

Menstrual solutions for schoolgirls in rural western Kenya: acceptability, use, and safety, and inferences of effect on schooling and health outcomes

Menstruation for most girls is a passage into adulthood, taken with both trepidation and pride. While positive effects accompany the reaching of maturity, girls also face a steep learning curve on how to best manage their menstrual hygiene. This includes choosing which sanitary product they feel most comfortable wearing. For millions of girls in low income countries such choices do not exist. In recent years studies have shown that these girls face extreme difficulty dealing with menstrual hygiene, particularly at school. Lack of money to buy sanitary pads means they must rely on old cloth, bedding or paper and, in some settings, use organic matter like leaves, grass, animal hides, or nothing at all. Such materials are unhygienic and uncomfortable, causing leakage and embarrassment, and can force girls to seek money from boyfriends to buy pads, or opt to miss school each period. This led agencies to believe girls may lose around 20% of their education, and cause them to fall behind and drop-out of school.



International aid programmes recognise that keeping girls in school improves their life-chances, and reduce inequalities both for themselves and for the wider community. Studies have shown that girls in school have a lower chance of HIV, teenage pregnancy, and early marriage. However, few studies have measured the effect menstrual needs have on girls' schooling and health, or if different products can improve the quality of girls' lives and reduce school absenteeism.

In western Kenya, partners conducted a pilot study to examine if rural primary schoolgirls are able to use menstrual cups (Box 1), if cups were safe and if use of cups reduced participants' dropout and absence, and improved their health, school experience, and wellbeing compared with sanitary pads or usual practice (control).

RESEARCH METHODS

Design

3-group cluster randomized controlled feasibility study conducted in rural western Kenya. Schools were the cluster unit of randomisation and eligible schoolgirls the unit of measurement.



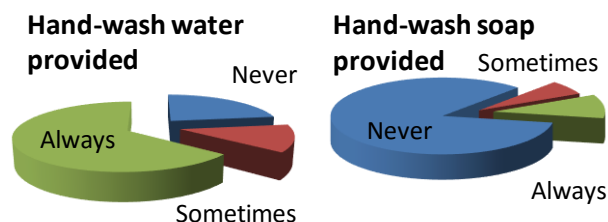
BOX 1: Menstrual cups

A silicone bell-shaped vessel that is inserted into the vagina to collect menstrual blood. The cup is emptied at intervals each day, and then cleaned by boiling at the end of each period. Cups can last for up to 10 years.

School and girls sampled

Of 71 schools listed in the study area, 62 attended the introductory meeting with head teachers, and agreed to participate in a school survey of water and sanitation and hygiene (WASH), prior to the menstrual study. From these, 30 schools fulfilled the study criteria of separate girls' toilets, a ratio of 70 or less children per latrine, and available water on the day of observation. Schools received individual WASH reports and WASH guidance.

Figure 1: water and soap availability in schools



After meetings with parents, 969 signed consent to let their daughters participate, and 40 refused. Girls qualified if aged 14-16 years, gave assent, experienced at least three monthly periods, had no disability stopping participation, and lived in the study area. Of the 969 girls, 766 were classed eligible at enrolment, starting in August 2012. Baseline focus groups recorded menstrual challenges faced by girls at school (Box 2).

BOX 2: Menstrual issues at baseline

'Some cloths might infect you... if you use damp cloths you might start itching then it turns to a wound' (schoolgirl)

'Sometimes she doesn't go to school due to the bruises she got from using blanket' (parent)

'You can develop a stench...when there is no soap you become stressed up because you don't know how you will wash them' (schoolgirl)

'She will go look for this money (to buy pads) from the men, and that's how they can end up with the unwanted pregnancies' (parent).

Randomisation into study groups

The 30 study schools were allotted into 3 groups for their eligible schoolgirls to receive menstrual cups, sanitary pads, or usual practice (control) using randomization ceremonies with the head teachers, who witnessed each school had an equal chance of allocation. No schools withdrew.



Provision of menstrual interventions

Parents and participating girls received written information about the study, before giving signed consent or assent, respectively. Study nurses, each assigned to ~3 schools, gave girls a health lesson on puberty and hygiene, including hand-washing, to prevent infection. Intervention began August 2012 and girls were followed until the end of the school year (November 2013). Girls given cups were trained how to insert, use and clean. Peers from another school gave guidance. Girls given pads received 2 packs a month, and usual practice girls had small non-menstrual items like a biro to ensure girls were all treated equally. Girls also all received soap regularly for menstrual hygiene.



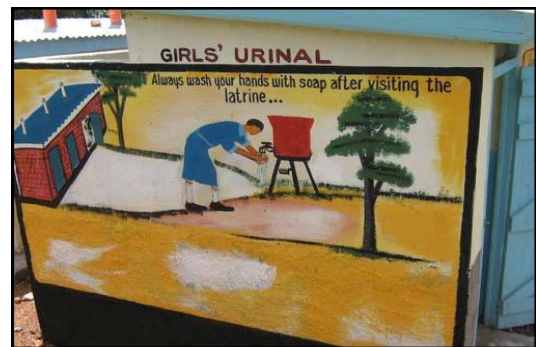
Study outcomes

The primary outcomes were school dropout and absence. Dropout was identified from computer generated lists of girls missing school per term, confirmed as dropouts by teachers. Field staff visited homes to check if girls dropped out or had migrated. Absence was recorded through girls' monthly menstrual calendars and school registries. Secondary outcomes were reproductive tract infections (RTI) including sexually acquired, identified by the end of the study, and wellbeing measured through a standard questionnaire.



Follow-up of schools and participants

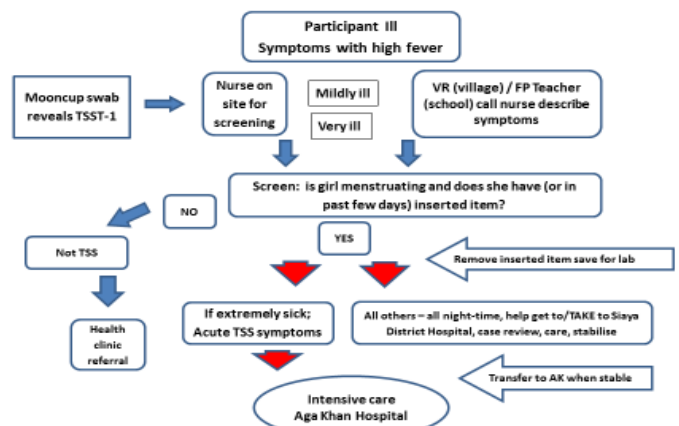
During the study nurses saw girls on average twice a term to document their monthly periods, use of interventions, and their health or other problems. Cups were checked for use and damage. Girls used netbook computer to answer privately to other questions. Termly, staff visited schools to check on presence of soap, washing water, latrine status, and check on girls present that day.



Safety of products

Girls, families, schools and field staff were given information on toxic shock syndrome (TSS), a rare but serious condition linked with high absorbency tampons. They were asked to report severe illness or fever to ensure detection of TSS. School focal teachers were tasked to alert nurses if girls had symptoms. Health services were informed of TSS, the need for TSS vigilance, and rapidly refer cases to tertiary care, and inform study staff (fig 2).

Figure 2: Algorithm for monitoring TSS safety



A survey was conducted to assess vaginal *Staph aureus*, the cause of TSS. Girls with positive smears were retested and if positive again, the sample was assessed for TSS toxin. Girls reported dropped or lost cups to the nurses who replaced those contaminated or damaged. A sample of used cups, representing differing lengths of use, were tested to check for *E. coli* contamination.

Study end

A school-based RTI study was conducted before end of year school closure. Endline focus groups were held to understand beneficiary's views on the study. Research and community outlays were recorded to evaluate costs. For 4 months after closure field staff returned to homes to verify if girls had migrated or dropped out of school and clarify delivery dates and outcomes of girls who were pregnant. Girls held celebrations in their schools at the study end, singing songs, reciting poetry or telling stories of their study experiences.



Analyses

Intention to treat analysis was conducted to evaluate primary and secondary outcomes using a standard computer programmes, to examine the effect of the interventions. We adjusted analysis for baseline age and reported sexual activity, and socio-economic status. Analysis was separated by the duration of intervention follow-up (i.e. after 12 months), and assessed the effect of cup use.

RESULTS AND CONCLUSIONS

Primary outcomes

While school dropout over the study did not differ by group (11-14%), in girls given cups or pads for 12 months or longer 1% using cups and 2% using pad dropped out, compared with 4% of controls. Half of reported dropout was due to pregnancy. Girls' self-recorded absence by calendars did not vary by group or time and was low (<1 per 100 school-days) suggesting it was a poor indicator.

Secondary outcomes

After 12 months or more, the prevalence of some RTIs were reduced by cups or pads: 4% of girls

given cups and 5% given pads had sexually acquired reproductive infections, compared with 11% in controls. In cup users, 11% had bacterial vaginosis compared with 19% among pad users and 19% among controls. Girls' wellbeing did not differ by group. Beneficiary focus groups reported positive feedback (Box 3).

BOX 3: Positive narratives on menstrual items

'So it is better if I do not go to school until the period stops. But since they brought us Mooncup ... after bathing you insert it you just go to school' (schoolgirl)
'I have noticed that she is very free and does not absent herself from school like she used to before' (parent)
'Yes, I'm feeling good...when I put that Mooncup inside I can run, I can do anything' (schoolgirl)
'She has pads she will now concentrate more-in case she is a clever girl, she will be cleverer now' (parent).
'When we were not having the Mooncup my mum was spending a lot of money buying pads, but since the Mooncup came, my mum is spending the money wisely sometimes if the fees is needed or even exam fees she can give me. Sometimes she gives me money to buy food at break time. So that is why I like the Mooncup'

Safety

No TSS cases was identified. The prevalence of *Staph aureus* did not differ by group or time. In *Staph aureus* positives, TSS toxin was found in 2 pad users (who remained healthy), but none in cup users. New cup users had more *E.coli* bacteria on their cups than those using for 6 months or more. This is explained by dropping of cups in early use due to inexperience. 7% of girls needed a new cup due to loss, dropping or damage.

Conclusions

Girls benefited from cups and pads, with no harms detected. As cups are cheaper than monthly pads, a full trial of cups in schoolgirls is recommended.

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Research partners

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