

Girls' attendance at school after a menstrual hygiene intervention in northern Ethiopia

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Abstract

Objective: To evaluate the effect on school attendance of a menstrual hygiene intervention that distributes educational booklets to school children and menstrual hygiene kits to schoolgirls in northern Ethiopia.

Methods: Attendance was tracked for 8839 students in grades 7–12 during the 2015–2016 academic year when the intervention was implemented. Negative binomial regression was used to test whether student sex predicted post-intervention school absences when controlling for grade-level and pre-intervention absences. Similar attendance data were analyzed for 3569 students in grades 7, 9, and 11 for the 2014–2015 academic year as a historical comparison.

Results: Over 12211 educational booklets were distributed to students and 5991 menstrual hygiene kits were distributed to schoolgirls. After the intervention, girls had 24% fewer school absences than boys. Sex was not a predictor of absences during a similar time-period in the prior school year.

Conclusion: This is one of the first large studies to show a positive relationship between a menstrual hygiene intervention and girls' school attendance. These positive results suggest such interventions should be expanded to other schools in northern Ethiopia. Future research should explore whether similar interventions can also decrease the rate at which girls drop out of school around menarche.

KEYWORDS

Adolescence; Ethiopia; Low-resource countries; Menstrual hygiene management; Menstruation; Program evaluation; Schools

1 | INTRODUCTION

Menstruation is a universal fact of human female reproductive life. The cyclic loss of blood that occurs from the endometrium during menstruation presents recurring hygiene challenges for all women of reproductive age, no matter where they live.^{1,2} What menstruation is, why it occurs, and how it should be managed once it starts are often neglected topics in the education of pre-pubertal girls in many countries, including high-resource countries such as the United States. As a result, many girls are unprepared for menarche when it occurs, and their first experience of menstruation may be unsettling or even traumatic.^{3–7}

Adequate management of menstrual hygiene has been defined as “women and adolescent girls use a clean material to absorb or collect menstrual blood, and this material can be changed in privacy as often as necessary for the duration of the menstrual period. Menstrual hygiene management includes soap and water for washing the body as required, and access to facilities to dispose of used menstrual management materials”.⁸ Because the physiology of menstruation is unique to girls and women, men and boys do not have to face these personal hygiene challenges themselves in the course of daily living; girls and women do. Reliable access to resources for the management of menstrual hygiene is therefore a prerequisite for gender equity.

Lack of access to adequate management of menstrual hygiene presents substantial challenges to girls and women in low-resource countries.^{1,2,4,6} Increasing evidence suggests that adolescent schoolgirls around the world face substantial difficulties managing menstruation in the school environment, and that this may hinder their educational progress.^{1-4,6,9-14} These problems are common in Ethiopia, where the average age of menarche is 13–14 years.^{15,16} Particularly in rural areas, lack of accurate information about the biology of menstruation is widespread, access to menstrual hygiene supplies is difficult and unreliable, and significant social stigma still surrounds the topic of menstruation.^{7,13,15,17-19}

A pilot project involving 15 schools (10 urban, 5 rural) in five districts (*woredas*) was developed to assess the feasibility of delivering a large-scale intervention on the management of menstrual hygiene to schoolchildren in northern Ethiopia, including the effectiveness of such a project on school attendance by girls. The intervention took place in February 2016. Education about menstruation was provided by school-based distribution of a 42-page booklet called *Growth and Changes*,²⁰ written in English and Tigrinya (the local language). Additional oral instruction was provided on-site by project staff from Mekelle University. Education on menstrual hygiene, including the booklets which schoolchildren were encouraged to take home and share with their families, was provided to both boys and girls because male ignorance concerning the biology of menstruation is a significant barrier to improving the management of menstrual hygiene, particularly in cultures such as those in northern Ethiopia where men control the levers of socioeconomic power.^{17,20}

In addition to education about menstruation, girls received menstrual hygiene kits containing four locally produced, reusable menstrual pads and two pairs of underwear (Fig. 1). There is some evidence that the provision of menstrual hygiene supplies along with education improves school attendance in low-resource



FIGURE 1 Contents of the menstrual hygiene kit include two pairs of stretchy underwear that fit most girls, and four reusable menstrual pads. The pads have a waterproof backing to prevent bleed-through, a soft inner cotton lining, and fasten together with a button over the crotch of the underwear so that they stay firmly in place during menses. Photo by the authors.

settings.^{10,21,22} The menstrual hygiene kits were produced by the Mariam Seba Sanitary Products Factory in Mekelle and were provided to the project at cost. Mariam Saba trains and employs local women to sew the pads and underwear which, when cared for properly, can last over 18 months. Demonstration of the proper use and care of the pads was provided by project staff at the time of distribution. The intervention provided education to boys and girls and menstrual hygiene kits to girls in grades 5–12. The aim of the present study was to assess the feasibility of the intervention and evaluate the intervention's effect on school attendance by girls in these 15 schools in the Tigray Region, northern Ethiopia, during the 2015–2016 academic year. Attendance by girls and boys was compared after the intervention because, while the boys received the menstrual hygiene education along with the girls, the intervention should not have affected boys' attendance at school.

2 | MATERIALS AND METHODS

Schools were selected to receive the intervention through a multi-stage, purposive sampling process. To ensure broad geographic distribution across Tigray, five of the seven zones were selected purposively, based on culture and ethnicity. Within each zone, one administrative district (locally known as a *woreda*) was also selected purposively, based on infrastructure and road accessibility. One rural school and two urban schools were then selected randomly from each district, for a total of 15 schools (Fig. 2). Attendance data for 2015–2016 were collected prospectively at each school by native speakers of Tigrinya who were on site and employed by the project as data collectors. They collected and collated attendance records each week. For historical comparison, attendance data for 2014–2015, the school year prior to the intervention, was obtained from each school where it was available. The study involved a single intervention group (15 schools) with internal comparison (girls' vs boys' attendance) plus historical comparison to the prior year. The variables available in the

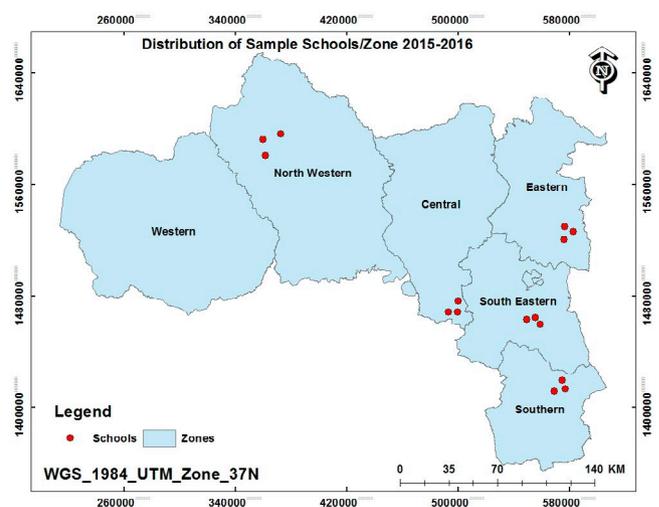


FIGURE 2 Map of 15 participating schools. Map by the authors.

dataset were grade, sex, and absences; no other demographic variables were available.

To ensure that most girls had reached menarche, the study sample was restricted to students in grade 7 (average age 13.34 years) through grade 12 during the 2015–2016 academic year. The pre-intervention time-period was defined as October through January. The post-intervention time-period was February through April. September, May, and June were excluded since schools in this region differ in their start and end dates and in their exam periods during these months.

The primary outcome measure was school attendance. Attendance data were a census of all students attending the 15 intervention schools. Both percent attendance and number of school absences were highly skewed and violated the assumption of normality for linear and Poisson regression, respectively. Therefore, a negative binomial regression was carried out to test whether sex predicted absences during the post-intervention period while controlling for grade-level and pre-intervention absences. All students had the same exposure (i.e. number of school days available) in both the pre- and post-intervention periods; therefore, no exposure variable was included in the model.

A separate negative binomial regression was carried out with the 2014–2015 data for historical comparison to test for possible seasonal variation in attendance by sex, i.e. to see whether sex predicted attendance during February to April 2015, the time-period equivalent to the post-intervention period the following academic year. All analyses were conducted in SPSS version 25 (IBM, Armonk, NY, USA).

The present study was reviewed and approved by the Institutional Review Board at Ayder Comprehensive Specialist Hospital, the teaching hospital affiliated with the School of Medicine and the College of Health Sciences (which includes Public Health) at Mekelle University, as an educational study that posed no more than minimal risk and utilized data (school attendance records) collected solely for non-research purposes. Because de-identified school data were utilized, individual consent was not required by the Institutional Review Board.

3 | RESULTS

All 15 schools were reached over a few weeks in February 2016. A combined educational session about menstruation for boys and girls was provided at each school, followed by an interactive question and answer session. A bilingual educational booklet, *Growth and Changes*,²⁰ in Tigrinya and English was distributed to all students, who were encouraged to take the booklet home with them to share with their families. A total of 12211 pamphlets were distributed across grades 5–12 in the 15 schools. Thereafter, a separate session was held for girls at each school, during which use of the sanitary pads was demonstrated and the menstrual hygiene kits (consisting of two pairs of underwear and four washable, reusable menstrual pads) were distributed. A total of 5991 menstrual hygiene kits were distributed to girls across grades 5–12 in the 15 schools. Fieldworkers visited each of the 15 schools on a weekly basis to collect attendance data prospectively and to engage in discussions with students as needed.

TABLE 1 Post-intervention absences among schoolchildren in grades 7–12, Tigray, Ethiopia (n=8839).

Variable	Exp (B) ^a	P value	
Intercept	1.965	<0.001	
Sex	0.756	<0.001	
Pre-intervention absences	1.060	<0.001	
Grade level	1.083	<0.001	
Omnibus test	Likelihood ratio χ^2	Degrees of freedom	P value
	1235.704	3	<0.001

^aParameter estimates for negative binomial regression.

There were 8839 students in grades 7–12 across the 15 schools for the analyses of attendance during the 2015–2016 academic year. There was also attendance data for 3569 students in grades 7, 9, and 11 in these same schools during the 2014–2015 academic year for historical comparison.

Just over half of the students in the sample from 2015 to 2016 were girls (51.8%). The average age of the students was 15.17 years (± 1.64) with a range of 12–27 years. All 15 schools were co-educational with an approximately equal split between girls and boys in each school. Before the intervention, 21% of the sample had zero absences. Sex was not a predictor of school attendance in the pre-intervention period.

During the post-intervention period, 17% of the sample had zero absences while 56% missed up to 3 days of school. The median number of absences in the post-intervention period was three for the sample overall, with a median of two for girls and four for boys.

In the negative binomial regression model, sex significantly predicted post-intervention absences when controlling for grade-level and pre-intervention absences (Table 1). The model shows that girls had 24% fewer absences than boys during the post-intervention period. In a similar model for 2014–2015, sex was not a significant predictor of absences during February to April, the months equivalent to the post-intervention period in 2015–2016 (data not shown).

4 | DISCUSSION

The management of menstrual hygiene is increasingly being recognized as an important public health issue.^{1–3,6,9–14} The present study showed that it is feasible to implement a large-scale intervention combining education about menstrual hygiene and kit provision under challenging logistical conditions in a low-resource setting and to do so in a timely fashion. Furthermore, the present study is one of the first large-scale interventions to document a positive effect on school attendance by girls through the provision of menstrual hygiene kits and education in a low-resource setting (northern Ethiopia). Girls are highly motivated to attend school, as indicated by their similar rates of attendance to boys both before the intervention and in the previous year. Menstruation, however, poses a potential barrier to attendance, even among well-motivated students, as evidenced by the fact that

after the intervention, attendance by girls was even better than that of boys.

Our findings indicate that for the school year *before* the menstrual hygiene intervention, there was no significant difference in absences between girls and boys during the corresponding time-period. This historical comparison from 2014 to 2015 increases confidence that the pattern observed in 2015–2016 is a result of the menstrual hygiene intervention rather than of an established difference or an existing pattern in school attendance by sex during these months. The results of the present study show robust proof-of-concept to support the provision of menstrual education and menstrual hygiene kits (reusable pads plus underwear) as one strategy to help improve school attendance by girls. They are consistent with previous studies that have shown that provision of education about menstruation appears to have positive effects on school attendance.^{11,21–23}

Several limitations of the present study should be acknowledged. There were no individual-level data on the use of pads, satisfaction with the intervention, or menarche, although the analyses were restricted to students in grades with an average age equal to or older than the average age of menarche in northern Ethiopia.^{15,16} We also could not disentangle the effects of education about menstrual hygiene from the provision of menstrual hygiene kits to adolescent girls. Because the data were de-identified, school drop-outs could not be evaluated. Finally, there were only attendance data with limited additional demographic variables from intervention schools, so although a historical comparison (previous school year) and an internal comparison (boys) for attendance could be performed, there was no non-intervention comparison. The historical and internal comparisons help build plausibility but cannot establish causality.²⁴

Despite these limitations, the intervention had several advantages that may have improved its effectiveness. The intervention was school-based and involved both male and female students. By making menstruation an acceptable topic for discussion at school, this otherwise uncomfortable, “taboo” subject was brought into public discourse and students were “given permission” to talk about it. The distribution of educational booklets to all students, male as well as female, encouraged open discussion of the subject. The fact that booklets were taken home and shown to parents likely further increased the community-wide nature of the discussion and likely produced a “ripple effect” within the community with respect to discussions concerning menstruation and menstrual hygiene.

Although provision of education and menstrual hygiene kits together appears to have a positive effect on school attendance by girls in the present study, this intervention alone will not be sufficient to meet all of their menstrual hygiene needs. In addition to knowledge and access to absorbent menstrual materials, Tigrayan girls often attend schools with sub-standard latrines that are lacking in privacy, do not have ready access to water for washing (particularly in the face of a menstrual hygiene accident at school), often lack access to medications for treating menstrual cramps, and may face obstacles to washing and drying reusable pads in their home environments.²³ Improved school attendance is nonetheless an important achievement. The use of reusable menstrual pads that can last over 18 months

could help some girls get almost 2 years of further education, bringing important long-term benefits to themselves and their families.²⁵ Based on the results of the present feasibility study, this intervention is being expanded to other schools in the Tigray Region as well as into the contiguous region of Afar.

The management of menstrual hygiene is still a problem for adolescent schoolgirls in Tigray, northern Ethiopia. Further research into the rates of school drop-outs around menarche and their possible relationship to menstrual hygiene, and into the ongoing daily challenges of the management of menstrual hygiene faced by schoolgirls in this part of the world, is warranted. The school-based provision of menstrual education to both boys and girls along with the provision of a menstrual hygiene kit appears, however, to improve attendance by girls at school in this context.

AUTHOR CONTRIBUTIONS

SB, ASK, and LLW all contributed to the design, planning, writing, and revision of the manuscript. SB oversaw the intervention implementation and data collection. All authors agree to be accountable for all aspects of the work.

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CONFLICTS OF INTEREST

ASK and LLW are unpaid, volunteer board members of Dignity Period.

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