The Effect of Commercial Sanitary Pad Use on School Attendance and Health of Adolescents in Western Kenya

by

Amy Louise Stopford

Department of Global Health
Duke University

December 12, 2011
Approved:

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Sherryl Broverman, Supervisor

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Joanna Maselko

___________________________
Daniel Westreich

Thesis submitted in partial fulfillment of the requirements for the degree of Master in Science in the Department of Global Health in the Graduate School of Duke University

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ABSTRACT

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Abstract

This mixed-method cross-sectional study evaluated the association of commercial sanitary pads with school attendance and symptoms of vaginal infections in rural Kenyan adolescents aged 11-18. Contextual information is used to situate the data gathered on school attendance and vaginal infections into the broader experience of girls managing their menstruation. This study used a sequential design with a total of 8 qualitative focus groups and a quantitative survey. A total of 482 girls were surveyed, 321 currently attending school and 151 who had dropped out of school. Qualitative data from focus groups was analyzed using applied thematic analysis. The effect of the use of commercial sanitary pads and the use of other items on school attendance and symptoms of vaginal infections was estimated using logistic regression analysis. Overall, girls reported that menstruation negatively affects their experience at school and in the classroom and causes an array of negative emotions. Girls reported leaving school often to change or bathe due to menstrual leaks and as a result missing class lessons. Poor concentration in class attributed to menstrual pain and worry over potential leaks was also mentioned. Lastly, the practice of transactional sex to obtain money to purchase pads was a theme within the data. It was found through the quantitative data that the prevalence odds of missing one or more days of school over a two-month period when using commercial sanitary pads is 1.74 times as high as the odds of missing one or more days of school over a two-month period when using other methods for menstrual control \( p = 0.02, 95\% \text{ C.I.} = 1.08 - 2.81 \). The data showed no significant difference in school attendance of those that using commercial sanitary pads when compared to those that used alternative methods, such as reusable pads, multiple underwear, homemade items, and no item. The overall prevalence of symptoms of vaginal infections among all girls in this study was found to be 9.4%. There is no statistically
significant difference between the odds of having symptoms of a vaginal infection when using commercial sanitary pads as compared to using any other item to control menstruation. Although commercial sanitary pad use has a negative effect on school attendance and no statistically significant effect on symptoms of vaginal infections in this study, the use of commercial sanitary pads has important implications for girls’ ability to concentrate and participate in school during their menstruation.
Dedication

This paper is dedicated to the women who worked with me in Muhuru Bay: Anne, Lencer, Dorthy, Zilpa, Merab, Wema, Maurine, Quinter, and Everlyne. Without each of you—your dedication, genuine interest, and hard work—this study would not have been possible.
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1. Introduction and Background

1.1 Introduction

Recent global health policy has focused considerable attention on improving the education of women and promoting gender equity. It is widely understood that improving women’s education can lead to overall health improvements and population as well as social and economic gains within developing nations (Berhman and Wolfe 1989; Summers 1994; Subbarao and Raney 1995; Psacharopoulous and Patrinos 2002; Herz and Sperling 2004, World Health Organization 2011, World Bank 2011). As a result, there is global focus on possible interventions that may improve school attendance and educational attainment in females (World Food Programme 2007; Fast Track Initiative 2011; Birdthistle et al. 2011). The provision of sanitary materials to girls to control their menstruation is one such intervention. According to policy makers and the literature, menstruation contributes to absenteeism of adolescent girls attending school in developing countries (Beyene 1989; Herz et al. 1990, Mehrah 1995; World Bank 2005; Sommer 2010a; Sommer 2009b). Some reports indicate that girls miss up to four days of school per month due to limited access to affordable sanitary pads in Kenya (Friedman 2007; Sustainable Health Enterprises 2011; ZanaAfrica 2011, Siringi 2011, Commonwealth Education Fund 2011).

Despite widely accepted beliefs and anecdotal evidence that girls are missing school due to lack of affordable sanitary materials, there exists very little research worldwide that rigorously quantifies the effect of sanitary material use on school absenteeism. In Kenya, the country in which this study took place, there have been no published studies that analyze the relationship between commercial sanitary pad use and school attendance. Two separate qualitative investigations, one by McMahon et al. in 2011 and the other by the African
Population and Health Research Center in 2010, are the only published studies documenting the experience of Kenyan schoolgirls in managing their menstruation. However, neither study was constructed to access the relationship between commercial sanitary pad use and school days missed in a rigorous manner.

This study uses a sequential mixed-method cross-sectional design to evaluate the effect of commercial sanitary pad use on school attendance of adolescent girls aged 11 to 18 in the rural Kenyan village of Muhuru Bay. It also investigates the relationship between commercial sanitary pad use and self-reported symptoms of vaginal infections as a secondary analysis. Finally, this study provides information that contextualizes data on school attendance and vaginal infections in the broader experience of girls managing their menstruation. In light of reports from NGOs and existing literature that girls are missing a significant amount of school due to lack of sanitary materials, and the role that female education has in determining development and health outcomes, a study of effects of commercial sanitary pad use on school attendance and related health outcomes is justified.
1.2 Background

1.2.1 Study Setting

Muhuru Bay is a small fishing community located along the shores of Lake Victoria in Nyanza Province. Families rely largely on subsistence farming and fishing for their livelihoods in Nyanza Province and in Muhuru (McMahon et al. 2011, Kenya Demographic Survey 2008). Prolonged drought in Nyanza province and Kenya as a whole has lead to significant restraints on crop outputs and food insecurity at the household level (Food and Agriculture Organization of the United Nations 2011). The southern region of Nyanza Province where Muhuru Bay is located is one of the poorest areas in Kenya (International Fund for Agricultural Development 2011).

An estimated 46.3% of females in Nyanza Province have only completed a portion of primary school and 13.4% have received no education at all. Overall, 7.3% of females between the ages of 15-49 in Nyanza Province have self-reported symptoms of vaginal infections. The rate of HIV in Nyanza Province is most recently estimated at 13.4%, the highest of any province in Kenya (Kenya National Bureau of Statistics 2010). HIV prevalence may be even higher in Muhuru Bay as compared to other parts of Nyanza Province because those living in communities...
located along Lake Victoria are believed to be at highest risk for HIV as a result of common ‘fish for sex’ transactions between fisherman and local women (Seeley and Allison 2005; Béné and Merten 2008).

1.2.2 The State of Primary Education in Kenya and sub-Saharan Africa

It was estimated in 2003 that 54% of all girls do not complete primary school and only 17% of girls attend secondary school in sub-Saharan Africa. In sub-Saharan Africa, the age for primary school girls usually ranges from 6-14, the equivalent of grades 1 through 8 in the United States. However, girls up to age 18 may be enrolled in primary school. One of the major reasons attributed to poor completion and attendance figures in sub-Saharan Africa is charging direct fees for schooling (Herz and Sperling 2004). Following many sub-Saharan Africa countries, the Kenyan government instituted a policy of Free Primary Education beginning in 2003 to combat poor school attendance and poor enrollment rates, the thought being that school fees composed a major obstacle to education. From 1999 to 2008, the number of girls enrolling in primary school for every 100 boys in primary school in SSA overall increased from 85 to 91. In this same period, the ratio of female-to-male primary completion also rose from 0.78 to 0.91 (The World Bank 2011). Although the World Bank reports that the rate of primary school completion by girls has improved, there exists conflicting evidence that this is the case. New reports have recently stated that dropout rates of women from primary and secondary schools have remained high (Gathigath 2010; Muganda-Onyando and Omondi 2008).

1.2.3 WISER and Reusable Sanitary Pads

Muhuru Bay is unique in that it is home to the Women’s Institute for Secondary Education and Research (WISER), a free secondary school for girls of high scholastic achievement founded in 2007. In June of 2010, WISER paired with Johnson and Johnson to
distribute 150 reusable sanitary pads and hygiene kits to girls in class 8 studying within Muhuru Bay. This effort was initiated as a result of anecdotes about girls missing school due to lack of sanitary materials and unpublished data that fifty percent of sexually active girls aged 10 to 16 in Muhuru Bay have engaged in transactional sex to pay for school fees, food, and hygienic items including sanitary pads (Puffer et al. 2011). The director of WISER Bridge, an adjunct program to WISER designed to increase scholastic achievement in 14 primary schools in Muhuru Bay, also distributed homemade reusable pads to girls in early 2011 that were handmade in the United States. For this research, reusable pads made by Johnson and Johnson and those handmade in the United States are undistinguished. It is important to note that WISER distributed reusable pads because girls in the focus groups who had experience with these pads were able to discuss their opinions about them.
2. Literature Review

2.1 The Benefits of Girls’ Education

There are many documented benefits of educating young women. Females who are educated earn higher wages and contribute more to the economic development of countries. Overall, World Bank studies have found that an extra year of education beyond the country average increases the eventual earning wages of a woman between 10 to 20 percent (Psacharopoulous and Patrinos 2002; Psacharopoulous 1994). Another World Bank report also showed that increasing the amount of women with education by one percentage point increases annual per capita income growth by 0.3 percentage points (Dollar and Gatti 1999).

Increased female education is also associated with health benefits to women, girls, and their children. First, female education is positively associated with health, measured as absence of major disease, and nutrition, defined as having sufficient caloric and protein intake (Behrman and Wolfe 1989). Secondly, girls who are more educated are more likely to know basic facts about HIV/AIDS such as contraction mechanisms and are less like to contract HIV as compared to girls who are less educated (Vandemoortele and Delamonica 2000; World Bank 2002; De Walque 2004; Pettifor et al. 2008, Jukes et al. 2008). Increased female education is furthermore associated with decreased fertility rates and increased use of family planning services (Subbarao and Raney 1995; Fritshel and Mohan 1999; Osili and Long 2007). One year of extra education reduces female fertility by approximately 5 to 10 percent (World Bank 1992). Finally, a female’s educational attainment also has implications for her children. Increased female education is linked to reduced child malnutrition and infant mortality rates as well as higher educational attainment in children (World Bank 1992; Summers 1994; Ridker 1997; Subbarao and Raney 1999; Fritshel and Mohan 1999; Gakidou et al. 2010). Nearly half of the reduction in child
mortality worldwide over the last four decades can be accredited to increases in female educational attainment (Gakidou et al. 2010).

### 2.2 Use of Sanitary Materials and School Attendance

It is reported by news agencies and NGOs that girls in sub-Saharan African and Kenyan miss up to four days of school due to menstruation and lack of affordable sanitary pads (Friedman 2007; Sustainable Health Enterprises 2011; ZanaAfrica 2011, Siringi 2011, Commonwealth Education Fund 2011). However, there has been little rigorously reviewed and published research devoted to studying the effect of sanitary materials on school attendance. Only two studies have been conducted worldwide to investigate this relationship, one of which was took place in sub-Saharan Africa in Ghana. This study revealed that the provision of sanitary pads to girls reduced absenteeism from 21% of days missed to 9% of days missed per year (Scott et al. 2009). The other study, a randomized trial conducted in Nepal, found that the provision of a menstrual cup to girls had no effect on school attendance and showed further that menstruation caused girls to miss only 0.4 days of school per year (Oster and Thornton 2011). Both studies were limited by a small sample size and did not explore the effect of other items that girls may use during menstruation (such as handmade materials) on school attendance.

### 2.3 School Girls’ Experience of Menstruation and Puberty in sub-Saharan Africa

Studies reveal that girls’ experience of menstruation and puberty in sub-Saharan Africa is often negative. In a qualitative study conducted in Tanzania, girls reported that they were happy to become women through puberty. This positive feeling is contrasted, however, to their reports of confusion, fear, and shame associated with menarche (Sommer 2010b). Challenges that these girls reported in managing their menstruation include school environments that
lacked adequate toilet facilities and discrete places to dispose of pads (Sommer 2010a) Girls also reported being distracted during class due to worry about menstruation complications such as menstrual leaks and the procurement of sanitary pads in the long term (Sommer 2009). As well, girls from sub-Saharan African, including Kenya, report being teased in school if others are aware that they have their period, which often happens after an unexpected menstrual leak due to using materials that have poor absorbency (Biriwasha 2008; McMahon et al 2011; African Population and Health Research Center 2010). Kenyan primary school girls report that they feel shame most often when they have their periods (McMahon et al. 2011). When girls have their menstrual period, they will try to hide the fact that they are menstruating from both teachers and their peers (Sommer 2009). Girls reportedly do not want others to know they are menstruating because of the belief that this information will be shared throughout their community and will cause them to feel ashamed (McMahon et al. 2011).

2.4 Sexual Harassment and Transactional Sex Among Girls in sub-Saharan Africa

Sexual abuse of girls by men and boys in the school setting is prevalent throughout sub-Saharan Africa. In a 2001 study in Botswana interviewing 560 students, 67% of girls reported that a teacher had sexually harassed them (Rossetti 2001). In a 2005 survey of 1,496 schoolgirls in Malawi, 50% of girls indicated that male teachers or boys had touched them inappropriately (Bisika et al. 2005). A high prevalence of sexual abuse in school by male teachers and boys has furthermore been found in Cameroon and South Africa (Mbassa Menick 2001; George 2005). While in school, girls are also reportedly given preferential treatment by male teachers who are looking for sexual favors, which causes young males to feel resentment towards girls (Chege 2006, United Nations 2006, Dunne et al. 2007; Jones et al. 2008).
Sexual harassment of primary school girls by their teachers and peers is also common occurrence in Kenya. In a 2009 study conducted among 70 primary schools Kenya, 21 percent of 1,158 respondents indicated that they knew at least one girl who was having a sexual relationship with her teacher. Moreover, 24 percent of girls in this survey reported being forced into having unwanted sex (Ruto 2009). Overall, 76% of girls who were impregnated by teachers in this study dropped out of school. There are news reports in Nyanza province of male teachers coercing female students into having sex (IRIN 2011, BBC 2010).

One of the reasons girls engage in sexual relationships with male teachers and older men is because these men offer to provide them cash for school fees, food, hygienic products, and other items (IRIN 2011; FAWE 2000; Puffer et al. 2011). This practice, known as transactional sex, is common among female adolescents in sub-Saharan Africa (Silberschmidt and Rasch 2001; Luke and Kurz 2002; Moore et al. 2007, Wamoyi et al. 2010). In Tanzania, it was found that 75% of sexually active girls received money or a gift when they first had intercourse (Wamoyi et al. 2010). In Kenya, evidence shows that girls themselves may initiate contact and negotiations with teachers for the reason of obtaining pocket money (Ruto 2009).

**2.5 Use of Sanitary Materials and Vaginal Infections**

There is evidence that using unsanitary materials, such as old cloth, to control menstruation increases an individual's risk of vaginal infection. In India, unsafe menstrual practice, classified as the use of unhygienic materials such as old cloth, was found to increase the risk of reproductive tract infections three-fold in girls aged 13 to 19 (Khanna et al. 2005). The authors of another study completed in India also suggest that prevalence of white vaginal discharge reported by girls in their sample, which is indicative of poor hygiene and vaginal infections, is likely partially due to the use of unhygienic materials during menstruation (Narayan
et al. 2001). The two studies in India represent the only literature on the relationship between item used to control menstruation and vaginal infections.

As a result of these studies and evidence of the types of materials that girls in Sub-Saharan Africa use to control their menstruation, there is reason to believe that investigating the relationship between the item used during menstruation and vaginal infections is important. It is known that in the absence of affordable sanitary pads adolescent girls living in sub-Saharan Africa will use unhygienic items such as rags, tree leaves, newspaper, and old clothing to absorb blood, and the use of these items may cause young girls to have an increased risk of contracting a vaginal infection (Biriwasha 2008, Varghese et al. 1999). Having a vaginal infection in a setting with a high HIV prevalence like Muhuru Bay is also significant because the presence of a vaginal infection is a risk factor for HIV contraction (Hilber et al. 2010, Mavedzenge et al. 2011). It is hypothesized that the use of unhygienic materials such as rags puts a girl at higher risk for vaginal infections and consequently HIV.
3. Objectives

The primary aim of this study was to evaluate the effect of commercial sanitary pad use on school attendance among Kenyan adolescents. Commercial sanitary pads are defined as pads that are mass produced and available for purchase in a shop; examples include Always and Stayfree. The secondary objective of this study was to evaluate the relationship between commercial sanitary pad use and prevalence of vaginal infections among Kenyan girls. Supplemental themes from the qualitative research are treated as secondary findings. These themes include the practice of transactional sex among Kenyan girls and in relation to commercial sanitary pad access, feelings that characterize the school experience of girls managing their menstruation, the challenges that girls face in managing their menstruation in school, and the effect of lack of access to commercial sanitary pads on the overall school experience of girls.

3.1 Hypotheses

The following hypotheses were formulated in response to the existing literature on the effect of use of sanitary materials on school attendance and the effect of commercial sanitary pads on the prevalence of vaginal infections:

1. Among girls who are using commercial sanitary pads, school attendance will be higher indicating a negative relationship between commercial sanitary pad use and school days missed.

2. Among girls who use commercial sanitary pads, prevalence of vaginal infections will be lower indicating a negative relationship between commercial sanitary pad use and prevalence of
vaginal infections.
4. Methods

4.1 Study Design

This study used a mixed method, exploratory sequential research design. In this design, the data analysis from one part of the study influences data collection from a subsequent part (Guest et al. In Press 2011). Qualitative focus groups preceded the quantitative survey, and data collected from these groups was predominantly used to refine and evaluate the validity of the quantitative survey questions. The data from focus groups was also later used to help interpret results from the quantitative survey and to provide unique commentary on the menstrual experience of girls living in Muhuru Bay.

4.2 Quantitative Survey

4.2.1 Population and Sample

The study population consists of 482 girls aged 11 to 18 who either attend school or live in Muhuru Bay, Kenya. Of these girls, 321 were currently in school while 151 had dropped out. Inclusion criteria for participation was based on age being 10 to 18 and having reached menarche. Although eligible for inclusion, no girls aged 10 years old participated in this study. Girls in school were recruited from all 14 primary schools located in Muhuru Bay.

School rosters were collected from each school and a random sample of 380 girls was obtained to account for girls who may not be eligible for the survey. Of these 380 girls, 59 did not meet the inclusion criteria and were ineligible for this survey. Girls that had dropped out of primary school and were between the ages of 10 to 18 were recruited through household door-to-door stops by research assistants and through snowball sampling initiated at local schools (Goodman 1961). The team visited each school to ask students if they knew any girl who had
dropped out recently. The team also asked girls who had dropped out of school and were being surveyed whether they knew of other girls who were between the ages of 10 and 18 and had dropped recently out of school. This study identified 151 girls who had dropped out of school.

4.2.2 Research Team

The research team consisted of nine women from Muhuru Bay and three female undergraduate Duke University students. Six of the women had previously worked with a researcher from Duke University studying HIV risk factors and interventions. Each woman that was part of the team was trained in research ethics and proper survey administration. Only women were used as research assistants for the survey procedure to help limit shame and embarrassment that may be introduced by discussing menstruation and related issues.

4.2.3 Questionnaire Development and Piloting

A cross-sectional survey (Appendix A) consisted of questions about demographic characteristics and retrospective questions about each individual’s menstrual experience. Retrospective questions asked the young woman to recall how many school days she missed in the last two months, what item she used most of the time in the past two months for her period, and if she had certain symptoms indicating a vaginal infection within the last three months.

The appropriateness of survey questions and answers were evaluated during six focus groups that took place with girls currently in school, which were led by the primary researcher and a research assistant fluent in Dholuo and English. After these focus groups, answer choices were revised and questions were also added to the survey that included those aimed specifically at assessing treatment by teachers while a girl is menstruating (questions 71 to 78) and knowledge about sexually transmitted infections (questions 79 and 80). Several girls during the
focus groups commented that teachers treated them differently when they were menstruating in school, and a few individuals also seemed to have little knowledge about ways to prevent sexually transmitted infections. These comments lead to changes in the survey. The completed survey was piloted on four girls currently in school. Due to time constraints, the survey was not piloted on girls who had dropped out of school.

4.2.4 Measures

4.2.4.1 School Attendance

School attendance was measured as the self-reported number of school days that a girl had missed in the last two months. Formal school attendance records from schools were biased and were therefore not used.

4.2.4.2 Presence of Vaginal infections

Two criteria used locally by the Ministry of Health to diagnose presence of any vaginal infection were adapted into two questions. Specifically, these questions ask whether in the last three months has the girl had a vaginal discharge that has an unusual color or smell and whether in the last three months she has had itchiness, burning or pain (not associated with menstrual cramps) in the vaginal area. Using self-reporting to diagnose the presence of vaginal infections is common practice in Kenya. The latest Kenya Demographic and Health Survey (2008) uses self-report of vaginal infections to determine prevalence of vaginal infections.

4.2.5 Translation

The survey was translated into Dholuo, the local language, by four individuals from Muhuru Bay who were both fluent in English and native speakers of Dholuo. A fifth individual also fluent in both Dholuo and English back translated all translations to English. The most
meaningful translations of the English version questions were chosen for the survey written in Dholuo. Any mistranslation errors evident in the survey that research assistants agreed upon from Dholuo to English were noted and corrected for the final version.

4.3 Qualitative Focus Groups

4.3.1 Focus Groups With Girls Current Enrolled In School

A total of six qualitative focus groups with girls enrolled in school took place prior to the quantitative survey portion of the study. The purpose of these focus groups were to validate questions and answer choices on the survey as well as to collect information on the challenges that girls face living in Muhuru Bay and managing their menstruation. The six focus groups took place at six different schools in the area, and six to eight girls aged 11-18 participated in each group. A total of 42 girls currently in school were included in these focus groups. Discussion questions were devised and translated into Dholuo ahead of time, two research assistants took notes during the focus groups, and one researcher fluent in both Dholuo and English lead the discussion. The primary researcher was present to take notes and to ask follow-up questions. These discussion groups were each an hour and a half in length, and girls were given a notebook and candy for their participation. Discussion groups were not recorded because of possible sensitivity of the subject matter. Instead, two individuals took careful notes on what each girl discussed.

4.3.2 Focus Groups With Girls Who Have Dropped Out of School

Two focus groups were conducted with girls who had dropped out of school and who had taken the survey after the survey portion of the study was completed. These focus groups, held after the quantitative survey, were deemed necessary by the research team, which
observed that the participants appeared depressed and hopeless. The focus groups aimed to capture the perspective of girls who were no longer enrolled in school because they represented the worst outcome as far as school attendance and perhaps were most adversely affected by menstruation of all girls in the community. These discussion groups were conducted at WISER, which was used as a central meeting location for these girls. There were a total of six girls in one focus group, and five girls in the other. Two to three research assistants lead each focus group. The discussion groups were an hour and half in length and led by two research assistants. Discussions were not tape recorded, but two individuals took careful notes. The questions asked were similar to those that were asked in focus groups with girls currently enrolled in school but also included questions that reflect the experience of being a dropout, such as the challenges they have faced since dropping out of school, what led to their decision to leave school, and what is preventing them from going back.

4.4 Qualitative Data Analysis

The two sets of notes were combined for each discussion group for greater accuracy. All qualitative data was analyzed using applied thematic analysis by two separate coders (Guest et al. 2011). Emergent themes were identified. The methods that were used are outlined in Guest et al. (2011) and Ryan and Bernard (2003). In addition to major themes that were identified there were also several additional findings reported related to the use of commercial sanitary pads and school attendance that help to contextualize the quantitative survey data.

4.5 Quantitative Data Analysis

Quantitative data collected through the survey was analyzed using Stata 11.2 software by the primary researcher. Possible confounders of each specific relationship were identified
through a direct acyclic diagram (DAG). DAGs were used to determine minimally sufficient adjustment set. All relationships were analyzed using logistic regression in which the outcome was dichotomized (see below).

4.5.1 Outcome

4.5.1.1 School Attendance

School attendance was dichotomized into missing one or more days of school in a two-month period and missing no days of school. Subsequent analysis was performed dichotomizing school attendance into missing three or more days of school or less than three days of school in a two month-period and missing five or more days of school or less than five days of school. This analysis was performed for the purpose of comparing the various dichotomizations and determining whether the way that school days missed is dichotomized has an effect on the relationship between commercial sanitary pad use and school attendance.

4.5.1.2 Symptoms of Vaginal Infections

Having symptoms of vaginal infections was coded as a dichotomous variable (presence of one or more symptoms of vaginal infections or no symptoms).

4.5.2 Exposure

4.5.2.1 Commercial Sanitary Pad Use

Commercial sanitary pad use was coded as a dichotomous variable

4.5.2.2. Reusable Pads, Many Underwear, Handmade Materials, and No Item Used

In addition to the primary exposure of commercial sanitary pad use, the effect of using other methods to control menstruation on school attendance was also analyzed. These four categories represent the breakdown of ‘other’ when comparing commercial sanitary pad use to use of other methods. These four methods are using reusable pads, many underwear put
together, handmade materials, or using no item at all. All exposures were coded as dichotomous variables.

4.5.3 Confounders

4.5.3.1 Of The Effect of Commercial Sanitary Pad Use on School Attendance

Possible confounders of the relationship between commercial sanitary pad use and school attendance were identified through a DAG (Figure 2). For this particular analysis, the variables age, maternal education, sexual activity/behavior, and ever being pregnant were controlled for. It was found that sexual activity/behavior (measured as ever having sex) and ever being pregnant have large and statistically significant associations with school attendance. Possible confounders of this relationship that we did not measure are italicized in Figure 2.
Figure 2: Directed Acyclic Graph of the Relationship Between Commercial Sanitary Pad and School Attendance

4.5.3.2 Of The Effect of Reusable Pad Use, Using Many Underwear, Using Handmade Materials, and Using No Item on School Attendance

The same confounders were controlled for in each of the above four relationships. These were age, maternal education, sexual activity/behavior, and ever being pregnant.

4.5.3.3 Of The Effect of Commercial Sanitary Pad Use on Symptoms of Vaginal Infections

A DAG was constructed for the relationship between commercial sanitary pad use and vaginal infections to determine potential confounding of the relationship by other variables (Figure 3). The analysis of this relationship included controlling for age, maternal education, and sexual activity/behavior, and ever being pregnant. Variables that may act as confounders but were not measured are italicized in the DAG.

Figure 3: Directed Acyclic Graph of the Relationship Between Commercial Sanitary Pad Use and Vaginal Infections
4.5.3.4 Of The Effect of Reusable Pad Use, Using Many Underwear, Using Handmade Materials, and Using No Item on Symptoms of Vaginal Infections

We controlled for age, maternal education, sexual activity/behavior, and ever having been pregnant when analyzing the above four relationships.

4.6 Ethical Approval and Consent

Written informed consent was asked from each school headmaster for girls currently enrolled in school to participate in the study as they are minors. Asking for the headmaster’s consent rather than the consent of parents for girls who are enrolled in school has been conducted in two previous studies conducted in Muhuru Bay and is accepted in the community as standard practice. Girls who are enrolled in school were asked to sign a form of informed assent for both parts of the study, the qualitative focus groups and the quantitative survey, documenting that they understand the research and agree to participate in the study. A trained research assistant read forms for both the qualitative and quantitative parts of the study aloud to girls in Dholuo.

Parental consent was obtained for girls who were not currently enrolled in school because of their state as minors. Girls who were married were allowed to provide their own consent. As most adults living in Muhuru Bay are illiterate, a trained research assistant read consent forms to the parent or guardian in Dholuo. Written assent was also collected from each girl who was not enrolled in school prior to the discussion groups and surveys. A research assistant fluent in Dholuo read written assent documents to girls in Dholuo.
4.7 Institutional Review Board Approval

The study was approved by the Institutional Review Board for human subject’s research at Duke University in Durham, North Carolina. It was received in-country approval by The Kenya Medical Research Institute (KEMRI).
5. Qualitative Results

The following are major themes and findings of the qualitative data that informed the quantitative survey and provided contextual background of the menstrual experience of girls in Muhuru Bay.

5.1 Emergent Themes

5.1.1 Negative Emotions Surrounding the Experience of Menstruation in School

Girls currently in school who participated in the focus discussions indicated that they often feel ashamed when they are menstruating. Multiple girls commented that if a boy is aware a girl is menstruating, he will not sit besides her in class or ask her to find another place to sit. This treatment causes girls to feel ostracized, lonely, and leads to feelings of shame. Not having an item to use to control blood while attending, unexpected heavy menstrual leaking and staining of clothes, and boys teasing them about leaks or smelling are also cited as major reasons girls describe feeling ashamed and ‘shy’, a word used in Kenya that describes feeling either shame, deep embarrassment, or humiliation. Girls participating in the discussion groups often used the words ‘shame’ and ‘shy’ together to describe the feelings that they have while they are menstruating at school. Another common cause of shame for girls is when they cannot play sports during their periods. If they are using a piece of cloth or rag to control their flow, they worry that it will fall out of their underpants. Girls mentioned that other students will talk about them and why they are not participating, which will make them feel shy. One girl shared, “Once you hear your name, and ‘she’s not playing’, you feel shy.” Girls also described worrying that their rag will drop out at other times during the day. They reported feeling ashamed at the times that the rag does drop out.
The feeling of shame associated with menstruation appears to negatively affect girls’ school experience and the time that they spend in school during the school day. It is reported that some girls will not laugh in class while menstruating for fear that the laughing will cause a greater amount of blood to leak. Multiple girls also described how they will remain seated after class and wait for everyone to leave before standing up to avoid the embarrassment of peers noticing that they have leaked and stained their clothes. When boys tease girls, they feel ashamed to the point that they do not want to be in class again or want to leave school for the day. In this case, they may ask permission from teachers to go home.

5.1.2 Nonparticipation, Poor Concentration, and Pain in School When Menstruating

The academic experience of girls changes when they are menstruating. Although girls must stand up to answer questions in class, girls indicate that they will often not stand up when they are menstruating because of fear that they have leaked. Girls also report participating less in class and not making eye contact with teachers for fear that the teacher will know she is menstruating. They describe only feeling comfortable in class when no one knows they are menstruating. They also report not participating in sports/games for fear that their rag will fall out or that they will start to smell.

As girls often do not know the exact day when they will start their monthly menstrual period, they worry about whether they will begin it while they are in school. This was described as leading them to focus on possible unexpected leaks and to lose concentration in class. It was also consistently reported that girls are not able to concentrate in class during their periods due to significant pain associated with menstrual cramps. The theme of problems concentrating in school due to pain is consistent with reports by Scott et al. (2010) and Sommer (2010a). It is also
confirmed through quantitative data through the survey. When asked what is the greatest challenge you face dealing with menstruation, the two most reported answers were (1) pain and menstrual cramps (47.5%, $n = 229$) and (2) not having anything use to control the blood (31.1%, $n = 150$). During one focus group, young women asked the leaders on ways that they might manage their pain.

Girls reported that boys also have trouble concentrating in school when they know a girl is menstruating. The boys’ focus, instead of on class, is on girls and whether they have their period.

5.1.3 Leaving School to Change and Missing Lessons

Girls recurrently described leaving school to change the item that they were used to control their period or to bathe. They will often ask permission from teachers to go home to change or bathe, and teachers are described as obliging. Others are given direct advice from teachers to go home to change. One girl comments that when girls have a menstrual leak, “some females tell male teachers. Some will advice you to go home.” Some girls described going home during breaks, so as to not miss any lessons, while others said that they missed at least one lesson to go home.

Missing lessons due to menstrual pain was a common theme during the focus groups, Girls may choose to attend school when they have their period but may decide to skip a lesson due to pain from menstrual cramps.

5.1.4 Boys’ Awareness of Girls’ Menstruation and Subsequent Teasing

Girls recurrently described that boys have a keen awareness of when a girl is attending. As described by the girls, boys may be able to recognize that a girl is menstruating by how she smells, bloodstains on clothes, and changes in a girl’s behavior and actions, such as excessive
worry, quietness, and nonparticipation in classes. A girl in one focus groups commented, “These boys are very much aware of our periods. I hear [them say] ‘Someone is smelling.’” Boys may also seek to find out if a girl is menstruating by bending over to look under her skirt.

Throughout the qualitative focus groups with both girls in school and who have dropped out, girls also portrayed boys as teasing them excessively about their periods. Multiple females said that a boy will tell a girl to go home and bathe if he notices that she smells. If he discovers she is menstruating, he may also tell others she is menstruating. Boys are describing as laughing at girls who have their periods, singling them out by pointing at them, and verbally abusing them.

However, data collected quantitatively through the survey are not consistent with these reports. When asked whether boys tease them when they are menstruating, 80.9% of girls report that boys do not tease them \((n = 390)\), while 18.9% report that boys do tease them \((n = 91)\).

### 5.1.5 Transactional Sex in Relation to Menstruation and Sexual Harassment

In both focus groups with girls in school and girls who had dropped out of school, participants described female adolescents in Muhuru Bay as being lured into having sex with men who offer them money. This report is consistent with unpublished data about the prevalence of transactional sex in Muhuru bay (Puffer et al. 2011). If a girl does not have money, she may befriend and have sex with an older man in order to pay for school fees, exam fees, and sanitary pads. Participants also reported that girls will seek out a boyfriend for these reasons. Multiple girls in the focus groups said that their boyfriend gives them pocket money to buy pads. Participants from both in school and out of school from in school focus groups also commented that boys in Muhuru Bay will call girls prostitutes and proposition them for sex.
5.1.6 Early Pregnancy and Marriage

Pregnancy and early marriage is very much on the minds of young women participating in all of the focus groups. Although girls described multiple negative aspects of their menstrual experience, common positive feelings that many reported about having their period were pride and happiness. Girls report being happy and proud when they have their period because when they miss their period their parents may accuse them of being pregnant. Sexually active girls report that they are proud that they have their period because it means they are not pregnant. Worry of girls over early pregnancy is also reported in the survey. Overall, 34.0% of all girls worry when they miss their period because they feel they may be pregnant ($n = 164$).

Our focus groups also show that dropping out of school due to early pregnancy is also a clear concern and reality for girls in Muhuru Bay. Girls in school commonly described girls dropping out of school due to early pregnancies. This description is also supported by survey data (see section 3.5). Girls who had dropped out of school that participated in focus groups reported negative feelings around early pregnancy, similar to those feelings reported by girls in school above. One of the main challenges of being a dropout that they described was being seen as ‘loose’ for having gotten pregnant and left school.

Many girls also described how early marriage is one of the negative aspects of being a female in Muhuru Bay. Reasons for early marriage as described by the girls in focus groups are poverty and early pregnancy. Girls who have actually dropped out of school, however, also describe marriage as a state they wish to attain. A frustration expressed by these girls is that they are told they cannot marry.
5.2 Additional Findings

5.2.1 Reported Number of Days of School Missed

Participants from in school focus groups reported missing between 3 to 7 days of school per month due to menstruation.

5.2.2 Risk Factors for Vaginal Infections

The majority of girls from both in school and out of school focus groups reported using materials other than commercial sanitary pads to control their menstrual periods. These materials include rags (pieces of old blankets and old clothes), pieces of old mattresses, and handkerchiefs with leaves placed on top. Some participants from the in school focus groups described having itchiness in their vaginal area after having used rags or reusable pads. Girls also report that reusable pads sometimes do not dry quickly, although no information was given on whether they will use them while they are still wet.

5.2.3 Commentary on Reusable Pads

Participants described both positive and negative aspects of reusable pads. Two positive aspects of reusable pads are that they are reusable and accessible. When using reusable pads, girls do not have to search for or worry about how they will acquire money to pay for commercial sanitary pads. Girls also commented that they like reusable pads because it means that they do not have use rags. They find that reusable pads are more durable than rags and are long lasting.

Negative aspects of reusable pads that girls reported are that they may not dry fast enough and that the inside material of the pad (such as cotton) will collect to one end after the
pad is washed. Girls also commented that they do not like washing the blood from reusable pads.
6. Quantitative Results

6.1 Description of the Sample Population

For the purpose of demographic summary (Table 1), individuals from the sample population were categorized as either using commercial sanitary pads (n= 170) or using other items for menstruation control in the past two months (n= 267). The other items category includes the use of reusable pads; many underwear used together, handmade items, or not using anything. The item used in the last two months to control period was not applicable, missing, or another item for 45 girls. Reasons for these three response categories were that the girl was either pregnant or had missed two periods (n=41), her data was missing due to surveying error (n=3), or other (n=1).

Participants included girls aged 11 to 18 years. Overall, more girls using other methods to control menstruation are enrolled in school than girls using commercial sanitary pads (77.5%, vs. 62.4%, $\chi^2(1) = 11.67, p = 0.001$). As seen in Table 1, significant demographic findings were as follows. Girls using commercial sanitary pads were significantly more likely to be sexually active than those using other materials and more likely to have weekly pocket money than girls using other items or no item at all. Overall, girls with pocket money primarily receive it from their parents or relative followed by a boyfriend and a job. The amount of pocket money that girls have that use commercial sanitary pads is greater than for those who use other items or no item. In general, a greater percentage of girls using commercial sanitary pads in comparison to those using other methods have a boyfriend (51.2%, vs. 44.2%) and have ever been pregnant (28.2% vs. 19.5). For the entire population, the mean age of first pregnancy is 15.7 (SD = 1.34).
Table 1: Sample Demographics

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Commercial sanitary pads</th>
<th>Other items</th>
<th>Not applicable*</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N</strong></td>
<td>170</td>
<td>267</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>15.4 [1.7]</td>
<td>14.9 [1.5]</td>
<td>16.1 [1.6]</td>
<td>0.01</td>
</tr>
<tr>
<td>Currently enrolled in school</td>
<td>106 (62.4)</td>
<td>207 (77.5)</td>
<td>8 (17.8)</td>
<td>0.001</td>
</tr>
<tr>
<td>Sexually active?</td>
<td>116 (68.2)</td>
<td>154 (57.8)</td>
<td>39 (86.7)</td>
<td>0.05</td>
</tr>
<tr>
<td>Age of sexual debut</td>
<td>14.1 [1.8]</td>
<td>13.6 [1.9]</td>
<td>13.9 [1.8]</td>
<td>0.01</td>
</tr>
<tr>
<td>Ever pregnant</td>
<td>48 (28.2)</td>
<td>52 (19.5)</td>
<td>33 (73.3)</td>
<td>0.08</td>
</tr>
<tr>
<td>Age at first pregnancy</td>
<td>16.0 (1.4)</td>
<td>15.4 (1.26)</td>
<td>15.8 (1.2)</td>
<td>0.20</td>
</tr>
<tr>
<td>Boyfriend</td>
<td>87 (51.2)</td>
<td>118 (44.2)</td>
<td>24 (53.3)</td>
<td>0.16</td>
</tr>
<tr>
<td>Has pocket money</td>
<td>104 (61.2)</td>
<td>121 (45.3)</td>
<td>24 (53.3)</td>
<td>0.001</td>
</tr>
<tr>
<td>Where she gets pocket money</td>
<td></td>
<td></td>
<td></td>
<td>0.72</td>
</tr>
<tr>
<td>Parents or relatives</td>
<td>50 (29.5)</td>
<td>66 (24.7)</td>
<td>11 (24.4)</td>
<td></td>
</tr>
<tr>
<td>Boyfriend</td>
<td>34 (20.0)</td>
<td>41 (15.3)</td>
<td>8 (17.7)</td>
<td></td>
</tr>
<tr>
<td>Job</td>
<td>11 (6.5)</td>
<td>13 (4.9)</td>
<td>2 (4.4)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>8 (4.7)</td>
<td>7 (2.6)</td>
<td>3 (6.7)</td>
<td></td>
</tr>
<tr>
<td>Not applicable/missing</td>
<td>67 (39.4)</td>
<td>146 (54.7)</td>
<td>22 (48.9)</td>
<td></td>
</tr>
<tr>
<td>Amount of pocket money</td>
<td></td>
<td></td>
<td></td>
<td>0.004</td>
</tr>
<tr>
<td>50 KSh or less</td>
<td>30 (17.6)</td>
<td>57 (21.3)</td>
<td>9 (20.0)</td>
<td></td>
</tr>
<tr>
<td>Between 50 and 100 KSh</td>
<td>23 (13.5)</td>
<td>18 (6.7)</td>
<td>4 (8.9)</td>
<td></td>
</tr>
<tr>
<td>100 to 200 KSh</td>
<td>31 (18.2)</td>
<td>33 (12.3)</td>
<td>5 (11.1)</td>
<td></td>
</tr>
<tr>
<td>More than 200 KSh</td>
<td>20 (11.8)</td>
<td>12 (4.5)</td>
<td>5 (11.1)</td>
<td></td>
</tr>
<tr>
<td>Not applicable/missing</td>
<td>66 (38.8)</td>
<td>147 (55.1)</td>
<td>22 (48.9)</td>
<td></td>
</tr>
<tr>
<td>Family characteristics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biological mother alive</td>
<td>131 (77.1)</td>
<td>212 (79.4)</td>
<td>37 (82.2)</td>
<td>0.56</td>
</tr>
<tr>
<td>Biological father alive</td>
<td>101 (59.4)</td>
<td>162 (60.7)</td>
<td>32 (71.1)</td>
<td>0.76</td>
</tr>
<tr>
<td>Orphan</td>
<td>26 (15.3)</td>
<td>35 (13.1)</td>
<td>2 (4.4)</td>
<td>0.52</td>
</tr>
<tr>
<td>Primary Caregiver (s)</td>
<td></td>
<td></td>
<td></td>
<td>0.35</td>
</tr>
<tr>
<td>Biological mother and father</td>
<td>48 (28.2)</td>
<td>77 (28.8)</td>
<td>13 (28.9)</td>
<td></td>
</tr>
<tr>
<td>Biological mother</td>
<td>44 (25.9)</td>
<td>84 (31.5)</td>
<td>14 (31.1)</td>
<td></td>
</tr>
<tr>
<td>Biological father</td>
<td>12 (7.1)</td>
<td>22 (8.0)</td>
<td>1 (2.2)</td>
<td></td>
</tr>
<tr>
<td>Female caregiver</td>
<td>30 (17.6)</td>
<td>41 (15.4)</td>
<td>6 (13.3)</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>15 (8.8)</td>
<td>11 (4.1)</td>
<td>5 (11.1)</td>
<td></td>
</tr>
<tr>
<td>Female and male caregiver</td>
<td>12 (7.1)</td>
<td>21 (7.9)</td>
<td>1 (2.2)</td>
<td></td>
</tr>
<tr>
<td>Female caregiver education</td>
<td></td>
<td></td>
<td></td>
<td>0.25</td>
</tr>
<tr>
<td>Primary or less</td>
<td>83 (48.8)</td>
<td>154 (57.7)</td>
<td>27 (60.0)</td>
<td></td>
</tr>
<tr>
<td>All or part of secondary</td>
<td>26 (15.3)</td>
<td>34 (12.7)</td>
<td>3 (6.6)</td>
<td></td>
</tr>
<tr>
<td>Missing/does not know</td>
<td>56 (32.9)</td>
<td>75 (28.1)</td>
<td>15 (33.3)</td>
<td></td>
</tr>
<tr>
<td>Women treated equally to men</td>
<td>79 (46.5)</td>
<td>116 (43.4)</td>
<td>32 (71.1)</td>
<td>0.43</td>
</tr>
</tbody>
</table>

Continuous variables expressed as mean +/- [SD]; categorical variables expressed as n (%). *Not applicable = 41 (91.1); missing = 3 (6.7); other = 1 (2.2); reasons for not applicable are being currently pregnant or missing period.
6.2 Items Used For Menstruation In Last Two Months and Normally

There is very little difference between the types of item that participants used in the last two months as compared to what they normally use. Overall, 92.2% (n = 403) report that what they used in the last two months is what they normally use to control their menstruation.

6.3 Average Number of School Days Missed For Girls In School

The mean number of school days that girls miss over a two-month period is 2.30 (SD = 3.68). The distribution of school days missed among the entire population of girls in school is shown in Figure 4. The distribution of school days missed among girls in school who are using commercial sanitary pads and those who are using other are shown in Figure 5.

Figure 4: Frequency (n) Distribution of Reported Number of School Days Missed In A Two-Month Period Of All Girls Currently In School
6.3.1 Of Girls Using Commercial Sanitary Pads Versus Other

There is only a slight difference in the mean number of school days missed between girls who use commercial sanitary pads and those who use other items (Figure 4). The mean number of days of school missed in a two month-period for girls using commercial sanitary pads is 2.28 (SD = 2.98) while it is 2.13 (SD = 3.34) for girls using other items.
6.3.2 Of Girls Using Reusable Pads, Many Underwear, Handmade Items, Or No Item

The mean number of school days missed by girls using reusable pads over a two-month period is 1.46 (SD = 2.15). Girls using handmade items miss an average of 1.92 days over a two-month period (SD = 2.24), while girls who used no item to control their period over the last two months to control their period missed an average 0.86 days (SD = 1.41). Girls using many underwear to control their period missed significantly more school on average over a two-month period at 3.56 days (SD = 5.40) than those using reusable pads, handmade items, or no item at all (see Figure 5).
6.4 Missing School Due to Menstruation

Overall, only 8.5% of girls currently in school \((n = 41)\) indicated that they missed school days due to menstruation. For girls who dropped out of school, only two (0.4%) individuals indicated that the main reason they dropped out was directly due to menstruation, specifically that they missed too many classes due to menstruation.

6.5 Reasons Girls Drop Out of Primary School

Becoming pregnant is the main reason that girls report dropping out of school (Table 2). Overall, 55.70% of girls who had dropped out of school did so because of early pregnancy \((n = \ldots\).
Other commonly reported reasons are not being able to afford various types of school fees (29.7%, \(n = 47\)) and other (11.4%, \(n = 18\)).

Table 2: Reported Reasons for Dropping Out of School

<table>
<thead>
<tr>
<th>Main reason for dropping out of school</th>
<th>Girls Who Have Dropped Out (n = 156)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I became pregnant</td>
<td>88 (55.7)</td>
</tr>
<tr>
<td>I couldn’t afford school fees, uniforms, or other fees</td>
<td>47 (29.7)</td>
</tr>
<tr>
<td>My family needed/kept me at home</td>
<td>2 (1.3)</td>
</tr>
<tr>
<td>I missed too many classes due to menstruation/attending</td>
<td>2 (1.3)</td>
</tr>
<tr>
<td>Other</td>
<td>18 (11.4)</td>
</tr>
</tbody>
</table>

*Variables expressed as \(n\) (%)

6.6 The Effect of Commercial Sanitary Pad Use on School Attendance

The adjusted prevalence odds of missing school 1 or more days of school in two months when using commercial sanitary pads are 1.74 times as high as the odds of missing 1 of more days of school in two months when using other items (\(p = 0.02\), 95% C.I. = 1.08 - 2.81). The crude prevalence odds ratio of missing school using commercial sanitary pads versus other items is 1.93 (\(p = 0.004\), 95% C.I. = 1.23 - 3.05). When school attendance is dichotomized at 3 days and at 5 days, this negative relationship between commercial sanitary pad use and school attendance still holds, but the adjusted prevalence odds ratios are not statistically significant and are smaller in value. The adjusted prevalence odds of missing 3 or more days of school in a two-month period when using commercial sanitary pads are 1.36 as compared to when using other items or no item (\(p = 0.18\), 95% C.I. = 0.87 - 2.11). The adjusted prevalence odds of missing 5 or more days of school in a two-month period when using commercial sanitary pads are 1.27 (\(p = 0.35\), 95% C.I. = 0.77-2.09).
6.7 The Effect of Using Reusable Pads, Many Underwear, Handmade Items, and Nothing on School Attendance

6.7.1 The Effect of Using Reusable Pads on School Attendance

The adjusted prevalence odds of missing school 1 or more days of school in two months when using reusable pads are 0.67 times as high as the prevalence odds of missing 1 or more days of school in two months when using commercial sanitary pads (p = 0.18, 95% C.I. = 0.37 - 1.21). The crude odds of missing 1 or more days of school in two months when using reusable pads are 0.64 (p = 0.11, 95% C.I. = 0.36 – 1.11).

6.7.2 The Effect of Using Many Underwear to Control Menstrual Flow on School Attendance

The adjusted prevalence odds of missing more than 1 day of school in a two month period when using many underwear to control menstrual flow are 1.26 times as high as the prevalence odds of missing more than 1 day of school in a two month period when using commercial sanitary pads (p = 0.47, 95% C.I. = 0.67 - 2.38). The crude odds ratio of missing school when using many underwear versus commercial sanitary pads is 1.23 (p = 0.50, 95% C.I. = 0.67 - 2.26).

6.7.3 The Effect of Using Handmade Materials on School Attendance

The adjusted prevalence odds of missing more than 1 day of school in a two-month period when using handmade materials to control menstrual flow are 0.71 times as high as the prevalence odds of missing this amount of school when using commercial sanitary pads (p = 0.16, 95% C.I. = 0.43 - 1.15). The crude odds ratio of missing school when using handmade materials as compared to using commercial sanitary pads is 0.68 (p = 0.09, 95% C.I. = 0.43 - 1.07).
6.7.4 The Effect of Nothing to Control Menstruation on School Attendance

The adjusted prevalence odds ratio of missing 1 or more days of school in two months when using no item to control menstruation is 0.56 (p = 0.26, 95% C.I. = 0.21 - 1.53). The crude prevalence odds of missing school when using no item to control menstruation are 0.46 times as high as the odds of missing 1 or more days of school when using commercial sanitary pads (p = 0.11, 95% C.I. = 0.18 - 1.20).

6.8 The Prevalence of Vaginal Infections

Overall, 9.39% (n = 45) of all girls reported symptoms of vaginal infections. The prevalence of vaginal infection symptoms among girls using commercial sanitary pads is 7.65% (n = 13), while the prevalence of vaginal infection symptoms among girls using other items is 10.90% (n = 29).

6.9 The Effect of Commercial Sanitary Pad Use on Prevalence of Vaginal Infections

The prevalence odds of having symptoms of a vaginal infection when using commercial sanitary pads are 0.68 times as high as having symptoms of a vaginal infection when using other items to control menstruation (p = 0.68, 95% C.I. = 0.34 - 1.34). This difference in odds is not significant.

6.10 The Effect of Using Reusable Pads, Many Underwear, Handmade Materials, and Nothing on Prevalence of Vaginal Infections

We found no significant difference in the odds of having symptoms of vaginal infections when using each of the above items to control menstruation as compared to when using commercial sanitary pads.
7. Discussion and Policy Implications

The results from the study indicate that primary schoolgirls in Muhuru Bay miss on average 2.3 days of school in a two-month period for any reason, on average 1 day of school per month. It was found that the prevalence odds of a girl missing school when using commercial sanitary pads are 1.74 times as high as that when using other items such as reusable pads and handmade items. That the use of sanitary pads is associated with missing more school than when using other strategies to control menstruation contradicts the original hypothesis, statements by news agencies and NGOs, and results from Scott et al.’s study on the effect of sanitary pad provision on school attendance in Ghana (2010).

It seems unlikely that the fact that girls are using commercial sanitary pads as compared to other means is the actual reason that they are missing more school. Rather, there are likely other unexplored variables and relationships that are affecting this particular relationship. A reasonable hypothesis for why girls using commercial sanitary pads miss significantly more school than those using other items is that they may have heavier blood flow during their periods or a period of long duration (5 days or greater). Both having a heavy menstrual flow and a period of long duration may be reasons why girls would have greater motivation to access (i.e. through money obtained via transactional sex) and use commercial sanitary pads. Having a heavy menstrual flow and a period of long duration are each associated with increased levels of pain during menstruation in adolescents (Teperi and Rimpela 1989; Balbi et al. 2000). Girls using commercial sanitary pads may have a heavier and longer menstrual flow and therefore have greater pain during menstruation. This pain would likely lead to missing school and would create an association between commercial sanitary pad use and school absenteeism.
It also is possible that the sexual behavior of girls is a residual confounder of relationship between commercial sanitary pads and school attendance. While we measured a girl’s sexual activity by asking her whether she has ever had sex or not, this variable does not capture any differences in overall frequency or presence of risky behavior. The qualitative data from this study reveals that girls are engaging in transactional sex to gain money to pay for various items including commercial sanitary pads, and previous research has shown girls are not able to negotiate safe sex practices in these relationships (Wamoyi et al. 2010). It may be the case in our study that promiscuous sexual behavior is leading to severe illnesses, such as urinary tract infections or sexually transmitted infections, among girls using commercial sanitary pads that may cause them to miss school. It also may be that girls are missing school in order to have sex to gain cash to pay for sanitary pads and other items.

Data on the effect of commercial sanitary pads on vaginal infections negated the second hypothesis of this study that there will be a negative relationship between commercial sanitary pad use and prevalence of vaginal infections. Although the prevalence odds of having symptoms of a vaginal infection is less among girls using commercial sanitary pads as compared to other items, this difference is not statistically significant. The average prevalence of any type of vaginal infections in our sample was 9.4%, which is consistent with prevalence of vaginal infections among girls and women in Nyanza province reported in the 2008 Kenyan Demographic Health Survey. However, the factors that are causing this prevalence are unknown.

The different effects that commercial sanitary pad use may have on girls’ lives are shown in Figure 7. Although it was found that the use of commercial sanitary pads is not associated with increased school attendance or decreased prevalence of symptoms of vagina infections, it is likely that increases in girls’ access to commercial sanitary pads or another
absorbent item would improve their overall school experience. The qualitative data indicates that girls do not want to stand up in class while they are menstruating, which is usually required in order to answer question from the teacher, for fear that they are leaking. This behavior has also been reported in McMahon et al. (2011). Girls also have problems concentrating in class during their periods because they are worried about potential menstrual leaks. As well, girls will not participate in sports at school because of fear of smelling and leaking during their menstruation. Excessive smell and leaks will also cause a girl to leave school to bathe or change, in which case she may miss class lessons. This finding is corroborated by data described by Sommer (2010b).

Figure 8: Possible Effects of Commercial Sanitary Pad Access and Use on Girls’ Lives
The negative feelings that girls experience at school during menstruation, such as shame, embarrassment, and loneliness, likely also affect their overall school experience. These negative feelings that girls have in school, especially when using handmade materials to control their menstruation, have been previously reported elsewhere (Sommer 2010b; McMahon et al. 2011). In the qualitative focus groups, girls also consistently reported being teased by boys who have a keen awareness of when they are menstruating. The teasing of girls by boys during menstruation has also been previously discussed in McMahon et al. (2011) and by the African Population Health Research Center (2010).

There is, however, an inconsistency in the data. While girls in the focus groups discussed specific stories about being teased by boys, the vast majority of girls participating in the quantitative survey reported that boys did not tease them during their menstruation. It is hypothesized that this inconsistency may be due to selection bias when selecting girls in school for focus groups. Head teachers were asked to arbitrarily select five to seven girls for these groups, but each may have selected girls that he/she knew had experienced problems with menstruation. Another inconsistency arose between the qualitative and quantitative data reported for the number of school days that girls’ miss when menstruating. Girls’ in the focus groups primarily reported missing between three to seven days of school each month due to menstruation. However, data from the quantitative survey indicates that girls only miss 2.6 days per month in a two-month period of time for all reasons including menstruation. It is hypothesized that this difference in quantitative and qualitative data is likely also due to the selection bias for the focus groups with girls currently attending school outlined above. The possibility that head teachers selected girls for the focus groups who have more difficulty with
their menstruation may indicate that there exists a subset of girls for whom managing menstruation is a critical problem.

It is important to note that pain, rather than not having an item to use that has high absorbency, was reported by almost half of all 482 girls in our study as the greatest challenge faced in dealing with menstruation. Oster and Thorton (2010) also found that a similar percentage of girls from their sample, 43.8%, missed school mainly because of menstrual cramps. As noted in the qualitative results sections, girls in the focus groups wanted to know strategies to manage menstrual pain. Unfortunately, affordable access to pain medication is extremely limited in Muhuru Bay. While the issue of girls missing school due to cramps is not unique to this setting, more attention should be given to giving girls in developing areas like Muhuru Bay affordable access to pain medication and teaching girls in school about strategies to deal with their menstrual cramps.

Another significant issue that arose from the data was the number of individuals that had dropped out of school due to early pregnancy. Contraceptive use or abstinence, in this context, is a means to stay in school and policies should prioritize the important of abstinence and safe sex behaviors. As well, there should be more focus on sexual education classes in school. It is also likely that some of these girls have become pregnant through transactional sex arrangements. Policy should also focus on teaching young women about the hazards of engaging in transactional arrangements and should devise other outlets, such a microfinance programs, in which young women and their families can make money. Girls who have dropped out of school due to early pregnancy and are teenage mothers should also have a feasible way to continue their education, such as school programs tailored specifically to their needs or a local community center with classes. The creation of community centers in poor areas such as
Muhuru Bay could act as one arena for women and men in these communities to work and make a living.

The inability to pay indirect school fees was also a common reason for dropping out of school for participants in this study and should be addressed by policy makers. While policy is in place for free primary education, the reality is that primary education is not free in many parts of Kenya, as reported by at least one news agency (Inter Press Service News Agency 2008). The effect of indirect fees on school drop out rates should be investigated further.

7.1 Opportunities for Future Research

It is important for future research to investigate what exactly makes girls who use commercial sanitary pads different from those who don’t and how this difference affects school attendance. This research hypothesizes that it may be sexual behavior or more painful periods, but ultimately it is unknown what is leading to the small, but statistically significant, difference in school attendance among these groups.

It follows from the proposed explanation of our findings that future studies should focus on the effect that sexual behavior, such as frequency of sex and participation in risky sexual practices, has on school absenteeism. Investigations of the effect of unaffordable access commercial sanitary pads on prevalence of transactional sex among adolescent girls are warranted. It is important to also study the overall belief system that leads to the practice of transactional sex among both men and women in order to determine possible avenues for interventions to reduce this high-risk behavior.

Future studies should also investigate not only whether girls are missing school days due to menstruation, but whether they are missing a significant amount of lessons during the day, as opposed to full days, in order to bathe and wash. When asked about whether they had a place
to change and dispose their sanitary pads or rags at school, all girls reported that they did have a place to change. However, running water is not available at schools. Missing lessons to go home to wash may be an overlooked factor that affects girls’ educational attainment.

There should also be more research conducted that investigates the effect of using sanitary materials on prevalence of vaginal infections. This study likely did not have enough power to detect a statistically significant difference in the prevalence odds of having a vaginal infection in the two groups compared, which means that the results form this study are inconclusive (see section 7.2 Limitations). There may be a relationship between using sanitary materials and vaginal infections that this study was not able to find due to low power. Future studies should explore this relationship using a larger sample size.

Finally, focus should be on providing support to girls who have significant pain association with menstruation and do not have affordable access to pain medication. Appropriate methods to use in resource-poor settings for menstrual pain control should be investigated. Future research on the effect of commercial sanitary pad use on school attendance should also include a measure for menstrual pain to understand the effect that pain has on school absenteeism.

7.2 Limitations

There exist multiple limitations to this research. First, school attendance data was self-report and may have been affected by recall bias. Self-report data was used because of seemingly greater bias present in formal school attendance records. Most schools in Muhuru Bay update their school attendance records once a week, which requires teachers to recall from memory the attendance of each student each day and may result in bias. Schools also receive money based on high attendance records, so there was a chance that these records were not
reflective of actual attendance of students. It was decided because of these concerns that self-reported school attendance data would be more informative than data from school attendance records. However, there is possible recall bias in this school attendance data.

There also may not be enough statistical power to detect a statistically significant difference in the prevalence odds of having a vaginal infection among girls using commercial sanitary pads as comparing to girls using different method. This study did not detect a statistically significant prevalence odds ratio comparing these the prevalence odds of having a vaginal infection in these two groups. The fact that there was a non-significant odds ratio is likely due to low power. It was found that the sample size of this study, which was 170 girls using commercial sanitary pads and 267 girls using other items or no item, was not large enough to have 80% power to detect a statistically significant difference in the prevalence of vaginal infections that this study actually found between these two groups. In fact, this sample size only has a 15% power to detect a statistically significant difference. Due the fact that this part of our study was underpowered, the conclusion that there is no difference in the prevalence odds of having a vaginal infection among those using commercial sanitary pads and those using other items should be viewed with uncertainty.

Another concern is that not all of the confounders identified in directed acyclic diagrams for both the relationship between of commercial sanitary pads and school attendance and the relationship between commercial sanitary pads and symptoms of vaginal infections were measured. For the relationship between sanitary pads and school attendance, these unmeasured variables are family income, rate of transactional sex, presence of indirect school fees, and religious beliefs. It was decided that family income would be difficult to measure without also surveying the primary caretaker of the girl who was surveyed and, in the interest of
time, this was not done. Presence of indirect school fees, such as that for uniforms or books, was not measured during the survey but would be helpful to measure in future studies. The measurement of religious beliefs was omitted, but this should also be included in future studies. While there is no indication from the literature on sub-Saharan Africa that religion plays a role on whether a girl would use a commercial sanitary pad or another item, the extent of a girl’s religiosity may have an effect on the amount of school that she attends.

Variables identified as possible confounders of the relationship between commercial sanitary pads and symptoms of vaginal infections that were not measured are currently having HIV or another sexually transmitted infection (STI), immunodeficiency, antibiotic use, and being currently pregnant. This study did not measure the presence of an STI because self-report of STI presence would have been the only feasible way for this study to have collected STI data. It is likely that many girls do not know whether or not they have a STI, as the healthcare system in Muhuru Bay is limited to two small, undersupplied clinics. Furthermore, STIs such like HIV carry a significant amount of stigma in the community, and girls may not know their status or wish to reveal their status as a result. Information on whether a girl is immunodeficient would be virtually impossible to collect in Muhuru Bay with the poor state of health care in the area. Antibiotic use may be measured through self-report and may be a confounder as antibiotics are easy to obtain from the local health centers. As a result, future studies focusing on vaginal infections should measure this variable. Finally, it is known that being pregnant is a risk factor for vaginal and yeast infections. Our survey did not ask whether a girl was currently pregnant, only if she has ever been pregnant, which is a limitation of our results.

There are also variables that may act as residual confounders that were either not measured or can only be classified as crude measures. These variables were not included in the
analysis and could have affected the results. These include menstrual pain and being currently pregnant. Also, sexual activity was only measured as a yes or no. Frequency of sex and safe sex practices may be residually confounding the relationships that we measured.

The results also may be limited by the fact that we used logistic, rather than log binomial, regression to analyze all data. This regression was chosen because of its stability. However, the odds ratio reported for each set of data may overestimate the risk ratio for this data when an outcome is high in the sample population. The prevalence odds ratio comparing school days missed of girls using sanitary pads versus that of girls using other items may overestimate the prevalence risk ratio comparing these two groups because the outcome of missing 1 or more days of school is common. However, it is reasonable to expect the risk ratio for this set of data to be in the same direction as the odds ratio. It is also important to note that ratio measures, as compared to risk difference measures, are ultimately better suited for disease etiology rather than public health investigations.

A final possible limitation to the generalizability of this study’s results is that primary schoolgirls in Muhuru Bay seem to be motivated to stay in school because of the presence of WISER. The presence of WISER, a free all-girls secondary school, was overwhelmingly the only positive aspect that girls mentioned about living in Muhuru Bay. As a result, it may be that all girls are missing significantly less school due to menstruation in this area in comparison to what is reported by news agencies and NGOs in other parts of Kenya because they want to have a chance to attend WISER.
Appendix A

Survey

Inclusion Criteria:
1. Attending
2. Ages 10-18

Inclusion Questions:
1. Are you currently attending (have already had your first period)?
   ☐ Yes
   ☐ No

2. What is your current age? ________________

Survey: Sanitary Pad Access, School Attendance, Self-Esteem, and Infections
Location: Muhuru Bay, Kenya
Participants: Girls Class 8______, Class 7 _____, Class 6______, Class 5 _____, Class 4______
School name: _________________________________
Girls not currently enrolled in school_______

Part A: We are first going to ask you a few questions about you.
1. What location/village are you from? ___________________________ (East, west, central, etc).

   2. Is your birth (biological) mother alive?
   ☐ Alive       ☐ Dead

   3. Is your birth (biological) father alive?
   ☐ Alive       ☐ Dead

   4. Who primarily takes care of you?
   ☐ Biological mother
   ☐ Biological father
   ☐ Both biological mother and father
   ☐ Female caregiver
   ☐ Male caregiver
   ☐ Both female and male caregiver
   ☐ Not applicable (married)

   5. If a female takes care of you (biological mother or caregiver), what level of school did she reach?
   ☐ She did not attend school
☐ She finished part of primary school
☐ She finished all of primary school
☐ She finished part of secondary school
☐ She finished all of secondary school
☐ She finished part of college/university
☐ She finished all of college/university
☐ I don’t know
☐ Not applicable (female does not take care of you)

6. Are women treated equally to men in your family?
☐ Yes        ☐ No

7. Do you currently have a boyfriend?
☐ Yes        ☐ No

8. Do you normally have pocket money to use?
☐ Yes        ☐ No

IF YES TO QUESTION 8, CONTINUE TO QUESTION 9. IF NO, SKIP TO QUESTION 11.

9. Where do you usually get your pocket money from?
☐ My job
☐ Money/allowance given to me by my parents or relatives
☐ My boyfriend
☐ A girlfriend
☐ An older female friend
☐ An older male friend
☐ Other ______________

10. In the last week, how much pocket money have you had total?
☐ 50 KSh or less
☐ Between 50 and 100 KSh
☐ 100 KSh
☐ Between 100 and 200 KSh
☐ More than 200 KSh

11. Are you currently going to school?
☐ Yes        ☐ No
IF YES TO QUESTION 11, ANSWER QUESTIONS 12-19 and then GO TO QUESTION 21
IF NO TO QUESTION 11, ANSWER QUESTION 20, and then GO TO QUESTION 21

12. What was your score on the last exam you took? ________________

13. How many days of school did you miss in the last two months? ________________

14. If you missed any day of school, why was this? (Can check more than one answer)
   ☐ I could not afford school fees or exam fees
   ☐ I was menstruating
   ☐ I did not have a school uniform to wear
   ☐ I was sick
   ☐ I don't like school
   ☐ I was told by my parents to stay home (to help)
   ☐ Other ________________
   ☐ Not applicable (I haven't missed school in the past two months)

15. If you've ever missed school because you were attending, what are some of the reasons why it caused you to miss school?
   ☐ I had pain and cramps that kept me at home
   ☐ My flow was too heavy to control
   ☐ The item I used did not absorb blood well
   ☐ I did not have anything to use to control my period
   ☐ I did not want to be around boys
   ☐ I felt shy
   ☐ My parents kept me at home
   ☐ Not applicable (I haven't missed school because I was attending)
   ☐ Other ________________

16. Have you ever used attending as an excuse to miss school when you were not really attending?
   ☐ Yes ☐ No

17. How many class lessons did you miss in the last two months? ________________

18. Did you miss lessons because you were attending?
   ☐ Yes ☐ No

IF YES TO QUESTION 18, CONTINUE TO QUESTION 19. IF NO, SKIP TO 21.
19. What are some of the reasons attending caused you to miss lessons? (Can put more than one answer)
☐ I had too much pain to be in class
☐ I was leaking a lot of blood
☐ I smelled like blood
☐ I was teased by boys
☐ I was teased by other girls
☐ I was teased by teachers
☐ I felt shy

QUESTION FOR THOSE WHO HAVE DROPPED OUT OF SCHOOL

20. What was the main reason that you dropped out of school?
☐ I became pregnant
☐ I couldn’t afford school fees, uniforms, or other fees
☐ My family needed/kept me at home
☐ It was too difficult to manage attending at school
☐ I missed too many classes due to attending
☐ Other____________________________________________________________

QUESTIONS FOR BOTH THOSE WHO ARE IN SCHOOL AND THOSE WHO HAVE DROPPED OUT

21. During the last two months, what item did you use most of the time for your period?
☐ (1) Washable pads given to me through the WISER program (Johnson & Johnson)
☐ (2) Pads from a shop such as Always that another individual gave to me
☐ (3) Pads from a shop such as Always that I bought myself
☐ (4) Pads given to me by the WISERBridge Director, Margaret Hughes
☐ (5) Many pants put together
☐ (6) Something that I made or someone made for me out of cloth
☐ (7) Something I made or someone made for me out of vegetation
☐ (8) Something that I made or someone made for me out of paper
☐ (9) I did not use anything and went to school anyway
☐ (10) I did not use anything and stayed at home
☐ (11) Not applicable (I was pregnant or did not attend)

22. What do you normally use?
☐ (1) Washable pads given to me through the WISER program (Johnson & Johnson)
☐ (2) Pads from a shop such as Stayfree that another individual gave to me
☐ (3) Pads from a shop such as Stayfree that I bought myself
☐ (4) Pads given to me by the WISERBridge Director, Margaret Hughes
☐ (5) Many pants put together
☐ (6) Something that I made or someone made for me out of cloth
☐ (7) Something I made or someone made for me out of vegetation
☐ (8) Something that I made or someone made for me out of paper
☐ (9) I did not use anything and went to school anyway
☐ (10) I did not use anything and stayed at home

LOOK BELOW FOR ANSWER NUMBER FROM QUESTION 22 and FOLLOW SKIP PATTERN:

SKIP PATTERN
Answer (1): HAVE GIRL ANSWER QUESTIONS 32-38, and then SKIP TO PART B.
Answer (2): HAVE GIRL ANSWER QUESTIONS 23-26, and then SKIP TO PART B.
Answer (3): HAVE GIRL ANSWER QUESTIONS 27-31, and then SKIP TO PART B.
Answer (4): HAVE GIRL ANSWER QUESTIONS 32-38, and then SKIP TO PART B.
Answer (5): HAVE GIRL ANSWER QUESTIONS 39-42, and then SKIP TO PART B.
Answer (6): HAVE GIRL ANSWER QUESTIONS 39-42, and then SKIP TO PART B.
Answer (7): HAVE GIRL ANSWER QUESTIONS 39-42, and then SKIP TO PART B.
Answer (8): HAVE GIRL ANSWER QUESTIONS 39-42, and then SKIP TO PART B.
Answer (9): HAVE GIRL ANSWER QUESTIONS 39-42, and then SKIP TO PART B.
Answer (10): HAVE GIRL ANSWER QUESTIONS 39-42, and then SKIP TO PART B.

Question for Answer (2)
23. Who gave you pads to use?
☐ Your mother
☐ Your father
☐ A relative other than your parents
☐ A female friend of your age
☐ A boyfriend
☐ An older female friend
☐ An older male friend
☐ Other ________________________________

24. Have you ever shared a store bought pad with someone else after you have used it?
☐ Yes ☐ No

25. How often do you change your pad when you have your period?
☐ More than two times per day
☐ Two times per day
☐ One time per day
☐ One time every two days
☐ One time every three days

26. If in school, do you have a place to change your pad while you are at school?
☐ Yes       ☐ No       ☐ Not applicable

Questions for Answer (3)
27. Who gave you the money to pay for pads?
☐ Your mother
☐ Your father
☐ A relative other than your parents
☐ A female friend of your age
☐ A boyfriend
☐ An older female friend
☐ An older male friend
☐ Other ________________________________

28. How many times have you bought pads since the start of the school year?
__________________________

29. How often do you change your pad when you have your period?
☐ More than two times per day
☐ Two times per day
☐ One time per day
☐ One time every two days
☐ One time every three days

30. What do you use to hold your pads when you are using them?
☐ Pants
☐ String
☐ Pins
☐ Other ________________________________

31. If in school, do you have a place to change your pad while you are at school?
☐ Yes       ☐ No       ☐ Not applicable

Questions for Answer (1) or (4)
32. How many months total have you used pads given to you by WISER or the WISERBridge Director? ________________________________

33. Have you ever sold these pads for money?
☐ Yes ☐ No

34. How often do you change your pad when you have your period?
☐ More than two times per day
☐ Two times per day
☐ One time per day
☐ One time every two days
☐ One time every three days

35. What do you use to hold your pads when you are using them?
☐ Pants
☐ String
☐ Pins
☐ Other ________________________________

36. Have you ever bought sanitary pads yourself?
☐ Yes ☐ No

IF NO, SKIP QUESTIONS 37 and 38 SKIP TO SECTION C

37. How many times have you bought pads since the beginning of the school year? __________

38. Who gave you the money to pay for pads?
☐ Your mother
☐ Your father
☐ A relative other than your parents
☐ A female friend of your age
☐ A boyfriend
☐ An older female friend
☐ An older male friend
☐ Other ________________________________

Questions for Answer (5) (6) (7) (8) (9) or (10)
39. Do you prefer pads bought from a shop or other items (such as rags, many pants, paper)?
☐ Pads bought from a shop ☐ Other items

40. Would you prefer reusable pads made locally by a seamstress, or other items (such as rags, many pants, paper)?
☐ Reusable pads made locally ☐ Other items

41. If someone gave you sanitary pads, would you use them yourself or sell them for money?
☐ Use them
☐ Sell them for money
☐ Both
☐ I don’t know

42. If someone gave you sanitary pads, would you go to school/lessons more often?
☐ Yes
☐ No
☐ I don’t know
☐ Not applicable/I do not go to school

Part B: We are now going to ask you two questions on physical symptoms you have had over the past 3 months.

43. In the last three months have you had a vaginal discharge that has an unusual color or smell?
☐ Yes ☐ No

Variable: vinfection1

2244. In the last three months have you had itchiness, burning or pain (not associated with menstrual cramps) in the vaginal area?
☐ Yes ☐ No

Part C: We are now going to ask you a few questions about how you feel about your body and yourself since you have started attending.

45. How do you feel when you are having your period?
☐ Proud/Good
☐ I do not feel one way or the other
☐ Shy or ashamed
☐ Lonely
☐ Worried
☐ Bad
☐ Other ________________________________

46. Do you see attending as something positive that happens to a woman?
☐ Yes
☐ No
☐ Both positive and negative

47. What do you think or feel when you miss your period? (Can check more than one)
☐ I think that it is good to miss a period
☐ It is normal to miss a period
☐ I feel scared
☐ I feel worried because I may be sick/have a disease
☐ I feel worried because I may be pregnant
☐ Not applicable

48. What is the greatest challenge you face with managing your menstruation?
☐ I often have nothing to use to control the blood
☐ I have something to use, but it doesn’t absorb blood well (it leaks)
☐ I have a lot of pain and cramps
☐ I don’t have any challenges with managing my menstruation
☐ Other ________________________________

Part D: Below are listed a number of statements that reflect some feelings you might have. Please read each statement carefully and indicate how much you agree or disagree that it applies to you.

49. I feel that I am a person of worth, at least on an equal basis with others
☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

50. I feel that I have many good qualities
☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

51. I often think I’m a failure
☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

52. I am able to do things as well as most other people
☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree
53. I feel I do not have much to be proud of
☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

54. I like myself
☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

55. Most of the time, I feel badly about myself
☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

56. I am proud that I am woman
☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

57. My life would be easier if I were a boy
☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

58. When I am attending, I feel less powerful/confident
☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

59. When I am attending, I do not want to leave my compound.
☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

60. When I am attending, I become shy.
☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

61. I like myself less when I am attending.
☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

62. When I am attending, I don’t feel good at school.
☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

Part E: We are going to now ask you some questions about who you can talk with about attending and how others treat you while you are attending.

63. Are you able to talk about attending with your mother or a female caregiver?
☐ Yes ☐ No ☐ Not applicable (mother/female caregiver/not alive)

64. Are you able to talk about attending with your father or a male caregiver?
☐ Yes ☐ No ☐ Not applicable (father/male caregiver not alive)

65. Are you able to talk about attending with any other family member?
☐ Yes ☐ No
If yes, who? __________________________

58
66. Are you able to talk about attending with your girlfriends?
☐ Yes  ☐ No

67. Do boys tease you when you are attending?
☐ Yes  ☐ No

68. If yes, how does this make you feel? (check all that apply)
☐ It makes me feel good  ☐ It doesn’t make me feel one way or the other  ☐ It makes me feel bad  ☐ It makes me feel shy
☐ It makes me like myself less  ☐ It makes me not want to go to lessons/school  ☐ Not applicable (they don’t tease me, or do not know when I am attending)

69. How do girls treat you when you are attending? (you make check more than one answer)
☐ They give me pads  ☐ They give me a sweater to tie around my waist
☐ They don’t treat me one way or the other  ☐ They tease/laugh at me  ☐ They talk about me with others
☐ They do not know that I am attending  ☐ Other__________________________

70. How does this make you feel?
☐ It makes me feel good  ☐ It doesn’t make me feel one way or the other  ☐ It makes me feel bad
☐ It makes me feel shy  ☐ It makes me like myself less  ☐ It makes me not want to go to lessons/school  ☐ Not applicable

IF IN SCHOOL, ANSWER QUESTIONS 71-74.
IF GIRL HAS DROPPED OUT OF SCHOOL, ANSWER QUESTIONS 75-78.

Questions for Girls in School
71. How do female teachers treat you when you are attending? (check all that apply)
☐ They give me pads to use
☐ They are supportive of me by letting me leave school to bathe and/or change my clothes
☐ They don’t treat me in any particular way
☐ They tease/laugh at me
☐ They talk negatively about me to other teachers
☐ If I tie a shirt around my waist to cover blood, they make me take it off
☐ They do not know that I am attending
☐ Other___________________________________________________________

72. How does this make you feel? (check all that apply)
☐ I makes me feel good
☐ It doesn’t make me feel one way or the other
☐ It makes me feel bad
☐ It makes me feel shy
☐ It makes me like myself less
☐ It makes me not want to go to lessons/school

73. How do male teachers treat you when you are attending? (check all that apply)
☐ They give me pads to use
☐ They are supportive of me by letting me leave school to bathe and/or change my clothes
☐ They don’t treat me in any particular way
☐ They tease/laugh at me
☐ They talk negatively about me to other teachers
☐ If I tie a shirt around my waist to cover blood, they make me take it off
☐ They do not know that I am attending
☐ Other___________________________________________________________

74. How does this make you feel? (check all that apply)
☐ I makes me feel good
☐ It doesn’t make me feel one way or the other
☐ It makes me feel bad
☐ It makes me feel shy
☐ It makes me like myself less
☐ It makes me not want to go to lessons/school
Why?___________________________________________________________
Questions for Girls Who Have Dropped Out of School

75. When you were in school, how did female teachers treat you when you were attending? (check all that apply)
☐ They gave me pads to use
☐ They were supportive of me by letting me leave school to bathe and/or change my clothes
☐ They didn't treat me in any particular way
☐ They teased/laughed at me
☐ They talked negatively about me to other teachers
☐ If I tied a shirt around my waist to cover blood, they made me take it off
☐ Other__________________________________________________________

76. How did this make you feel? (check all that apply)
☐ I made me feel good
☐ It didn't make me feel one way or the other
☐ It made me feel bad
☐ It made me feel shy
☐ It made me like myself less
☐ It made me not want to go to lessons/school

77. When you were in school, how did male teachers treat you when you were attending?
☐ They were supportive of me by giving me pads to use
☐ They were supportive of me by letting me leave school to bathe and/or change my clothes
☐ They didn't treat me in any particular way
☐ They teased/laughed at me
☐ They talked negatively about me to other teachers
☐ If I tied a shirt around my waist to cover blood, they made me take it off
☐ Other__________________________________________________________

78. How did this make you feel? (check all that apply)
☐ I made me feel good
☐ It didn't make me feel one way or the other
☐ It made me feel bad
☐ It made me feel shy
☐ It made me like myself less
☐ It made me not want to go to lessons/school
Part F: This is the last section, and we are going to ask you some questions on your beliefs about attending as well two questions on your sexual activity and two questions on pregnancy.

79. Do you believe that the flow of blood from attending can rid your body of HIV?
☐ Yes  ☐ No

80. Do you believe that you can get sexually transmitted infections from having unprotected sex?
☐ Yes  ☐ No

The following two questions are to be answered on a separate sheet of paper so that you do not have to say them out loud. Again, your name will never be attached to your answers.

81. Have you ever had sex?
☐ Yes  ☐ No

82. If yes, at what age did you first have sex? ____________

83. Have you ever been pregnant?
☐ Yes  ☐ No

84. If yes, at what age(s) did you become pregnant? ________________

Thank you for your participation!
References


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