Peri-urban	78.03 (26.25)	78.96 (19.70)	91.36 (8.31)
Control	Peri-urban	88.43 (13.44)	82.14 (13.62)	83.21 (13.91)

n = 120.

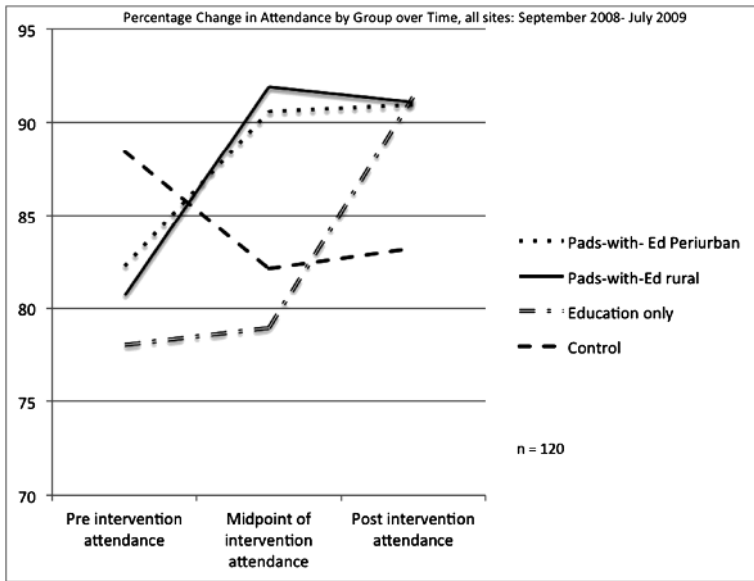


Figure 2. Percentage change in attendance by group over time, all sites: September 2008–July 2009

menarche by improving girls' attendance and retention at school. As described previously, to do so, we instituted an intervention with three arms of treatment (Table 2). While attendance⁶ did not vary between groups at baseline (pre-intervention), over the 5-month period of the intervention, attendance rose in the Pads + Ed groups by 9% (i.e. approximately 6 days per term out of a possible 65 days, or 18 out of 196 days per year). The control group showed no significant difference in attendance between baseline and follow-up (Table 4).

Importantly, attendance effects were consistent across pad sites despite significant differences in socioeconomic status (Figure 2). The longer walking distance, lack of toilet facilities, ubiquitous cloth usage and markedly lower material wealth in the rural site did not result in a more pronounced attendance effect from pads. Conversely, despite higher wealth, better latrines, accessibility of pads, and short distances between home and school, the peri-urban site similarly responded to the provision of pads. This suggests that the effect of pads may be less sensitive to socioeconomic context than often assumed and that sanitary pads may be as inaccessible to wealthier girls in peri-urban villages where pads are

⁶Attendance was measured as a percent of school days attended per term.

readily available as to girls in rural areas where they are not. In other words, despite claims that sanitary pads are too expensive for poor households (e.g. Kanyike *et al.*, 2004), cost may not be the over-riding issue but rather a girl's menstrual needs must compete against the needs and spending preferences of her family, a family in which she has little power to shape how income is used and distributed. This suggests that the degree to which menstruation acts as a barrier to education may be as, if not more, related to sociocultural norms, including the intrahousehold allocation patterns that are widely recognised to disadvantage women in parts of sub-Saharan Africa (Whitehead and Kabeer, 2001), than to household wealth or geographical constraints.

Figure 2 shows that, although attendance rates were initially unchanged in the Ed-only group, by follow-up, this group achieved a similar high mean attendance rate as the Pads + Ed sites. A longer-term trial is needed to confirm this effect; however, it may be that education is the 'active ingredient' in the intervention and that providing girls with information, resources and support may enable them to better navigate the school environment. We note, however, that education alone did not reduce girls' feelings of shame and insecurity. All three subjective measures—shame, self-confidence and insecurity—had significantly stronger responses in sites that received pads (Table 5). For example, at baseline, 90.5% of the girls in the rural site and 54.2% in all three peri-urban sites reported experiencing shame during their periods (no significant difference noted between peri-urban sites). Following the intervention, 66% and 86% of girls in the rural and peri-urban Pads + Ed sites respectively reported feeling less ashamed in contrast to 44.9% of girls in the Ed Only site. Girls in the rural and peri-urban Pads+Ed sites were twice and seven times as likely respectively as those in the Ed-only site to report a decrease in feelings of shame. Similarly, at baseline, close to three-quarters of girls in the rural Pads + Ed site (73.7%) and two-thirds (64.1%) in the peri-urban Pads + Ed site reported feeling less self-confident during their periods. Although these girls were still more likely to report feeling less-self confident than girls in the Ed-only site, significant improvement in self-confidence was demonstrated only among girls who received pads ($p < 0.001$). Similarly, reports of feeling insecure during one's period significantly decreased only in sites with pads between baseline and follow-up ($p < 0.001$).

Finally, the data suggest improvements in subjective well-being are associated with an increased capacity to engage in the classroom. During our interviews, girls reported feeling

Table 5. Subjective measures: pre-intervention and post-intervention

Percent of girls who experience	Shame		Lack of self-confidence		Insecurity		Difficulty concentrating	
	Baseline	Follow-up	Baseline	Follow-up	Baseline	Follow-up	Baseline	Follow-up
Rural Pads + education	90.5	65.7	73.7	33.3**	47.6	18.6**	77.8	58.3**
Peri-urban Pads + education	59.0	86.0	64.1	22.5**	17.9	5.6 **	61.5	37.5**
Peri-urban Education only	54.5	44.9	36.4	15.4	16	14.3	22.7	30.8
Peri-urban Control	48.6	—	51.4	—	8.6	—	48.6	—

$n = 120$.

** $p < 0.001$ —binomial test based on a z approximation.

distracted in school because of the inadequacy of the methods for managing their menses and were, in particular, afraid to stand and respond to teachers' questions for fear of exposing the backs of their dresses. It was only at treatment sites with pads that girls' ability to concentrate at school improved between baseline and follow-up ($p < 0.001$); of girls who received pads, 98.4% reported that they were better able to perform in school (Table 5), suggesting that the provision of sanitary care may mitigate menstruation-related anxiety and potentially enhance girls' receptivity to classroom instruction.

6 CONCLUDING OBSERVATIONS

Over the last decade, as the correlation between girls' education and key public health and economic measures has become clear, governments, donors and the private sector have turned their attention to menstruation as a potential barrier to the educational achievement of adolescent girls. Yet despite the growing number of initiatives focused on sanitary care, there has been no data to indicate that menarche, or the process of menstrual management, has an actual impact on school attendance, retention and/or completion. This paper has presented data from a two-stage pilot study conducted in Ghana, which qualitatively examined the effects of menarche for the experiences and opportunities of girls and conducted a nonrandomised control trial on the potential benefit of sanitary pads with reproductive education for girls' schooling. The qualitative research highlights the way menarche acts as a tipping point in the life course of girls (Cavanagh *et al.*, 2007), catalysing an array of negative events with significant ramifications for their social participation, education and health, and by extension their long-term economic opportunities. The intervention, the first study to assess the efficacy of sanitary pads with education for school attendance among menstruating students in Africa, demonstrated that the provision of sanitary pads and puberty education improved the school attendance of post-pubescent girl students by around 9% and reduced feelings of shame, insecurity, low self-confidence and poor concentration. The intervention also showed that the benefits of reliable sanitary care and puberty education were present in both rural and peri-urban sites, indicating that neither geography (distance to school), infrastructural (access to water) and/or socioeconomic (poverty) factors mitigate the positive effects of sanitary care.

Taken together, the qualitative and quantitative data demonstrate that understanding the role of adequate sanitary care in constraining or facilitating girls' access to education is certainly a legitimate area of development concern. Importantly, the study also provides donors, national governments and development organisations much-needed evidence to support existing and/or forthcoming hygiene and sanitation interventions, which to date have been largely grounded in untested assumptions. Although the findings make clear the relationship between menstruation and educational attainment, they also raise questions on the viability of current sanitary pad initiatives. Menstrual management does not operate in a vacuum; it is implicated by situated cultural processes, including gender and generational power structures. For example, although cloth is unreliable, older generations expressed little need to meddle with this longstanding, 'traditional' method of menstrual management, and in so doing, enforced rather than challenged the shame and fear that surrounded menstruation. Similarly, even in cases where families could access and afford sanitary pads, they were deemed an unnecessary 'luxury', suggesting that it is not simply cost or awareness but gender-based allocation priorities that will determine girls' access to sanitary care. At the same time, although manufactured sanitary pads may improve girls'

participation in family, school and social life, they also pose cultural and environmental challenges. Our study found that girls buried their used pads in the forest because they feared their pads would be seen by others or retrieved for purposes of witchcraft. Any device that required a girl to deposit a used pad in an open container and/or public setting thus would be avoided, suggesting that the environmentally preferable disposal method—incinerators—need to take girls' need for privacy into account. In such situations, disposable sanitary pads may be less feasible and/or environmentally sustainable than hygienic reusable cloth.

Advancing policy for the provision of sanitary care, therefore, will need to move beyond simply providing a technology such as sanitary pads to considering how menstruation interweaves with the wider social-cultural context of fertility, marriage and reproduction to shape the opportunities of young girls. Indeed, while sanitary pads may improve girls' educational prospects, they will not, alone, tackle the multiple challenges—gender discrimination, sociocultural norms, inequitable educational culture and poor school infrastructure—that continue to face girls' education.

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