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Gender Differences Related to WASH in Schools and Educational Efficiency

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ABSTRACT: Understanding Water, Sanitation and Hygiene (WASH) in schools from gender perspectives is fundamental in development. This paper tests the hypothesis that improved WASH in schools can lead to educational efficiency and progression especially for teenage girls. The hypothesis was tested using quantitative data collected through an Education Management Information System (EMIS) for just over 10,000 schools in Zambia, Southern Africa. Relationships between WASH provision in schools and repetition and drop-out ratios were investigated, disaggregated by gender and grade. The analysis revealed that lack of WASH leads to high rates of repetition and dropout in school for girls, compared to boys especially from the age of 13 and in grades 6, 7 and 8. This affirms the importance of providing adequate supply of WASH facilities in schools to facilitate educational efficiency and progression of girls.

KEYWORDS: WASH in schools, education, gender, Zambia

INTRODUCTION

The need to consider gender issues in the provision of water supplies and promotion of sanitation and hygiene in development has been emphasised for many years (WELL, 1998; UNICEF, 2003; WSP, 2010). Research and experiences continue to show that a gender perspective in water, sanitation and hygiene (WASH) is complex in nature reflecting multiple and difficult issues such as equality, vulnerability and risks, access, rights and entitlements (Cotton et al., 2013; Dreibelbis et al., 2013; Alexander et al., 2014; Gelaye et al., 2014; Jewitt and Ryley, 2014; Hirve et al., 2015; Nzengya, 2015). Poor availability and access to water and sanitation are a major health concern and constitute a principal barrier to the achievement of quality education in schools (Sommer, 2010; Jewitt and Ryley, 2014). Evidence from sub-Saharan Africa has shown that poor WASH is a common phenomenon within the school environment, particularly emphasising the everyday challenges that many school going girls face in managing their menstrual hygiene where there are inadequate water and sanitation facilities or no service at all (e.g. Jewitt and Ryley, 2014). For example, empirical work in Kenya and Tanzania has shown that lack of access to sanitation creates an unfavourable learning environment for teenage girls due to increased risks of menstrual leaks, discomfort and stigmatisation (ibid).

This paper explores linkages between WASH in schools (WinS) and educational efficiency, highlighting the potential impacts which poor water and sanitation have on learning outcomes when gender is considered (UNICEF, 2012; Agol et al., 2018). We define 'educational efficiency' to imply the ability of children to progress through school without dropping out or repeating a grade. We conceptualise improved WASH services to increase opportunities for learning outcomes and subsequent quality education in schools particularly for girls. Evidence of gender impacts of improved

WinS is well established within different contexts, including sub-Saharan Africa (Cotton et al., 2013; Dreibelbis et al., 2013; Alexander et al., 2014; Gelaye et al., 2014; Jewitt and Ryley, 2014). However, there remains a significant gap in the understanding of how gender inequalities in WASH impact upon education at different stages of learning in schools. There are no specific studies which present the impacts of WASH on different grades amongst different age groups in schools. Yet it is critical to understand how different grades and corresponding age groups of girls and boys respond to different levels of WASH services in schools.

This study fills the gap by testing the hypothesis that improved WASH in schools can reduce gender inequalities and result in efficient learning. The principal aim of the study is to investigate if improved WASH facilities and services in schools can reduce dropout and repetition rates, especially for teenage girls from the age of 13 who most need water and sanitation to manage their personal hygiene. Findings from this paper are based on a quantitative analysis of data collected from the Education Management Information System (EMIS) from over 10,000 schools in Zambia. Experiences from Zambia have shown that poor WASH affects girls and females disproportionately (Kasongamulilo, 2013; USAID, 2014).

Recently, a paper was published in WASHDEV with a similar analysis (Agol et al., 2018); however, the discussion on this analysis is narrow and lacks contextualisation of gender and development in the WASH sector. This analysis deepens the existing conceptualisations of gender inequalities which are inherent in WASH, drawing attention to the theories of access, vulnerability and empowerment (Bhanumathi and Carmel, 2011; Mbatha, 2011; Klasen et al., 2012) and the ways these are embedded in the broader gender and development discourse. The starting point is the entrenched belief that development programmes need to consider gender in the provision of water supplies and promotion of sanitation and hygiene (e.g. Giné-Garriga et al., 2017). Universally, there remains a strong focus on how the different needs of men and women determine access to, and power and control over access to, water supply, sanitation and hygiene facilities and services (Mbatha, 2011). In many parts of the world, particularly in developing countries, poor access and availability of water and sanitation tend to compromise women's practical needs putting them in disadvantaged positions compared to men (Gelaye et al., 2014; Jewitt and Ryley, 2014)

Discourse on access to WASH in institutions, such as schools, has evolved rapidly and scholarly contributions reflect a strong focus on the interconnections between WASH and education (Sommer, 2010; Bhanumathi and Carmel, 2011; Crofts and Fisher, 2012; Jasper et al., 2012; Chatterley et al., 2013; Alexander et al., 2014; Garn et al., 2014; Jewitt and Ryley, 2014; Deroo et al., 2015). They highlight the mediating role that WASH plays between health and education and the need to ensure access to adequate water supplies and sanitation in schools as a strategy for promoting favourable environments for learning (Adams et al., 2009; Sommer, 2010; Sommer et al., 2013; Jewitt and Ryley, 2014). Whilst these are useful observations, more still needs to be done, including a full recognition that access to water and sanitation is driven by a whole range of socio-economic, cultural and environmental factors that underpin gender inequalities within the context of WinS. For example, access to WASH in schools by students, whether female or male, goes beyond availability, quantities, location, distance and functionality, as widely debated (e.g. Jasper et al., 2012; Chatterley et al., 2013; Alexander et al., 2014; Garn et al., 2014; Jewitt and Ryley, 2014; Deroo et al., 2015). Access is also about understanding demand needs and responses by different grades and age groups in schools. Hence more studies are necessary that seek to understand linkages between access to WASH and educational efficiency through a disaggregate analysis of the different ages and grades.

An important theory which surrounds gender inequalities in poor WinS situations is vulnerability (e.g. Jewitt and Ryley, 2014). Within the framework of vulnerability, a growing evidence base draws attention to the various risks and dangers associated with lack of access to WASH by women (Campbell et al., 2015; Hirve et al., 2015). In vulnerability terms, these dangers range from physical to psychological risks such as diseases, bodily harm, harassment and sexual abuse (ibid). In schools, the

interactions between adolescent girls and boys in WASH-deficient conditions can create unsafe spaces for sexual harassment and instil fear in young girls (Jewitt and Ryley, 2014). In Kenya, for example, poor access to sanitation was found to be a significant barrier to girls' mobility and it is therefore quite understandable when girls miss schools during their menstrual cycle (ibid).

From the wider development context, the paper adds value on the recent progress in WinS monitoring by the Joint Monitoring Programme (JMP) of the WHO/UNICEF (WHO/UNICEF 2016). Current work of the JMP on WinS monitoring focuses on WASH in institutions – mainly schools and health care facilities – and is directly linked to Sustainable Development Goals (SDG) targets 6.1 and 6.2 which strive towards the achievement of universal access to WASH for all by 2030 (WHO/UNICEF 2016; WHO, Annex 4). Universal access applies to multiple settings including households, schools, healthcare facilities, work places and others. The JMP is constantly improving its WinS monitoring and currently has established a global WASH monitoring ladder that includes different categories such as 'basic', 'limited' and 'no service'. These are considered in the analysis of this study and correspond well with the different categories of schools in WASH situations in Zambia.

The SDG targets on WASH pay special attention to women and girls especially in vulnerable situations and therefore the gender and age perspectives highlighted in this study is an important step towards the fulfilment of the SDGs. This paper presents original findings conducted to capture the rapidly expanding knowledge on gender inequalities in WASH in learning institutions, by uncovering some of the less obvious issues such as age and grades which are still missing in the wider WASH debate. Exploring the gender differences disaggregated by grade in schools, deepens the understanding of the linkages between water and sanitation and educational efficiency and progression which is much needed for WASH policies and programming. Intentionally, the paper provides some relevant insights that can aid decision-making on how gender differences in the educational systems can be tackled, particularly from the context of the developing countries.

METHODOLOGY

Source of data and key variables

The main source of data for this study was the Education Management Information System (EMIS) national database of Zambia, designed to collect and store data on schools, students, staff, infrastructure, social services and many others. The data were collected in 2012 through questionnaires which contained over a hundred questions. They were distributed to over 10,000 schools and were filled up by school personnel, mostly teachers. The main variables selected for this study include: school type (government, community, private, etc), number of enrolled students, number of repeaters, number of dropouts, all disaggregated by gender and grade. In addition, the number and type of toilets available and type of water source in the schools were analysed. For testing the hypothesis that improved WASH in schools would advance the educational progression of girls, two educational indicators were selected for this analysis, namely: repetition ratio, i.e. the number of girls or boys who repeated the same grade divided by the total number of students who have repeated in a school in that year; and dropout ratio, i.e. the number of girls or boys who have left a specific grade divided by the total number of students from all the grades who have not completed studies in a school that year.

The datasets were sorted and fields with incomplete information were removed and then analyses were carried out disaggregated by gender and grade (ranging from grades 1 to 12). The disaggregated gender and grade analyses helped to compare the effect of WASH on girls and boys considering their specific age groups, which may have a link to menstrual hygiene management.

With reference to the provision of WASH infrastructure, the key variables were: number of toilets in relation to the number of students and whether these were considered improved or not; and the number and type of available water sources on the school premises. The Zambian education policy

stipulates the minimum requirements for sanitation to be at least one toilet per 20 students in a school. Hence the analyses considered three key categories of sanitation as follows: schools with at least one toilet per 20 students, representing the optimum level of sanitation service; schools with 100 or more students sharing a toilet, representing low service level; and those which reported no facilities at all, representing no service. The intermediate category of between 20 and 100 students per toilet was not included because schools falling under this category were too few to yield data for analysis.

The water situation was analysed in terms of the following categories: schools with a piped water system (e.g. water from the mains supply or piped from a mechanised borehole); schools with an improved water source on site (e.g. protected well or pumped borehole); schools with an unimproved source (e.g. unprotected well or untreated surface water); and schools with no source of water at all.

Data analysis process

Data analysis was done by the use of Microsoft Excel software. The initial analyses of the sanitation and water source situations were undertaken by adding up the total number of schools in each of the different categories above, considering the school type (i.e. government, grant-aided, private and community-managed). This was useful in determining the proportion of schools with and without adequate sanitation facilities, as well as those with different types of water sources.

In step two, the WASH situation was linked with the two educational indicators – i.e. repetition and dropout ratios. Average dropout and repetition ratios were calculated for each grade for girls and boys under each sanitation category. Since the variances were assumed to be unequal in all cases, a t-test was used to examine whether there were significant gender differences statistically at 95% confidence level ($P = \text{or} < 0.05$). Similarly, a line graph was used to display the output and to interpret whether inadequate toilets had a disproportional influence on dropout and repetition for girls and if so, in what grades. This analysis was repeated with reference to the water situation to determine if schools with adequate water sources, such as a piped water system, recorded reduced dropout and repetition ratios, especially for girls.

In the final step, average dropout and repetition ratios were calculated, for each grade for girls and boys under both water and sanitation categories (e.g. no toilets, no water) to ascertain if these were influenced by levels of WASH service provision in the schools. By doing this, disaggregation was used to show the best and worst WASH scenarios and linkages with education indicators, as well as detect if any specific aspect of WASH (sanitation or water) alone played a relatively higher significant role in promoting learning in schools.

Study limitations

This study utilised a 5-year old database and we therefore acknowledge the fact that the WinS situation in Zambia may have changed; however, this was the most complete Educational Management Information System (EMIS) database that could be obtained for the analysis. Secondly, the EMIS is a school database used to collect multiple information and was not designed specifically for WinS monitoring and therefore not directly linked to the Joint Monitoring Programme (JMP) of the WHO/UNICEF. Consequently, quite a few WinS indicators were missing from the EMIS including, design and appropriateness, functionality, accessibility, safety and usability of the WASH facilities and whether they were gender-sensitive (e.g. single-sex toilets). In particular, data on sanitation and hygiene were scarce; there were no schools reporting toilet type (e.g. flush, pit latrine) while three quarters of schools did not indicate availability and supply of handwashing facilities. Since all these indicators are important for the JMP, and the wider SDGs context, it limited the opportunity to do multiple analyses of WinS.

Nevertheless, the analysis took into consideration the JMP classification of WASH facilities. For improved water sources, we classified them as those safe from outside contamination including piped

systems, protected wells, springs and rainwater (WHO/UNICEF 2016). For sanitation, the analysis was limited to classifying the toilets as defined by the JMP (e.g. improved, unimproved) because there was no information to indicate if human excreta were hygienically separated from human contact, and the only data sets available were on the number of toilets. While these limitations were acknowledged, the results arising from this study are potentially useful within the WinS monitoring framework. The results provide a valuable source of information that has the potential to support current WHO/UNICEF JMP on basic WASH services in schools, particularly in Zambia and the general developing countries' contexts.

Secondly, although the intention of the study was to explore WASH-education linkages, we acknowledge the fact that the EMIS questionnaires were not designed with the intention to capture data on the impacts of WASH facilities and services on educational efficiency. Only the most relevant and available indicators were selected for the analysis, with an assumption that poor WASH was amongst reasons for school dropout and repetition. Related to this, we appreciate the fact that socio-economic factors such as poverty, health, location of school (e.g. urban, rural) may have influenced gender differences in educational outcomes; however, due to data scarcity, it was not possible to carry out further investigations.

Lastly, some bias may have occurred during the EMIS data collection process as schools were self-reporting. There is a possibility that some of the facilities were under reported or over-reported and this may have influenced results.

RESULTS

Water, sanitation and hygiene (WASH) situation in Zambian schools

More than half of all the schools surveyed had no toilets (57%) and the majority were community-managed and were found in Northern, Eastern, North-Western and Southern provinces. Schools which reported toilets without indicating the exact numbers were 21%. Approximately 17% of schools indicated having adequate toilet facilities (20 or fewer students per toilet) and these institutions were found across all the provinces. The remaining (5%) had 100 or more students per toilet and were mostly located in areas of Lusaka and Central provinces.

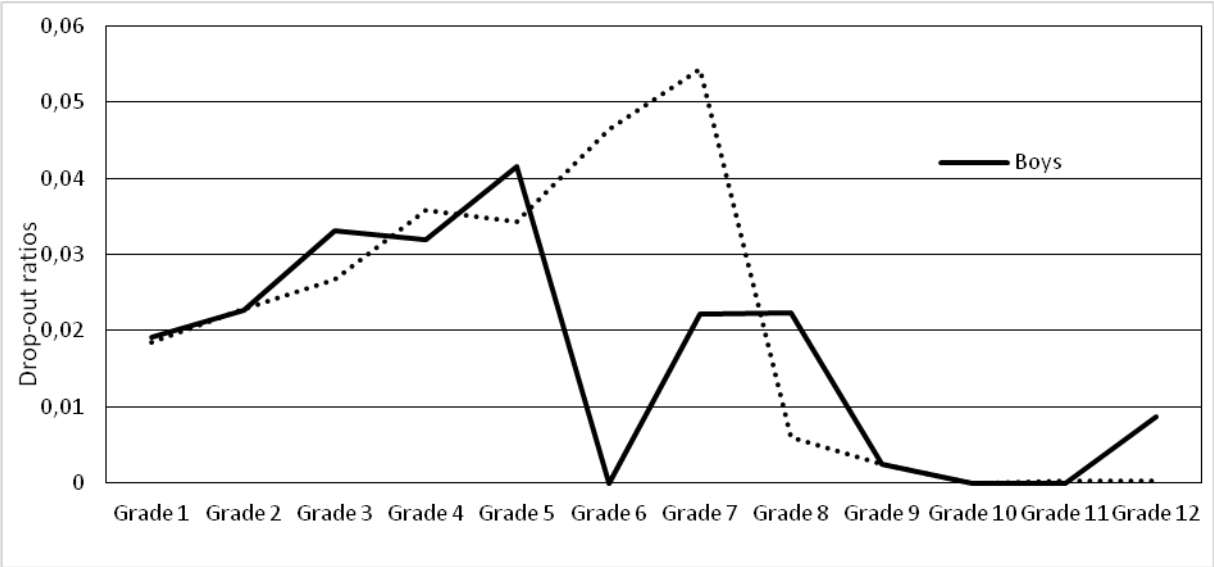
Approximately 45% of the schools reported point water sources on site including hand-pump-equipped boreholes or protected wells. The proportion with piped water systems was 22% of which the majority were privately owned. Unprotected wells were reported in 21% of the schools while 12% had no water source and were community-managed.

Dropout in schools

The lack of toilets and water sources puts girls at higher risk of dropping out of school compared to boys. Without either water or sanitation, dropout ratios were relatively higher for girls compared to boys, especially for those in grades 6, 7 and 8 (Figure 1) where the typical student age is 12 years onwards. The lack of both water and toilets is a probable explanation for the high rate of dropout for girls in these grades where menstrual hygiene and privacy are especially important.

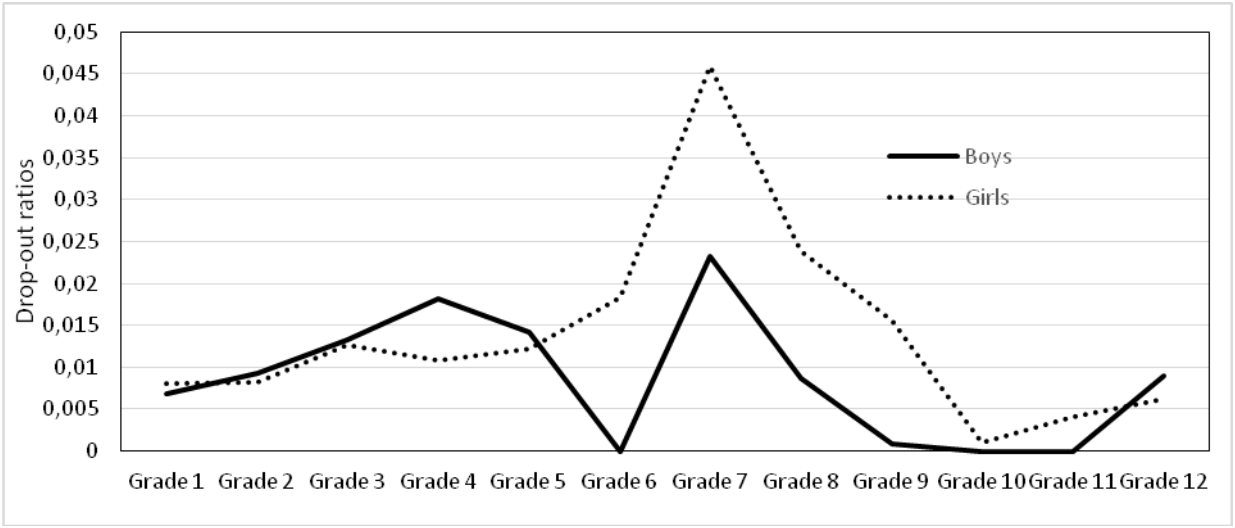
Significant gender differences were seen in dropout ratios between boys and girls in schools with no toilets ($P=0.006$, 95% confidence limit). Similarly, gender differences in dropout ratios were significant ($P=0.024$) within schools where there were 100 or more students per toilet, particularly in grades 6, 7, 8 and 9.

Figure 1. Drop-out ratios in schools with no water and no toilets.



Further analysis revealed that girls were more likely to drop out due to lack of toilets compared to lack of water. For example, a t-test showed significant gender differences in schools with 100 or more students per toilet (P=0.025) where ratios were higher for girls than boys. Similarly, dropout ratios for girls were relatively higher in grades 6, 7, 8 and 9 despite availability of piped water systems in these institutions (Figure 2).

Figure 2. Drop-out ratios in schools with PIPED WATER system but have no toilets.

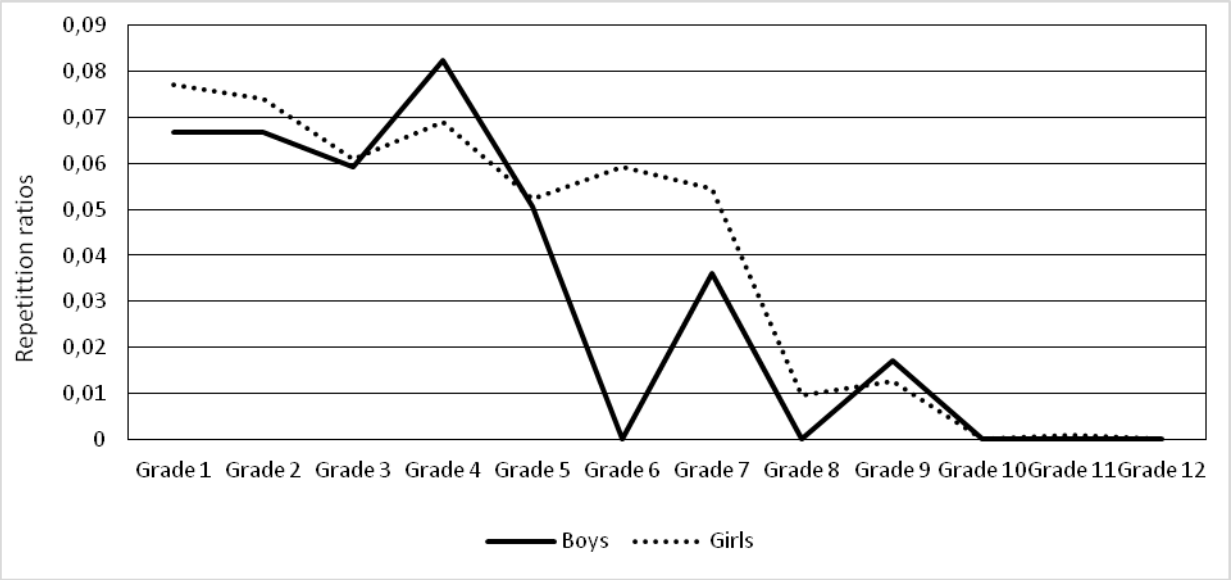


It appeared that adequate water and sanitation in combination had no significant influence on dropout for both girls and boys. For example, within schools with records of 20 or fewer students per toilet, the t-test suggested no significant gender differences (P=0.47). Similarly, no major significant gender differences were detected, for example in schools with improved water sources (P=0.2373).

Repetition in schools

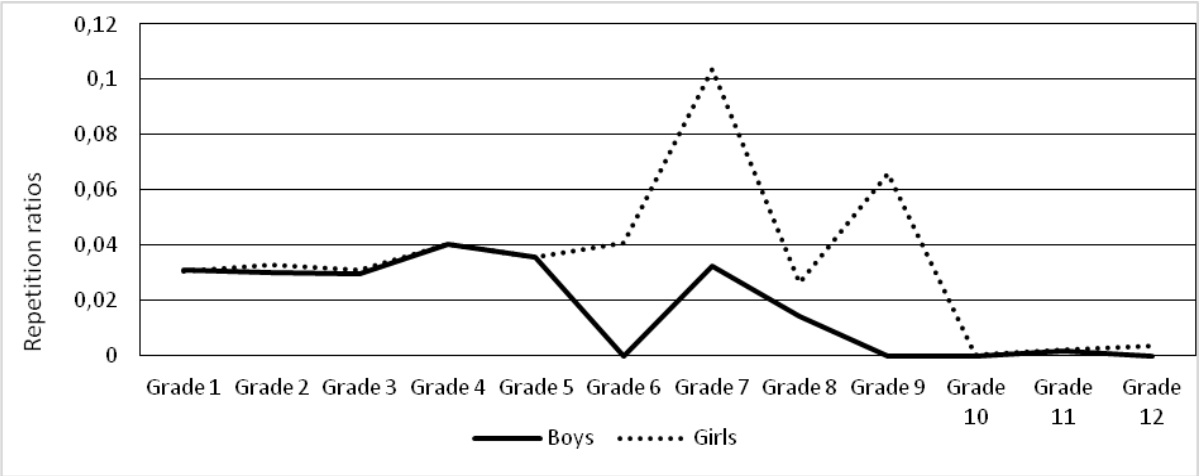
Lack of water and toilets was found to lead to higher levels of repetition, especially for girls in grades 6 and 7 compared to boys (Figure 3).

Figure 3. Repetition ratios in schools with no water sources and no toilets.



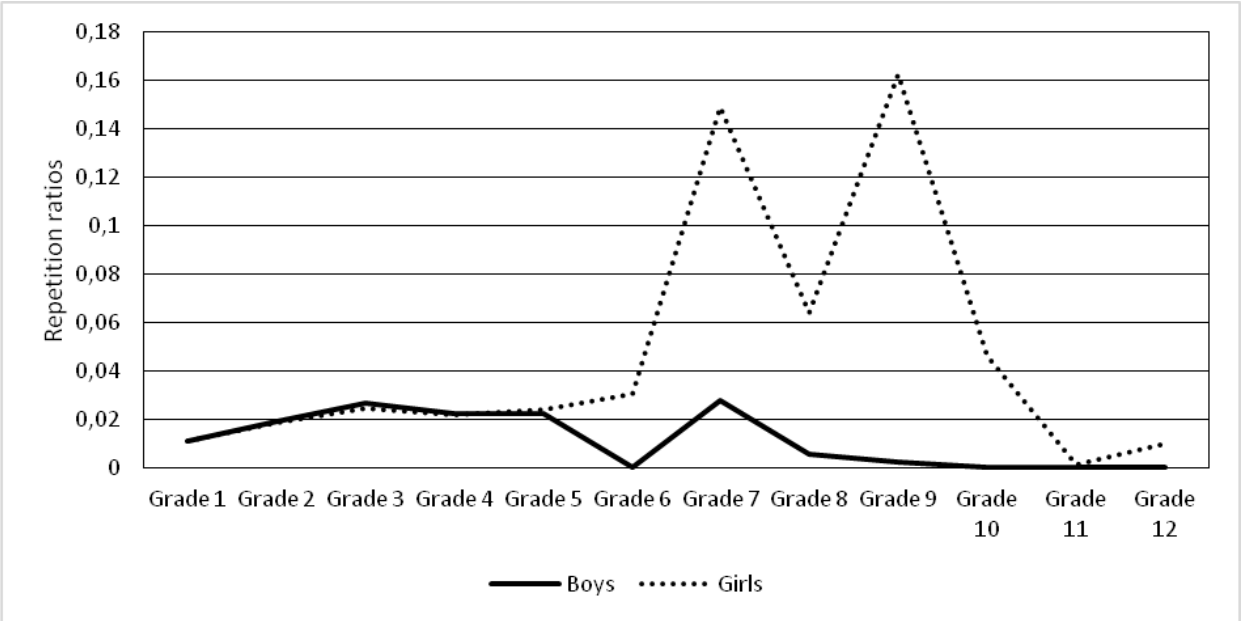
A t-test revealed significant gender differences in repetition ratios between schools with poor toilets and those with adequate facilities (P=0.0008) particularly in grades 7 and 9. Similarly with water, gender differences were statistically significant according to a t-test (P= 0.0514, figure 4).

Figure 4. Repetition ratios in schools with piped water but with no toilets.



Furthermore, there were significant gender differences in schools with 100 or more students per toilet (P=0.0232, Figure 5). Where toilet facilities are inadequate, they may be so crowded that girls may not feel comfortable to use them especially during their menstrual cycle.

Figure 5. Repetition ratios in schools with piped water and 100 or more students per toilet.



No significant gender differences were established in schools with adequate sanitation (i.e. fewer than 20 students per toilet) and adequate water supply (e.g. piped water system). In schools with adequate WASH, gender differences may not necessarily be significant due to the positive influence that the facilities have on attendance for both boys and girls.

DISCUSSION

One notable strategy of achieving the Sustainable Development Goals related to safe water supply and sanitation by 2030 is to provide schools with sustainable, safe water supply points, hand-washing stands and sanitation facilities (UNICEF, 2012). Across the world the Wash in School (WinS) strategy is widely recognised for its significant contributions towards the achievement of the SDGs, especially targets on water and sanitation, education, health and well-being, and gender equality (ibid). This study highlights the importance of building an evidence base for monitoring WinS programming and advocacy. It supports global efforts towards monitoring WASH in institutional settings. The assessment of progressive improvements in WASH services in institutional settings, notably, schools and healthcare facilities is a significant undertaking for the Joint Monitoring Programme (JMP) of the WHO/UNICEF which publishes approximations about progress on WASH at national, regional and global levels. Since its establishment in the 1990s, the JMP has been monitoring the MDG 7, target 7c aimed at halving the proportion of people without sustainable access to safe drinking water and basic sanitation by the year 2015 (WHO/UNICEF, 2016). WHO/UNICEF 2015 estimates show that over half of the population in Zambia (approximately 16 million people) has access to basic water service. However, access to sanitation is low with only about 30% of the total population with basic sanitation (WASH watch, 2018). Statistics also show that in 2015, 15% of the population in Zambia used open defecation (WHO/UNICEF 2015).

In support of monitoring efforts by the JMP, this study has shown that poor WASH can reinforce inequitable educational outcomes which clearly undermine the position of girls compared to that of boys. It supports the commonly held knowledge that inadequate WASH in schools (WinS) has significant gender influence on educational efficiency and progression (Cotton et al., 2013; Dreibelbis et al., 2013;

Alexander et al., 2014; Gelaye et al., 2014; Hirve et al., 2015; Nzengya 2015). Previous surveys in Zambia show that more than 25% of basic schools do not have basic water supplies. Pit latrines are common in schools and most lack ventilation and a good physical foundation (USAID, 2014). Toilet: student ratios remain high reaching up to 90 pupils in some cases while handwashing facilities are inadequate in many schools (ibid).

Poor WASH is particularly problematic for teenage girls who often face difficulties in managing their menstrual hygiene (Sommer, 2010; Crofts and Fisher, 2012; Sommer et al., 2013; Hirve et al., 2015; Sahin, 2015). Hence efforts to provide adequate water supplies and sanitation services would be much more beneficial to girls from the ages of 13 compared to boys of the same age range due to the critical need of girls for personal hygiene. Our study supports the common discourse about the importance of mainstreaming gender in WASH programming within the context of sustainable development goals. Experiences across the world show that the lack of water and sanitation has far-reaching impacts on women's health and livelihoods; access to clean potable water and good sanitation can make a difference for mothers and babies (UN Women, 2018). In rural Nepal, menstruation is a taboo and girls face the risk of sexual harassment and exploitation with potential to be absent from school (ibid).

Taking a gender perspective in WASH is crucial because it helps to highlight core issues such as access, vulnerability and empowerment (e.g. Mason et al., 2017). In many ways, the different roles which men and women play in WASH, and their different needs stipulate their levels of access to these resources (Bhanumathi and Carmel, 2011; Mbatha, 2011; Klasen et al., 2012). In resource-constrained settings, where access to water and sanitation facilities is poor, women often have a comparative disadvantage to men because their needs are often compromised, including personal hygiene and security (Sommer, 2010; Sommer et al., 2013; Hirve et al., 2015). Compared to boys, girls have a huge responsibility to fetch water, sometimes walking long distances in risky situations before and/or after school (Kasongamulilo, 2013). Apart from losing much time to attend school and/or to studies, girls face various risks, including being raped or attacked by wild animals making them much more vulnerable (e.g. Jewitt and Ryley, 2014). In addition, girls are more likely to lag in schools if they spend a lot of time walking long distances to fetch water (Kasongamulilo, 2013). In water-scarce situations, women's personal needs may be overlooked in favour of competing water uses in other sectors such as domestic, energy, agriculture and livestock. For example, experiences in the dry area in Kenya have shown that women must walk a long way to fetch water for their livestock and that this impacts on their health, safety, hygiene as well as their livelihoods (UN women, 2018).

We recognise and appreciate that there are possible multiple explanations as to why adolescent girls may not always complete education, including poverty, pregnancy, marriage, sickness and engagement with gender roles at home (e.g. Mensch and Lloyd, 1998; Mensch et al., 2001; Mbatha, 2011; Alexander et al., 2014). Poverty, for example, can cause school absenteeism and consequent dropouts (Mensch, 2001; Kasongamulilo, 2013). Evidence from Zambia for example shows that in poor households, girls are more likely to miss school to engage with livelihoods activities (Kasongamulilo, 2013). Nevertheless, our findings present strong support to the argument that poor WASH facilities and services expose teenage girls to stigmatisation during their menstrual cycle (Sahin, 2015; Vishnupriya et al., 2015). Although both water and toilets are important resources in schools, the latter is a much more important determinant in girls' educational outcomes than the former. Teenage girls are more likely to repeat a grade in schools without adequate sanitation due to absenteeism during menstruation (Sommer, 2010; Jewitt and Ryley, 2014). Without toilets, girls' mobility is highly restricted during their menstrual cycle, most likely due to the stigma which often surrounds menstruation such as impurity, indignity and embarrassment (Crofts and Fisher, 2012; Sommer et al., 2013; Mason et al., 2013; Alexander et al., 2014; Cronin et al., 2015; Hirve et al., 2015; Mason et al., 2017).

This study has shown that compared to boys, girls from grade 6 (approximately 13 years) are much more likely to drop-out of school and/or repeat a grade in poor WASH conditions, most probably due to

the critical need for adequate toilet facilities during their menstrual cycle. This behaviour puts girls at risks of not completing basic education as shown in previous studies (Crofts and Fisher, 2012; Sommer et al., 2013; Alexander et al., 2014; USAID, 2014; Agol et al., 2018). In a baseline survey conducted in Zambia, results showed that among the reasons why more girls dropped out and repeated a grade was the lack of sanitation facilities (USAID, 2014). Certainly, without any form of sanitation facilities, girls during their menstrual cycle are more likely to drop-out if they repeatedly experience difficulties in managing their hygiene every month. Practically, it would be difficult for girls who experience their menstrual cycle to attend classes or school and queue up for crowded toilets; they would rather remain at home to manage personal hygiene.

One of the most commonly articulated approaches to gender mainstreaming in WASH is to empower women to participate in the provision, management and safeguarding of water-related resources and facilities (Jasper et al., 2012; Hirve et al., 2015). We argue that the lack of educational efficiency can potentially lead to gender inequalities in learning processes. It is therefore necessary to advocate for improved WASH in schools to ameliorate gender inequalities within the learning environment as a vital strategy for gender mainstreaming in development. Our findings show how poor WASH can inhibit the effectiveness of education which can potentially lead to gender inequalities in learning processes. We support the assertion that the provision of adequate water and sanitation in schools can create a greater opportunity to promote a clean, healthy and secure environment and build self-confidence for girls who need to enhance efficient learning outcomes. Improved WASH in schools can incentivise both girls and boys to look after the facilities and sustain them in the longer term. In addition, teenage girls particularly, those who have benefitted from improved WASH can become future advocates in promoting health and hygiene and this can be useful in the context of gender and development.

Within the context of gender equality, there is a growing vision to empower women through better education and health (Aslam, 2013) and subsequent confidence-building. We argue that access to better WASH can empower women, for example by restoring their dignity and removing the stigma associated with poor personal hygiene. To gain a deeper understanding of how improved access to WASH empowers women, it is necessary to understand when access to WASH is most critical for women (e.g. Agol et al., 2018). Some schools may site toilets a long way from classrooms making them generally less accessible. In other cases, the toilets may be available but may be locked, out of service and/or not well secured. Unfortunately, many school WASH programmes in the developing countries tend to be short-lived partly due to poor operation and maintenance (O&M) as well as lack of ownership – i.e. involvement of families and the wider community in WinS activities (e.g. UNICEF, 2012; ARC, 2018). In Zambia, poor O&M of toilets and water sources is a common challenge towards sustainable WASH in schools and one of the reasons for this is lack of ownership by the community (ARC, 2018). To sustain WASH interventions, it is important to promote a sense of ownership which can be in the form of a school management committee or parent-teacher associations (ibid). We argue that such platforms can be useful in discussing key issues that are important for current WinS monitoring including functionality, siting of facilities, appropriateness of WASH design, access and usability, as well as the critical age groups when girls most need WASH services. It is necessary to site WASH facilities in convenient places to reduce the time spent by women for example in fetching water and minimise impacts on health and hygiene (Garn et al., 2014). However, every case is unique so that WASH programming should consider the specific contexts in which they operate, for example, pit latrines may not be sited close to classrooms due to emanation of bad odour.

We argue that promoting quality education in schools should strongly favour programmes which aim to remove gender inequalities in WASH in schools. We recognise that good educational progression requires a multi-sectoral approach in the learning system, which integrates socio-economic issues such as poverty, health and nutrition. On the other hand, the implications of gender on WASH in schools are not yet well explored. By disaggregating the analysis by gender and age, the study identified the critical

ages at which girls most need adequate water and sanitation facilities in schools. These correspond with those ages at which girls start to menstruate, when they are most likely to be self-conscious and insecure about how to manage their personal hygiene.

CONCLUSION

Improved WinS can fulfil the rights of children and youth to education, health and well-being all of which have significant contributions to the achievement of the SDGs. This study has highlighted the benefits of providing adequate water, sanitation and hygienic facilities within the context of Zambia. It shows that poor WASH facilities can influence educational efficiency negatively through increased repetition and dropout rates. Furthermore, the impacts of poor WASH are relatively more important for teenage girls compared to teenage boys, because girls require good menstrual hygiene management.

Although some limitations were encountered during the analysis, we believe that the study has added knowledge and understanding on the implications of poor WASH, especially within the context of gender and development. As revealed in this study, the lack of WASH and especially, sanitation in schools is a major gender constraint and thus ensuring adequate access by teenage girls can be a strategic step towards bridging gender inequalities in the learning environment.

The study supports current work by the Joint Monitoring Programme of the WHO/UNICEF which pays much attention to monitoring WinS globally. JMP estimates have often relied on multiple sources of data collected at various levels (including national surveys) as well as consultations with WASH-sector stakeholders. However, indicators used by the JMP can be contentious partly because they may not always align with cultural and local perspectives. To improve WASH monitoring, data analyses from institutional surveys such as EMIS can yield significant information that can capture local perspectives (e.g. schools) and this can help the JMP to refine methods and indicators for monitoring WinS.

We acknowledge the fact that Educational Management Information System (EMIS) can be a useful source of data for monitoring WinS in the education sector, especially in poor resource settings as in Zambia. It is important to note that EMIS is a fully recognised national database approved by the JMP of the WHO/UNICEF. We propose that more efforts should be made by countries such as Zambia to make it more robust and this can include formulating strong educational policies which clearly give guidance on WinS monitoring via EMIS, for example the need of designing surveys which consider important WASH indicators such as access, quality, functionality, and usability of facilities as well as their proximity to the schools.

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