WASH challenges to girls' menstrual hygiene management in Metro Manila, Masbate, and South Central Mindanao, Philippines

ANNA ELLIS and JACQUELYN HAVER, JON VILLASENOR, AMADO PARAWAN, MOHINI VENKATESH, MATTHEW C. FREEMAN, and BETHANY A. CARUSO

This paper examines water, sanitation, and hygiene (WASH) conditions that enable and hinder Philippine schoolgirls to hygienically manage their menstruation. We collected qualitative data from 13 schools in three regions of the Philippines. Schools in both urban (Metro Manila) and rural areas (Masbate and South Central Mindanao) were included to allow for comparison across settings. Unreliable access to water, lack of disposal mechanisms for menstrual materials, unclean facilities, and insufficient number of latrines were identified as the key barriers to effective menstrual management in Masbate and Metro Manila. In South Central Mindanao, there was greater oversight of WASH hardware at schools and hardware was in better condition, which created a more enabling environment for girls to manage menstruation. Creating an enabling WASH environment for girls to manage menstruation requires sustained support and system oversight, combined with knowledge and information.

Keywords: school water, sanitation, and hygiene, menstrual hygiene management, girls, Philippines, operations and maintenance

Anna Ellis MDP (anna.s.s.ellis@gmail.com) is Research Manager at the Department of Environmental Health, Emory University, Atlanta, GA; Jacquelyn Haver MSc (jhaver@savechildren.org) is Research Fellow in the Department of Environmental Health, Emory University, and Senior Specialist, School Health and Nutrition with Save the Children United States; Jon Villasenor (jmvillasenor@unicef.org) is the WASH in Schools Program Officer, UNICEF Philippines; Amado Parawan (amado.parawan@savethechildren.org) is Advisor, School Health and Nutrition Save the Children Philippines; Mohini Venkatesh (mvenkatesh@save) is Advisor, School Health and Nutrition, Save the Children, USA; Matthew C. Freeman MPH, PhD (matthew.freeman@emory.edu) is an Assistant Professor of Environmental Health, Emory University; and Bethany A. Caruso MPH, PhD (bcaruso@emory.edu) is a Post-doctoral Fellow in the Department of Environmental Health, Emory University.

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EDUCATING ADOLESCENT GIRLS THROUGH the secondary level has positive impacts on health outcomes, health behaviours, development, poverty alleviation, and enhanced civic engagement (Rihani, 2006; Ainsworth et al.,1996; McAlister and Baskett, 2006). Girls, however, still face barriers to education in many countries, and closing the education gender gap remains a global priority (UNESCO, 2015). While there are several factors that contribute to educational attainment (Hunt, 2008), the normal and healthy onset and management of menstruation during girls' adolescence can negatively impact girls' learning experience, including school absenteeism, decreased participation, distraction, and falling behind in course work (Sommer, 2009a, b; McMahon et al., 2011; Mason et al., 2013; Abioye-Kuteyi, 2000).

Poor school water, sanitation, and hygiene (WASH) conditions may contribute to girls' menstruation-related challenges (Sommer, 2010; Crofts and Fisher, 2012). While improvements in school WASH facilities have been shown to reduce girls' absences from schools in Kenya (Garn et al., 2014), these same school environments may lack facilities that address the key needs for girls to manage menstruation effectively (Alexander et al., 2014). These needs are rarely considered in the design of sanitation and WASH facilities (Sommer, 2010; Sommer and Sahin, 2013); indeed there has been little research to understand the context-specific requirements for girls.

To address this gap in the Philippines, Emory University, UNICEF, PLAN-Philippines, and Save the Children collaborated to investigate the challenges that girls faced in schools regarding menstruation and menstrual management (Haver et al., 2013). The research was subsequently expanded to include research activities in Metro Manila and in Mindanao to understand differences and similarities in girls' menstrual management practices and associated behaviours across three distinct urban and rural contexts.

Methods

Research locations

Data collection was carried out in two phases. Phase 1 was conducted in Masbate Province between 31 July and 15 December 2012. The research team visited seven schools in Masbate, where 43 per cent of families live below the poverty line (National Statistical Coordination Board, 2014). Activities took place in six secondary schools and one elementary school in the rural municipalities of Milagros (N=1), Balud (N=3), and Palanas (N=2), and in the peri-urban Masbate City (N=1). While Phase 1 also included data collection in Manila, it did not include focus group discussions with girls, which is the focus of this paper.

Phase 2 was conducted in South Central Mindanao and Metro Manila between 26 May and 23 July 2013. The research team visited three public schools in Metro Manila: one secondary school and two elementary schools. Activities in Metro Manila took place in the urban municipality of Caloocan where 9 per cent of families live below the poverty line (National Statistical Coordination Board, 2014). The research team visited three public schools in two provinces in South Central Mindanao: one secondary school and two elementary schools. Activities in South Central Mindanao

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took place in the rural municipalities of Lutayan (N=1) and Bagumbayan (N=1) in Sultan Kudarat, and T'boli (N=1) in South Cotabato. In Sultan Kudarat, 42 per cent of families live below the poverty line; in South Cotabato, 28 per cent of families live below the poverty line (National Statistical Coordination Board, 2014). All schools visited were supported by Save the Children Philippines' School Health and Nutrition sponsorship programming.

School and pupil selection

Schools were purposively selected by the study team and partner NGOs. In Masbate, this included water-scarce and water-rich areas; more generally, we wanted to understand schools with different levels of WASH facilities (Table 1). We included private, public, and NGO-sponsored schools in the sample. Schools selected in the secondary phase of research were intentionally selected to include Muslim and indigenous populations in South Central Mindanao and the urban population in metro Manila.

Female students aged 11–18 who had begun menstruating were eligible to participate. In order to capture a range of experiences, we included students who attended elementary and secondary schools. In Lutayan, Sultan Kudarat, only Muslim students were involved; in South Cotabato only students of the T'boli tribe were involved.

Data collection

We conducted focus group discussions (FGDs) to understand girls' typical experiences during menstruation at home and school, and how school WASH facilities and access to menstrual materials influenced their school experience. FGDs typically included six to eight girls, though one FGD in a Masbate primary school included two participants (Hennink et al., 2010). The FGD guide was created as part of a multi-country Emory-UNICEF research programme investigating girls' menstruation-related challenges (Caruso, 2014). The guide was adapted for each location to

Table 1 WASH in schools coverage, menstrual hygiene management research areas 2012–13

	Pupil–toilet ratio		*With water supply (any source)*		*With piped-in water supply**	
Area	*Elementary*	*Secondary*	*Elementary*	*Secondary*	*Elementary*	*Secondary*
Philippines	54:1	87:1	87%	91%	36%	46%
Caloocan City	181:1	201:1	100%	100%	96%	87%
Masbate Province	80:1	112:1	64%	79%	16%	30%
South Cotabato Province	46:1	54:1	92%	81%	37%	38%
Sultan Kudarat Province	80:1	130:1	91%	98%	12%	25%

Source: DepED Basic Education Information System 2012–13

* Piped-in water supply is defined as a water service pipe connected with in-house/school plumbing to one or more taps

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address differences in language, culture, and WASH infrastructure, but the key areas of inquiry remained the same.

In Masbate and Manila, FGDs were translated into Tagalog; in Mindanao, FGDs were translated into Illongo. In all locations, FGDs were facilitated by local, trained research assistants and were piloted and revised as necessary. All FGDs were recorded and transcribed verbatim by research assistants. Transcriptions were translated into English.

Structured observations of school WASH facilities were carried out by investigators or trained research assistants at each school accompanied by a schoolteacher or maintenance person to answer questions about operations and maintenance of facilities, general hygiene, and menstrual hygiene. Observations focused on WASH facilities examining access to water, sanitation, and waste disposal. Information was entered into an Excel database for analysis of the three locations.

A total of 79 participants from 13 schools were included in the FGDs (see Table 2). Structured observations were conducted at each school.

Research assistants in all locations received a one-week training, which included: qualitative research methods and data collection; key considerations for WASH in schools and menstrual hygiene management; research ethics; working with adolescents; child protection protocols; transcription and translation; and use of research tools. Research assistants lent their knowledge and cultural understanding to adapt the FGD and school observation tool to the local context.

Data analysis

Analysis started during the data collection phase, to allow for iterative changes to tools, including language choice, increased or different probes, and interview structure. FGD tools were read by the investigator, co-investigator, and research team members in order to identify areas for improvement. Tools were adapted in the second phase of research to include additional questions in the FGDs on knowledge, school curriculum, and programmatic recommendations, and on the school observation form regarding water access.

All translated focus group discussion transcripts were uploaded in MAXQDA version 10 for qualitative data analysis. All data was coded using a codebook developed during phase 1. Authors memoed the selected codes focusing on WASH hardware, consumables, and challenges and identified sub-codes within the

Table 2 Total number of FGDs with girls and participants by location

Location	*Secondary*	*Elementary*	*Total*	*Total Participants*
Metro Manila	1	2	3	23
Masbate Province	6	1	7	38
Cotabato and Sultan Kudarat Provinces)	1	2	3	18
Total	8	5	13	79

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already coded data (Guest et al., 2012). This information was then compared with the facilities observations to inform the results.

Ethics

Emory University's Institutional Review Board and the Philippines Department of Education approved all research protocols. The Philippines Department of Education Undersecretary of Programs and Projects gave national authorization for this project. Before data collection, the authors explained research aims and activities to school principals and acquired their permission to conduct research activities at each school. Informed parental/guardian consent was acquired from all parents of girls under the age of 18. Students provided oral assent to participate in the study.

Results

We collected data from three schools in an urban centre, Metro Manila, and from 10 schools in two rural settings: Masbate province in Luzon and the provinces of Sultan Kudarat and South Cotabato in South Central Mindanao. We report on how access to water, number of toilets, maintenance conditions, privacy, presence of disposal mechanisms, and access to absorbent materials impacted girls' experiences and ability to manage menstruation at school in these locations.

Access to water

In all locations, girls identified water as crucial for flushing toilets and cleaning their body after using the toilet regardless of menstruation; however lack of access and availability of water was especially important for menstruating girls. In all locations, toilets had water faucets in individual stalls to fill containers for flushing toilets and for handwashing. A girl in Mindanao noted: 'We have a pail inside and we fill it with water most of the time' (Girl 6, Mindanao School 1). In Manila, large drums were located outside of toilets with dippers for toilet flushing use. In Masbate and South Central Mindanao, buckets (and small dippers) were located in individual stalls.

Availability of water from primary sources (feeding these faucets) was impacted by intermittent electricity in Mindanao and Masbate. In Manila, students reported that

> *Girl 5: There are times that there is no water. Nothing is dripping out.*
>
> *Girl 7: Sometimes the water is cut off.*
>
> *Girl 6: Because they can't pay the bill* (Manila, School 3).

Inconsistent availability of water from faucets rendered schools reliant on secondary sources of water, at least some of the time.

While containers were present in or near toilets to hold water, mechanisms to ensure that these containers were filled were limited. In Mindanao, secondary sources of water were far from the schools. In most schools it was the boys' responsibility to fill water buckets or jugs, but there was no accountability procedure to ensure this action,

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and water containers often remained unfilled. In two schools where janitors were responsible for supplying water to containers, students also noted that availability was unreliable. Girls in Masbate reported that they were unlikely to carry water while menstruating as they had been advised to avoid carrying heavy loads.

Other factors impacted student water use. In Manila, water use was reduced when: 1) drums were too tall for students to access the water dipper inside; 2) students feared falling inside when reaching for water; or 3) 'dirty' water was left in drums without a cover, developing odour and mosquito larvae. Girls in Manila also reported that a secondary source of water was believed to be 'dirty' and that students would not use this water for handwashing, anal cleansing, or washing of genitals.

Girls reported that water availability in toilets impacted students differently. In Manila, boys chose to urinate outside instead of fetching water. In Masbate, girls reported that while boys would urinate behind classrooms or in tall grass it was shameful for girls to do the same. In Mindanao, when Muslim girls did not have access to water, they would leave school grounds to urinate in fields and would go home to manage menstruation. Muslim girls had cultural beliefs that required them to wash absorbent materials for menstrual management of blood before disposing of them, causing additional barriers for menstrual management in school when water was not present in toilets.

In all locations, students noted that when there was a lack of water, odour and filthiness increased, which was a barrier for student toilet use. When asked what they would do if there was no water in the toilet, girls responded:

> *Girl 5: We don't use the toilet.*
>
> *Girl 6: We will just endure it*
>
> *Girl 1: Because it is very dirty* (Manila, School 3).

Sanitation conditions

In all locations there was a noted difference between the total number of toilets available and those that were actually considered somewhat clean or somewhat functional (Table 3). A lack of clean or functional toilets translated to less space for girls to manage menstrual hygiene. When toilets were unclean, inaccessible, or not properly maintained, girls restricted their general toilet use and menstrual management at school.

In Manila, menstruating girls did not use dirty toilets at school because they believed this could cause infection. Girls reported not drinking or eating during school to avoid the toilets and that they accessed toilets to manage menstruation only during emergencies:

> *Girl 5: We really don't go there even though we really need to urinate.*
>
> *Girl 7: We will just hold our urine.*
>
> *Girl 4: That is why in the morning, we only drink a little so that we will not have an urge to urinate* (Manila, School 1).

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Table 3 Summary of school WASH characteristics among the 13 participating schools in the Philippines

	Metro Manila	*Masbate*	*South Central Mindanao*
	(N=3)	*(N=7)*	*(N=3)*
Mean school population	3,302	599	1065
Mean number of girl pupils	1,592	306	527
Mean number of boy pupils	1,707	293	537
Schools sanitation			
Number of schools with latrines	3	5	3
Girls' latrines	3	2	3
Boys' latrines	3	2	3
Shared latrines	1	0	3
Number of schools with all latrines separated by gender	1	2	0
Mean number of latrines in participating schools	6	3	10
Girls' latrines	7	2	4
Boys' latrines	7	2	4
Shared latrines	4	0	21
Mean pupil: latrine ratio in participating schools			
Girl pupils per latrine	177	153	35
Boy pupils per latrine	177	146	35
Mean pupil: latrine ratio for latrines considered at least *partially functional** only			
Girl pupils per latrine	348	306	66
Boy pupils per latrine	341	293	66
Mean pupil: latrine ratio for latrines considered at least *somewhat clean*** only			
Girl pupils per latrine	308	306	132
Boy pupils per latrine	427	293	132
Number of schools with functional locks inside *all* girl's latrines	0	1	0
Number of schools with functional locks inside *at least some* girl's latrines	2	2	2
Number of schools with trash bins inside *at least some* girl's latrines	1	0	2
Water and hygiene			
Number of schools with functional water source at time of visit	3	6	3

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	Metro Manila	*Masbate*	*South Central Mindanao*
	(N=3)	*(N=7)*	*(N=3)*
Menstrual hygiene			
Number of schools with a private place to bathe/wash	0	5	1
Number of schools with private facilities to wash menstrual cloth	0	3	1
Number of schools with sanitary pads available on a daily basis	0	0	3

* partially functional: The toilets can be used, but there are at least some problems with the physical infrastructure (e.g. some deterioriation in concrete, doors/locks coming loose, roof deteriorating, etc.) and some repair is necessary.
** somewhat clean: There is some smell and/or some sign of fecal matter and/or some flies and/or some litter.

In some cases, girls used teachers' bathrooms because they were cleaner or they left the school campus to use the common public toilet nearby. In schools with shared facilities, cleaning was the responsibility of a janitor; students did not have a role in ensuring their toilet cleanliness or functionality.

In Masbate and Manila, high student-to-toilet ratios meant more students using the same facilities, which caused them to become dirty:

> *Interviewer: You said that it is dirty, what are the possible reasons why it is dirty?*
>
> *Girl 2: It is because there are too many*
>
> *Girl 3: There are too many people going in that toilet* (Manila, School 2).

With an increasing number of unclean toilets throughout the day, the number of unusable toilets also increased throughout the day.

Girls faced challenges accessing the toilets that were fit to use. Long waits to access toilets were observed by researchers and reported by students; teachers enforced rules that prohibited toilet use during class time. Two schools in Manila had newly constructed toilet facilities that were locked and necessitated a key for use; however, as one girl said: 'Those ones with new toilets built in it, all the toilets are all locked and can't be opened. As far as I know, they [the school] never opened those toilets' (Girl 4, Manila, School 1).

In Masbate, when facilities were dirty or blocked, teachers warned students not to use the facilities: 'Sometimes the teachers are telling us not to use the toilet because it is clogged and smells bad and isn't clean' (Girl 5, Masbate, School 2). In Mindanao, the secondary school had a number of non-functional toilets. Girls identified sanitary napkins flushed down toilets as the main reason for toilet blockage and non-functionality of toilets. Non-functional toilets in individual classrooms led to

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open defecation behind the schools or use of toilet blocks designated for other students, causing longer lines during breaks.

In Masbate, toilets stalls were crowded with many water containers, which impacted girls' ability to manoeuvre inside, reducing their likelihood of changing menstrual materials at school.

Several factors contributed to cleaner toilets: 1) established student cleaning plans; 2) accountability measures to ensure that cleaning occurred; 3) toilet location; and 4) lower student to toilet ratio. In Mindanao and Manila, where there were student cleaning procedures in place, girls reported that toilets were more likely to be clean and used. In Manila, girls reported that annexed toilets were easier to access during class. Annexes also had sinks for handwashing and trashcans for disposal. Students reported that these annexed toilets were their responsibility to clean; teachers created cleaning schedules that involved all students. Systems helped promote cleanliness for longer periods: students were required to remove their shoes and wipe the floor after using the toilet. In South Central Mindanao, teachers and students were responsible for caring for their toilets and followed daily cleaning schedules. Parents contributed funding for classroom and bathroom cleaning supplies. Girls blamed boys for unclean facilities, saying that they did not clean up after themselves.

However, in Masbate, although students were responsible for cleaning toilet facilities, girls stated that students would not clean the toilets and facilities effectively because they were lazy or they lacked cleaning materials and access to water. In two schools in Manila and one school in Masbate, janitors were responsible for cleaning toilets, but girls reported unclean facilities.

Access to toilets impacted cleanliness and use: in Manila, students cited the toilets located within the classroom as accessible to them even during class time. In Mindanao, this was also the case, with most toilets located in the classroom. In Masbate, toilets located inside classrooms were normally in better condition than toilets in latrine blocks.

Privacy

Poor structural conditions impacted girls' use of toilet facilities. In Manila, some bathrooms lacked doors to stalls and toilet blocks. In one school where the boys' toilet block lacked doors, boys used the girls' toilets, resulting in girls' decreased use of toilets when other female students were not present. Girls reported not using toilets at school to manage menstruation when there were ineffective locks on the inside of toilet doors, because they feared being seen by other students. In all locations, girls reported that they ensured their privacy, safety, and comfort by going to the latrine with a partner or friend. Some girls noted:

> *Girl 4: Sometimes someone gets angry when you are inside the toilet. Someone else says, 'Can you make it faster'*
>
> *Girl 1: That is precisely why I always ask for company every time I go to the toilet, so you can have someone guarding at the door* (Manila, School 2).

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Location of the toilets could act as a barrier or driver to toilet use. Some girls in Masbate and Mindanao reported concern for privacy if the toilet was located directly in the classroom. But at one school in Manila, girls expressed fear about accessing their toilet facilities alone, as they were located at a distance from the school buildings near a residential area.

Interviewer: Why are you afraid?

Girl 6: Because it is in a remote/distant area. And also the door does not lock.

Interviewer: So since the door does not lock, you need to have someone else to guard you?

Girl 4: Yes (Manila, School 1).

In this school, teachers rarely let students leave the classroom together. Some girls in Masbate and Mindanao reported concern for privacy if the toilet was located directly in the classroom.

Girls chose not to use school toilets when they were afraid that people might know they were menstruating. In Masbate, girls would return home to change materials; they abstained from attending school during heavier days of menstrual flow: 'Our house is near here; I change there in the afternoon. There is no time during break and there are people in the toilet' (Girl 3, Masbate, School 7).

Girls expressed concern that if they were to use the toilet for managing menstruation and there was a line of students, other students would then know they were menstruating because of increased time of toilet use or blood left on the seat or toilet bowl. Girls expressed embarrassment, shame, and anxiety related to these possibilities.

When other students were not present and girls felt that their privacy would not be impeded, they felt more comfortable managing menstruation. Girls in Mindanao said that they would often wait for recess to manage menstruation or bathe in toilet structures, as many students went home for lunch. Additionally, teacher presence acted as a driver to using in-classroom toilets:

Interviewer: What do you feel when you are in school and you change your napkin at the toilet?

Girl 4: Uncomfortable.

Girl 3: Because boys are hard-headed; sometimes they enter intentionally. When we tell them that it's occupied, they won't believe us. But when our teacher is around I'm comfortable (Mindanao, School 1).

Disposal mechanisms

In the Philippines, girls desired to keep menstruation secret from their classmates. To hide menstruation, girls attempted to dispose of used sanitary napkins discreetly. Only three schools had trashcans in some toilet stalls to dispose of sanitary napkins: one primary school in Manila and two primary schools in South Central Mindanao (Table 3). However, trashcans did not guarantee disposal. In Mindanao, trashcans were located in non sex-segregated toilets, and girls were afraid of boys seeing or smelling their used napkins, which discouraged disposal in toilet trashcans. In Manila,

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trashcans were located in sex-segregated toilets, and girls would dispose of napkins after wrapping them in wrappers.

Lack of trashcans in most toilets deterred girls from private and clean disposal of sanitary napkins at school. In Manila and Masbate, when trashcans were located outside toilets, girls would dispose of materials only if other students were not present.

> *Interviewer: How do you change your sanitary napkin at school?*
>
> *Girl 5: I go to the toilet then I lock it, and I change the napkin there, then the things I used I throw out*
>
> *Interviewer: Which trashcan?*
>
> *Girl 5: In the hallway … I wrap it first using paper so that it won't smell and then I throw it …* (Masbate, School 7).

In some cases, girls left their used materials on the floors of toilet stalls, contributing to unclean facilities: 'Some students here, they make it [the toilet] disgusting because there are napkins everywhere, then others just stick them anywhere, oh yuck! Then sometimes some [students] left [their napkins] in the bowl' (Girl 7, Manila, School 3).

In Masbate and at the secondary school in Mindanao, girls tried to flush their napkins, resulting in clogged piping or napkins left in the bowl, which discouraged general toilet use by others. In some cases, girls went home to change materials. In all locations, some girls reported taking used materials home for discreet disposal, burning, or burial. In Mindanao, girls also reported throwing them behind the schools or in canals on their way home: 'When I have my menstruation here in school I use a napkin and when it's soaked I change it and then I wash the used napkin and throw it in the canal' (Girl 4, Mindanao, School 2).

Access to preferred absorbent materials

In Manila and Masbate, girls expressed a preference for using commercial sanitary napkins at school, as opposed to *pasadors*, folded cloths inserted into the underwear to absorb menstrual blood. Girls felt that sanitary napkins were more likely to prevent stains and leaks than pasadors. In Mindanao, girls expressed mixed feelings about the use of sanitary napkins; while they agreed that napkins provided better protection, they felt that the napkins were less 'breathable' and had concerns that napkins could cause infection and disease. In all locations, girls were more likely to use commercial sanitary napkins at school or when 'out', and more likely to use pasadors at home, especially when sleeping.

In Manila and Masbate locations, no schools provided sanitary napkins at the time of research; girls were expected to bring sanitary materials with them from home. Girls expressed that they wished they could purchase sanitary napkins at school:

> *Interviewer: What would help your school so that it will be easy for girls to menstruate at school?*
>
> *Girl 2: Put a store inside the school where we can buy napkins* (Masbate, School 8).

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In all locations, school regulations did not allow girls to leave school campuses while classes were in session although girls sometimes left school to purchase napkins or go home when they experienced a leak:

Interviewer: Do you have a friend who had a bloodstain?

Girl 6: Yes.

Interviewer: What did she do?

Girl 6: She panicked

Interviewer: And when she panicked because of her bloodstain, where did she go?

Girl 6: She just went home

Interviewer: Did she come back?

Girl 6: No, she no longer came back to school that day.

Interviewer: So, she didn't come back then. How about your other acquaintances and classmates?

Girl 2: The same as her, they just went home (Manila, School 1).

In Mindanao girls did not identify access to absorbent materials as an issue barring them from school. Students often brought commercial napkins with them from home to manage menstruation, tracking their menstrual cycle to determine when to bring supplies. School canteens provided napkins for purchase and two schools also provided napkins to girls in case of emergencies. In one school, students learned how to make *pasadors* in class and would use them when they had no money to buy sanitary napkins.

In all locations, lack of appropriate materials impacted girls' attendance, their participation, and concentration in classroom lessons: 'She participates in class but not like the others. … She is just silent and not that active. She is afraid that she might have a leak' (Girl 4, Manila, School 1).

Discussion

Our findings showed that girls felt enabled to manage menstruation at school when they had access to water, clean, private, functional facilities, absorbent materials, and disposal mechanisms. Through school facility observations and FGD data collected in Metro Manila, Masbate, and South Central Mindanao, our analysis found that the lack of proper management of WASH infrastructure contributed to inadequate facilities, similar to studies in Kenya, Tanzania, Bangladesh, and Mali (Caruso et al., 2014; Sommer and Sahin, 2013; Kjellen et al., 2012; Chatterly et al., 2014; Trinies et al., 2015). Lack of oversight contributed to breakdowns in service delivery of these interlinked components of an enabling environment. Inconsistent access to water, poor sanitation conditions, and lack of access to both absorbent materials and disposal mechanisms posed barriers to menstrual management in schools in Metro Manila and Masbate.

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In the Philippines girls adapt behaviours based on their beliefs or personal experiences, affecting how they interact with WASH infrastructure. This is similar to other contexts: beliefs influence girls' WASH practices. For example, during menstruation, girls in Masbate avoid carrying heavy loads for fear that it may impact menstrual flow, barring them from bringing water to toilets, and girls in Metro Manila refused to use dirty toilets as they believed it could cause infection during menstruation. In Mindanao, girls refused to dispose of materials without washing them clean of menstrual blood, as this was 'like throwing away a part of themselves'. In Bolivia, girls avoid water entirely during menstruation fearing the stoppage of menstrual blood and, in many countries, people believe menstrual blood can be used in witchcraft, which, at least in Mali, influences their disposal practices (Long et al., 2013; Trinies et al., 2015). In a qualitative study in Kenya focusing on student urination and defecation behaviours, students must juggle what they are taught about hygiene behaviour and what they can feasibly practise based on the resources and facilities available to them, creating an impossible choice (Caruso et al., 2014). Girls in the Philippines face impossible choices as well: girls can use inadequate facilities, face social stigma, and risk self-harm to stay in school, or they can go home to manage menstruation privately but miss school as a result.

Inconsistent access to water was one of the greatest barriers to girls' menstruation in school. When water was not available it compromised use of other WASH facilities. Girls and boys needed water for cleaning and flushing toilets. When water was not available, sanitation facilities were unclean and unusable, and girls were unable to manage hygiene. A lack of available water at schools has also negatively impacted girls in China (Maimaiti and Siebert, 2009). In Kenya, WASH interventions that included an improved water source demonstrated increased enrolment for girls (Garn et al., 2013). We found that girls in all three locations connected their ability to manage menstruation at school with consistent and reliable access to water at school.

In the Philippines, boys were able to adopt different sanitation locations at school in response to unclean facilities, urinating and defecting outside, behind buildings, or in girls' facilities (Haver et al., 2013). In the Philippines, if boys make use of girls' facilities during breaks, this further reduces available toilets for girls' management and reduces privacy, further impacting girls' comfort in using school toilets. Using alternative locations was not an option for girls. In Metro Manila, girls' need for privacy and water use for toilets prohibited them from mirroring boys' practices. Instead, girls made strategic adaptations, like reducing water and food intake during the day, not changing menstrual materials at school, or going home to manage menstruation. In Sierra Leone and Senegal, studies showed that girls adapted their sanitation behaviour to avoid unclean facilities by reducing water intake (Lionde, 2004; Caruso et al., 2013).

In South Central Mindanao, schools visited had better access to water, and teachers played an important role in ensuring that toilets were clean and accessible to students. A study in Bangladesh found that one factor in a package of motivating conditions for an enabling school WASH environment was holding one teacher accountable for the school toilets and including a clear maintenance

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plan (Chatterly et al., 2014). While schools in South Central Mindanao do not assign one teacher to this responsibility, there is a designated School Health and Nutrition point person at each school, who teaches students about healthy hygiene behaviours. Personnel from the partner NGO also makes announced visits to the school for monitoring of WASH facilities; this has been suggested as a possible motivator for sustained school accountability in a handwashing intervention in Kenya (Saboori et al., 2010). For two schools, teachers supervised cleaning for the bathrooms and cleaning materials and soap were funded through the PTA and national government; these toilets were cleaner than common toilets or those cleaned by janitors in Masbate and Metro Manila. Schools visited in South Central Mindanao also had lower student-to-toilet ratios; higher toilet functionality; better accessibility to toilets through their location in classrooms; higher flexibility for student use during class hours; sanitary napkins for sale in schools; and more consistent access to water. These schools may provide a model to other schools in the Philippines for more enabling WASH environments for girls managing menstruation, not strictly through the facilities in the school, but also through systems ensuring accountability.

When schools lacked accountability systems governing water access at the school, roles for fetching or providing water were not assigned or monitored in toilets without functional water points, school budgets did not prioritize water service, poor electrical grids caused brownouts (drop in voltage), and there was insufficient maintenance of water systems. Improving the roles and responsibilities of teachers may improve services and promote sustainability (Alexander et al., 2014). In Kenya, teachers do not have a good sense of the conditions of toilets or how students adapt behaviour to avoid latrines, using other locations to urinate or defecate. When teachers have separate toilets and do not have cause to enter student toilets, they may not have a sense of the serious challenges that students are facing related to cleanliness, access, and structural maintenance (Caruso et al., 2014). Teacher or school oversight of WASH facilities could raise awareness of the challenges that girls face in managing menstruation.

In many cases the schools and school community lack the autonomy to design and implement toilets that correspond to water supply and students' needs. An audit conducted in 2013 on the Philippines Department of Education found that many Department of Education-funded toilets and group handwashing facilities had not been used or rendered non-functional due to lack of consideration in the recipient schools (Republic of the Philippines 2014). While the Philippines Basic Education Information System indicates separately the number of schools without water and those that have water per type of source (piped-in, spring, protected, or unprotected well), the toilet designs mandated by the Department of Education all require piped-in water supply (Department of Education, 2010). The standard designs for WASH facilities in schools disregard the need for adaptations that may be required depending on the type of water supply available at each school. Schools are hesitant to reject the provision of these standard designed toilets, as rejection would be tantamount to losing a limited opportunity for school infrastructure development. These inappropriately designed

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and constructed toilets may not serve the school community because of their location (remote and isolated toilets), accessibility (lack of safe pathways), anthropometrics of facilities (handwashing faucets that are too high to reach for younger children, toilet bowls that are too big, and limited space inside cubicles for girls to move around and change materials), and poor or lacking facility provisions (ventilation and lighting).

In addition, the official pupil-to-toilet ratio at schools often does not account for non-functional, inaccessible, or unclean toilets. Our data shows that in all three areas, when taking functionality (which also accounts for access or locked toilets that could not be entered) into account, the student-to-toilet ratio doubles. Student-to-toilet ratios likewise increase when taking cleanliness into account. Teachers, schools, and governments should differentiate between functional and non-functional toilets. In the Philippines, operation and maintenance for WASH in schools is included in the 'maintenance and other operating expenses', which also funds water and electricity bills (UNICEF, 2012). Reporting on how many toilet bowls are both clean and functional might better represent a student's relationship to their WASH environment. This would also bring attention to the need for more WASH-specific budgeting, oversight, and monitoring of facilities, further district and national oversight, and continued leveraging of community and school wide engagement.

Strengths and limitations

A key strength of this work is the representation of perspectives from three diverse locations, which provides nuanced information about girls' experiences in the Philippines. Data from these locations allows for the identification of similarities and differences in experiences, which can inform policy and practice. There were two primary limitations to the research. First, the initial research plan intended to include both phases of research in 2012. Due to time limitations and safety concerns, this was not possible. A second phase of research followed in 2013 as a result. The spacing of data collection, however, proved useful as we were then allowed to carry out a full analysis of data from phase one and have those findings inform revisions to tools for phase two. Second, schools were notified in advance of visits. Therefore, school observations of facilities may have reflected better than typical conditions and may not be representative of true conditions. However, we did gather information about girls' perspectives of facilities, which do reflect the true nature of the facilities.

Conclusion

Across all three locations our findings show that poor maintenance of facilities was one of the key WASH challenges identified by girls in managing menstruation in school. Poor access to water exacerbated other WASH conditions, impacting functionality and therefor student use of toilets. Girls are unable to manage menstruation at

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school when challenges with cleanliness, maintenance, and functionality of WASH facilities exist. These challenges at school are magnified by a lack of systems and oversight. Where schools had systems for regular cleaning, operations and maintenance, access to water, absorbent materials, and disposal methods, girls were better able to manage menstruation discreetly at school. These findings may provide guidance for creating enabling school WASH environments for menstruating girls in the Philippines.

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