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RESEARCH ARTICLE

GENDER PERSPECTIVES OF STUDENT'S PERCEPTIONS TO ACCESS AND UTILIZATION OF WATER AND SANITATION FACILITIES IN EAST AFRICAN UNIVERSITIES

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ABSTRACT

This paper assessed student's perceptions of water and sanitation challenges and explored adaption measures of inadequate access and utilization of water supply and sanitation facilities in East African Universities from a gender perspective. Cross-sectional gender focused study design was adopted. Seven hundred and one (701) respondents were interviewed at Makerere University and University of Dar es salaam. Gender disaggregated data was collected using semi-structured and in-depth interviews, focus group discussions and site observations. The gender perspectives based frameworks were used to generate gender inequality insights and reflections. Majority of male and female students agreed that there are gender differences in access and utilization of water and sanitation facilities, female students being the most affected. Several adaptation measures are used by students in accessing and utilizing water and sanitary facilities including moving to other locations with water supply and sanitary facilities, buying water including for drinking, collecting water from unhygienic sources and storing water.

INTRODUCTION

Gender concerns in access and utilisation of water and sanitation facilities in public places continue to be an area of neglect worldwide, yet understanding the gender dynamics therein helps management of public institutions to provide quality and gender responsive services. WHO (2001) pronounced itself on access to drinking water of safe quality and ample quantities as well as adequate wastewater sanitation by making them fundamental public health principles (Daley *et al.,* 2015). In addition, they are internationally recognized human rights concerns (Sharmila and Murthy, 2013; Heller, 2015). In Sub-Saharan Africa, Institutions of Higher Education student's access and utilization of water and sanitation facilities are rapidly declining (Kebirungi *et al.*, 2015 and Hunter *et al.*, 2010). Several scholars like (Bartram and Cairncross, 2010; Ferreira de Oliveira *et al*., 2015; Heller, 2015; Daley *et al*., 2015; Coffey *et al*., 2015; and Moe *et al*., 2006, Regmi, 2015; and Jasper *et al*., 2012) point out that inadequate access and utilization of water supply is one of the main factors contributing to diseases globally. The main diseases associated with inadequate water supply and sanitation facilities include: - diarrhoea, intestinal helminth infections, dracunculiasis, schistosomiasis, gastroenteritis, dysentery, liver enlargement, malnutrition, ringworm, scabies, and other skin diseases and trachoma (McKenzie *et al.*, 2009; Bartram and Cairncross, 2010; Mara *et al.*, 2010; Nastar, 2014; Hunter *et al.*, 2010; Leee*t al*., 2005; Esrey *et al.*, 1990; and Grimes *et al*., 2015). According to (Bartram *et al*., 2010) more than half the hospital beds in the world are occupied by persons who have these diseases.

On the social aspect, poor water and sanitation infrastructure effects include; reduced education attainment due to absenteeism, social status and dignity and informal care (Ekman, 2015; Hunter *et al.*, 2010; WSP, 2012; and Freeman *et al*., 2012). In addition, inadequate access and utilization of water and sanitary facilities pose economic challenges including loss of resources due to mortality and morbidity, such as reduced labor productivity, increased health care costs, and increased poverty (Ekman, 2015; Hunter *et al.*, 2010; Heller *et*

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al., 2015; Coffey *et al*., 2015; Corburn *et al*., 2015; and Bisung *et al*., 2015). In the context of East African Universities, when students fall sick, they require funds to seek medical care and rehabilitation among others which funds may have not been budgeted for before coming to Universities. The economic effects due to the burden do not only affect the students, it also weighs heavily on both students households and health systems. For example, (Bartram *et al.,* 2010) estimated that the health costs for treating diseases alone amount to US$340 million for households lacking adequate water supply and sanitation and US$7 billion was lost by national health systems. In India, the total economic impacts of inadequate water supply and sanitation facilities amounts to Rs. 2.44 trillion (US$53.8 billion) a year. (Khuroo *et al*., 2015). According to a desk study carried out by the Water and Sanitation Program (WSP, 2012), the Government of Uganda spend 389 billion Ugandan Shillings each year, equivalent to US$ 177 million on poor sanitation. This sum is the equivalent of US$5.5 per person in Uganda per year or 1.1% of the national GDP**.** In the United Republic of Tanzania, poor sanitation costs Tanzania 301 billion Tanzanian Shillings each year, equivalent to US$206 million. This sum is the equivalent of US$5 per person in Tanzania per year or 1% of the national GDP (WSP, 2012).

Poor countries with access to improved water experienced average annual growth of 3.7% whereas countries with the same per capita income but without such access have an annual growth of only 0.1% (Hunter *et al.,* 2010, Stockholm International Water Institute, 2005). Thus poor water and sanitation infrastructure perpetuates gender inequalities and poverty especially in developing countries. Water governance is broadly understood as "the range of political, social, economic and administrative systems that are in place to develop and management of water resources, and the delivery of water services, at different levels of society" important to wellbeing (Rogers & Hall, 2003). Lack of water governance and prioritization of water and sanitation infrastructure in the context of East African Universities means; First, that University planners and decision makers have not accounted for the physical environment including the type (surface and ground) and quality of available source water, terrain, topography, and climate characteristics of the area. Second, that planners and decision makers have not considered the lived situations of male and female students at both Universities and their reliance on the water and sanitary systems to meet their practical needs and to protect their health.

Third, that the size of the user population, their setting, their water-related habits and usage patterns, and the nature of their human-environment interactions are all not reflected in the water and wastewater systems. The lack of an inclusive water and sanitation infrastructure in planning and key decision making organs means that a gender perspective of student's perception of access and utilization of water supply and sanitation facilities is not known. Related to the above, limited progress towards universal access to adequate water supply include non-existent or ineffective monitoring practices and treatment systems, un maintained infrastructure, water operator and health worker shortages. Other factors include crowded hall of residence conditions and water supply consumption restriction (Mollinga, 2008; Laracombe *et al*., 2011; Lee *et al*., 2005) all combined contribute to the multitude of water and sanitation related inadequacies and disease outbreaks in East African Universities that are bound to induce gender variances in perceptions (negative or positive) of students access to water and sanitation sources on campus. These causes should now be the main concern, since during any water consumption and sanitation use restriction in the form of rationing, decreasing pressure in water mains, fines on high consumption, the most severely affected population groups are precisely the most vulnerable ones (female students, students with disabilities and pregnant students). These vulnerable groups have fewer resources to deal with water scarcity due to their lower economic capacity, and are the most heavily impacted, especially from academic attainment and health perspectives (Heller, 2015, Freeman *et al.*, 2012). Durán-Narucki (2008) in a study on school building conditions, school attendance, and academic achievement in New York City public schools, found a significant relationship between quality of physical infrastructure and student's academic achievement.

Previous University research based studies, have been carried out in both developed and developing countries with a focus on student enrolments, quality and relevance of education, funding and technological innovations (Kasozi, 2004; Mamdani, 2007; UNESCO, 2006; Bhatia *et al.*, 2010; and Kebirungi *et al*., 2015). Other scholars like Zellner (2014) focused on water conservation on campuses of higher education in Texas. Kebirungi *et al.,* (2015) studied a gender perspective of the status of water and sanitation landscape in East Africa Universities. Jasper *et al.,* (2012) water and sanitation in schools: a systematic review of the health and educational outcomes; Hendriks (2014) studied the influence of school size, leadership, evaluation, and time on student outcomes; Barnes and Maddocks (2002) focused on standards in school toilets; Lundblad and Hellstrom (2005) focused on perceptions of school toilets as a cause for irregular toilet habits among schoolchildren aged 6 to 16 years; and WHO (2009) studied water, sanitation and hygiene standards for schools in low-cost settings.

Using modelling approach, Kebirungi *et al.,* (2015) demonstrated that there are inadequate water and sanitation conditions in East African Universities. This issue still remains relatively neglected in academic institutions, national, and international levels and yet it impacts on student's academic attainment and health wellbeing (WHO, 2009). Additionally existing adaptation approaches and perspectives pay little attention to gender and University students especially female students and students with special needs in EAUs. This study uses a gender perspective to i) assess students perceptions of water and sanitation challenges in East African Universities ii) explore adaptation measures of inadequate access and utilization of water supply and sanitation facilities in East African Universities.

Theoretical Considerations

This paper uses the theories of political sociology of water resources management (Mollinga, 2008), water questions in feminism (Ahlers and Zwarteveen, 2009) and the human rights

based framework to water and sanitation (Jensen, 2014). These are analytical frameworks employed to understand the political, technical or physical, social economic and regulatory and management dimensions of water and sanitation resources. Water resources management is an inherently political process based on the idea of water control and should be conceived as a process of politically contested resource use. This creates boundaries and binaries important in shaping gender differences and perspectives among students in response to provision, access and utilization of water and sanitation facilities in EAUs. Several scholars (Ahlers, 2005; Boelens and Zwarteveen, 2005; Gleick *et al.*, 2002; Moore, 1989; Zwarteveen, 1998) believe that today's water questions involve complex distributional choices that are intrinsically political, yet it hides political choices of distribution through naturalizing, universalizing and objectifying abstractions. The theory of water question in feminism highlights that water control perpetuates gender inequities (Ahlers and Zwarteveen, 2009).These inequalities are structural/institutional and reify and reproduce boundaries and binaries in water provision, access and utilization in EAUs.

Access to and utilization of resources including water and sanitation facilities is a right or opportunity to use, manage or control a particular resource (Kebirungi *et al*., 2015; and Jensen, 2014). The right to water entitles everyone to access to sufficient, safe, acceptable, physically accessible and affordable water and sanitation. It helps to focus on the needs of the poorest and most marginalized groups by empowering communities and vulnerable groups to take part in decision making processes without discrimination on the basis of gender, race, colour, and disability among others (Jensen, 2014). In general women require different levels of access to and utilization of resources based on their productive, reproductive and community management roles (Moser, 1993; and Kebirungi *et al*, 2015).

All the three above mentioned theories recognize the interaction of natural resources and gender relations. These theoretical frameworks are flexible, meaning that different theories and concepts can be combined to explore the intricacy of interactions among critical components of water management systems and their impacts on claim holders in terms of equitable water provision, access to and utilization. This raises the question of water allocation whose claim to how much water is provided, and distribution systems that is how to get a certain volume of water to a certain location at a particular time. A comprehensive understanding of the process of gender relations and behavior is also useful (Mollinga, 2008; and Kebirungi *et al*., 2015). For example, different individuals or groups involved as water and sanitation resource providers or claim holders have different gender practical and strategic needs and interests. Whether the Universities provide water or not these students will strive to ensure that they fulfill their water and sanitation needs.

Therefore, the gender perspectives, the political sociology of water resource management and human rights based frameworks will generate gender inequality insights and reflections rising from water resource management, access to and utilization of water and sanitation facilities. This paper analyses student's perceptions, the insights and reflections arising from the aforementioned theories and uses them further to explore adaptation measures employed by Universities and male and female students in the provision, accessibility and utilization of water and sanitation facilities.

MATERIALS AND METHODS

A cross-sectional approach was adopted for the gender focused study design; both qualitative and quantitative research methods were used. A total of twenty four (24) in-depth interviews were conducted with 12 key informants at each University with a representative sample of 16 (10 male and 6 female) from key informants drawn from the University decision-making bodies and of 8 (4male and 4 female) key informants drawn from student leaders at both universities. The objective of these key informant interviews was to allow for more in-depth investigation of gender concerns related to the current status of water and sanitation facilities and their gendered causes at both Universities. A total of 1000 (one thousand) students was randomly selected at both Universities with a proportionate University distribution in the ratio of 50%. The 50% was again proportionately distributed with a ratio of 25 % male and female students respectively at both Universities. This sample included resident and non-resident students. A total of seven hundred and one (701) complete questionnaires were returned although the ratio of female to male student respondents was found to be disproportionately low as follows: 333 students [132 (36.6%) female and 201 (60.4%) male] at Makerere University and 368 students [158 (42.9%) female and 210 (57.1%) male] at University of Dar es Salaam.

In addition, sixteen focus group discussions were conducted. A total of 8 FGD were conducted with a representative sample of student leaders, 4 with custodians and 4 with cleaners at both Universities. On average 8 student leaders (4 males and 4 females), 4 custodians (2 males and 2 female), 4 cleaners (2 males and 2 female) were invited for each of the focus group discussion. The objective of these discussions was to elicit information pertaining to gender concerns, student's practices and behaviors in access to and utilization of water and sanitation facilities in halls of residence and lecture theatres. Site visits and observations were also conducted. An observation guide was generated with an intention to assess gender sensitivity and responsiveness of water and sanitation facilities in respect to water and sanitation availability, accessibility, acceptability, and adequacy, cleanliness of the facilities in lecture theatres and halls of residence, student's behaviors towards utilization of water and sanitation facilities. Data were coded, entered in SPSS and analyzed from a gender perspective. Gender disaggregated descriptive statistics were generated and presented in figures and tables.

RESULTS AND DISCUSSION

Student's Perception towards Access to and Utilization of Toilets by Gender

Figure 1 below shows that there are differing gender

perceptions towards access to and utilization of toilets located in halls of residence and lecture theatres at Makerere University and University of Dar es Salaam. Only 39.8% female compared to 51.5% male and 30.3% female compared to 58.6% male resident students have access to and utilization of toilets at University of Dar es Salaam and Makerere University respectively. However 13.6% female resident students at Makerere University who did not have access to and utilization of toilets raise a lot of concern regarding their health well-being. Similar differing gender perceptions among male and female students towards access to and utilization of toilets located in lecture theatres at both Universities are reported. About 56.3% male and 33.7% female and 53.5% male and 36.4% female students located in lecture theatres reported lack of access to and utilization of to toilets at University of Dar es Salaam and Makerere University respectively.

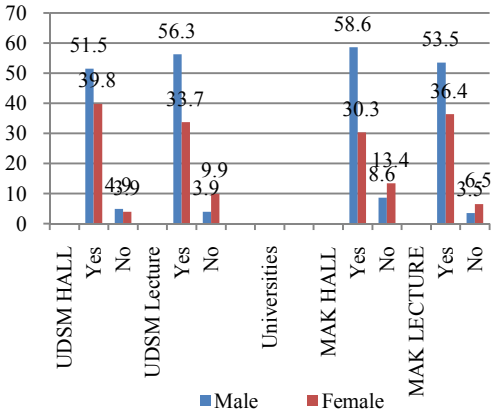

Figure 1 Students Perceptions towards Access and Utilization of Toilets by Gender

Figure 2 below shows that at both Universities male and female students had similar perceptions on the inadequacy of the toilet design (seating and squatting). A relatively high percentage of students, 65.7% male and 76.8% female; and 76.7% male and female 85.6% students at Makerere University and University of Dar es Salaam respectively reported that the toilet design was not convenient for usage. On the other hand, a relatively lower percentage 34.3% male and 22.2% female and 22.2% male and 14.4% female reported that the toilet design was convenient at Makerere University and University of Dar es Salaam respectively.

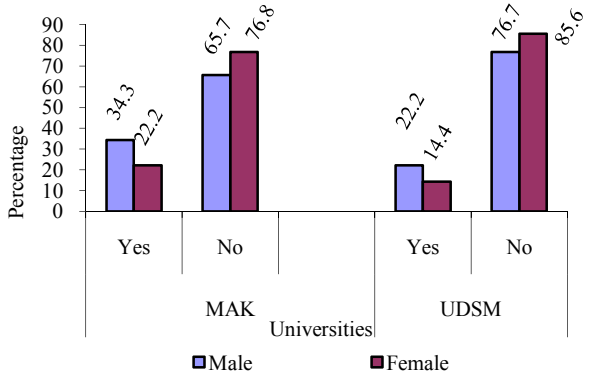

Figure 2 Students Perception on Convenience of Toilets Design by Gender

Figure 3 below shows water usage in halls of residence at Makerere University and University of Dar es Salaam. Accordingly, University of Dar es Salaam has a relatively higher percentage of students using water for washing (53.4% male and 51.6% female) and bathing (36.9% male and 35.8% female) compared to Makerere University (25.9% male and 18.9% female); and (24.4% male and 23.7% female) for the same water usage. Gender differences are captured at both Universities with a relatively higher number of male students who? used water for washing clothes and bathing compared to the female students for the same water usage. Makerere University has a relatively higher percentage of students using water for toileting (36.8% male and 32.1% female) compared to (9.6% male and 12.6% female) at University of Dar es Salaam. Although there are relatively gender differences in water usage for toileting among male students at Makerere University, a higher percentage of female students at University of Dar es Salaam use more water for the same usage compared to their male counterparts. Findings also reveal that at Makerere University, students use water for drinking a practice not reported at University of Dar es Salaam. Generally, gender differences exist where more male students use water for washing and toileting. The same gender differences are evident in the proportion of male and female students using water for bathing and drinking.

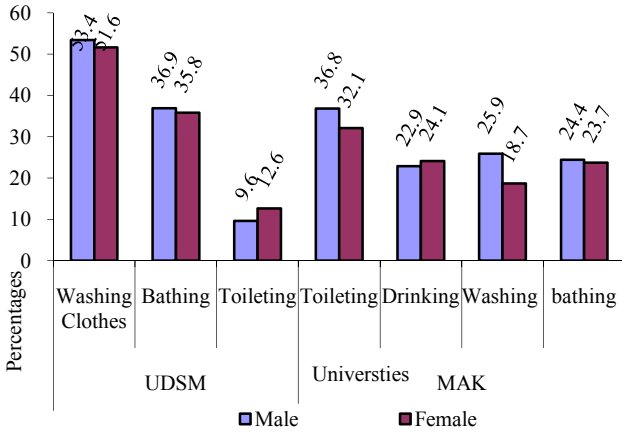

Figure 3 Students Perceptions of Water Usage by Gender

Figure 4 below shows that there are gender differences in reporting on the existence of- water, hand washing basins and soap in halls of residence and lecture theatres at Makerere University and University of Dar es Salaam. 38.5% male and 44.8% female and 42.9% male; and 35.4% female resident students reported existence of water, hand washing basins and soap while a relatively higher percentage of students 61.5% male and 55.2% female; and 57.1% male and 64.6 female in the same location reported non existence of the aforementioned facilities at University of Dar es Salaam and Makerere University respectively. About 1.9% male and 1% female; and 20.5% male and 24.7% females students reported existence of water, hand washing basins and soap while 98.1% male and 99% female); and 79.5% male and 75.3% female) reported non-existence of water, hand washing basins and soap at University of Dar es Salaam and Makerere University respectively. Subsequently, a big percentage of male in Dar es Salaam (98.6% on average) reported the absence of these practices compared to their colleagues of Makerere University (77.4% on average).

The percentage difference of male and female who reported the absence of water and sanitation facilities is relatively small at Dar es Salaam (-0.9%) compared to Makerere University (4.2%). Where water, hand washing basins with soap exists, is relatively smaller than where those facilities are non-existent in hall of residence.

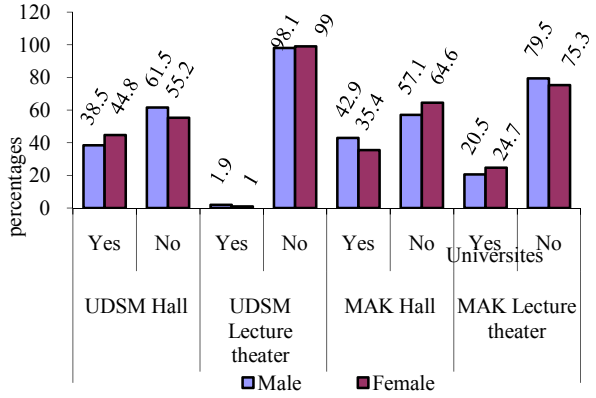

Figure 4 Student's Perceptions on Water, Hand Washing Basins and Soap by Gender

Figure 5 below shows a range of perceived challenges faced by students in accessing and utilizing water and sanitary facilities. These include; inadequate water, dirty toilets, stench from toilets, fewer toilets, distance to toilet and wet floor. Both male and female students at Makerere University and at University of Dar es salaam concurred on the challenges affecting utilization of water and sanitation facilities. In halls of residence student's perceptions concurred that there were fewer toilets at Makerere University and inadequate water at University of Dar es Salaam. Students in lecture halls also concurred that there is inadequate water at Makerere University and University of Dar es Salaam. There was no significant association in students perception and gender at both Universities (P>0.05).

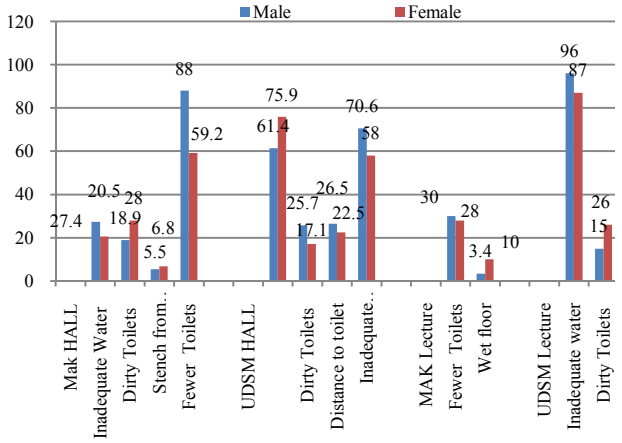

Figure 5 Students Perceptions of the Challenges in the Utilization of Water and Sanitary Facilities by Gender

In terms of water volume, figure 6 shows that the majority students at University of Dar es Salaam use less than 10 liters. There is no significant discrepancy between male and female responses (P>0.05). Few students use up to 25 liters. At Makerere University, there is a relative variation between male and female responses. On average students use between 11-15 liters of water although there are students who use up to 21-25 liters of water for all their water needs. Compared to University of Dar es Salaam there is a relatively higher number of students who use less than 10 liters of water per day.

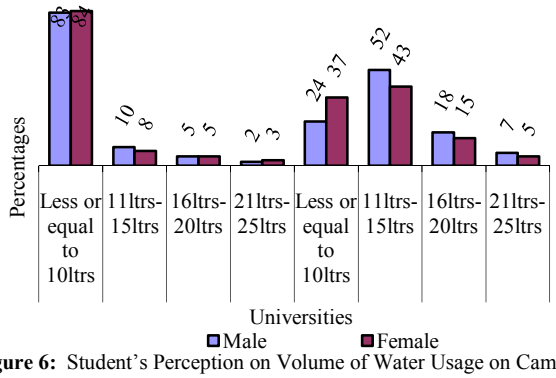

Figure 6: Student's Perception on Volume of Water Usage on Campus by Gender

Adaption Measures to Inadequate Water Supply and Sanitary Facilities by Gender

During focus group discussions with students at both Universities, students revealed that when there is no water supply they are compelled to move from their halls of residence to areas with water within the university. For example at Makerere University, some male students of Lumumba Hall block B use water facilities for Hall A or use senior common room washrooms, both male halls of residence, during rush hours. In case there is complete water shortage male students go to other male halls of residence like University hall or other halls where they have friends. A similar adaptation measure of moving to areas with water was used by students at University of Dar es Salaam. University of Dar es Salaam was found to be more water deficient than Makerere University. At University of Dar es Salaam, instead of students moving to other halls of residence, they packed their towels and changing clothes and used water in toilets located in lecture theatres with regular water supply. Students looked for water at College of Engineering and Technology and Mwalimu Nyerere Lecture Theatres. Other students used water and sanitary facilities from the University Mosque which are quit distant from their halls of residences.

For female students in Africa hall of residence at Makerere University, they make movements within the same hall for residence and their preferred bathing facility was Block D located in the same hall of residence while others stored water in jerrycans or buckets. During focus group discussions, female students reported that they felt vulnerable to attacks and rape especially at night in case they went to distant toilet locations or alternative distant water sources. Majority female students at University of Dar es Salaam bought water from water vendors or collected water from unhygienic sources. Both male and female students at University of Dar es Salaam also took advantage of bust pipes to collect water for bathing and washing during water shortage as show in the picture below.

Other students especially male students at both Universities reduced bathing and washing frequencies and used perfumes to disguise the body odour while female students absconded from attending lectures especially those who were in their menstruation cycles. Another adaptation measure used among both male and female students at both Universities was to quit University halls of residence and rented a room as an option in the neighborhood private hostels. For those who had their

homes or relatives within reasonable distance resorted to commuting from their homes while others especially female student were forced to engage in unwanted relations just because they need comfort.


Figure 6 Picture taken from Hall 7 (University of Dar es Salaam)

Appropriate adaptation to water and sanitation inadequacies is critical especially for females and other socially marginalized groups who bear a disproportionately high burden of water and sanitation impacts especially from a health perspective (Heller, 2015; Regim, 2015; and Khadka, 2015). In EAUs, the degree of vulnerability of male and female students to water and sanitation depends on the capacity of those students to adapt which in turn is shaped by water and sanitary infrastructure systems and design, location and distribution of water and sanitary facilities and economic status. These factors determine students perceptions to access to and utilization of water supply and sanitary facilities in EAUs.

Table 1 below, shows that at both Universities students resolved to fetch water from tank outside halls of residence and stored water for later use. A relatively higher percentage 91% (46.5% male and 44.5% female); and 97.1% (56.3% male and 40.8% female) that water was inadequate and fetched water from tanks installed outside halls of residence at both Universities. Results further reveal that 11% (5.5% male and 5.5%female); and (2.9%female) stored water for later use. Although gender differences among students exists at both Universities, there is no significant association between gender and adaptation measures detected (P>0.05).

Table 1 Students Adaptation Measures to Inadequate Water Supply by Gender

adaptation measures	Makerere University			University of Dar es Salaam		
	Male	Female	Total	Male	Female	Total
Fetch outside tank	46.5	44.5	91	56.3	40.8	97.1
Store water for later use	5.5	5.5	11	-	2.9	2.9

In most cases, both male and female students fetch water from tank outside their halls of residence. A very small number of them store water for later use. At University of Dar es Salaam, no male student stored water for later use. Students with special needs (Table 2) either were helped by friends or struggled on their own. At Makerere University, no significant association was observed between gender and the adaptation measures used by students with special needs (p>0.05). At University of Dar es Salaam a significant association between gender and adaptation measures used by students with special needs was observed (p<0.001). A relatively high number of female students are helped by friends or struggle on their own compared to male students with special needs.

Table 2 Students with Special Needs Adaptation Measures with Inadequate Drinking Water by Gender

Adaptation measure	Makerere University			University of Dar es Salaam		
	Male	Female	Total	Male	Female	Total
Helped by friends	52	48	100	68	32	100
Don't know	47	53	100	40	60	100
Struggle on their own	48	52	100	26	74	100

Table 3 below shows water used by students for drinking at both Universities. For resident students, Makerere University kitchens provided treated water for drinking, a practice not used at University of Dar es Salaam. There was no association between adaptation measure and gender (P>0.05; X^2cal=0.65, df=2 for Makerere University and X^2cal =0.87 and df=1 for University of Dar es Salaam). In case drinking water was not provided, students resorted to buy water from the canteens (21.5% male and 17.5% female) at Makerere University and (53.8 male and 35.4% female) at University of Dar es Salaam. Other students (73.5% male and 73% female) at Makerere University and (54.4% male and 26.3% female) at University of Dar es Salaam boiled their own drinking water using personal kettles. All non-resident students bought their water for drinking. At both Universities students exclusively bought water from the cafeterias or canteens.

Table 3 Students adaptation measures with Inadequate Drinking Water by Gender

adaptation measures	Makerere University		University of Dar es Salaam	
	Male	Female	Male	Female
Buy water from canteen/cafeteria	21.5	17.5	53.8	35.4
Boil own drinking water	73.5	73	54.4	26.3
Dinning provides drinking water	5.0	4.0	-	-

Adaptation Measures with Inadequate Toileting Facilities

Table 4 depicts the different adaptation measures towards inadequacy of toilet facilities. At both Universities, students moved from one location to another in search of clean toilets; while others postponed defecating or urinating by way of not thinking about it all the time, by dancing or by tightening their muscles. Some students who had friends in the nearby hostels, they disguised as if they were going to visit their friends and after answered the nature's call there. While others went to the nearby restaurants or canteens ordered for a drink or a snack and after used the toilet. Other students especially male students stepped on the toilet seat while defecating. The study further revealed that other students defecated or urinated on the floor within the toilet area. In addition male students at both Universities stood at a distance of the entry of the toilet entrance and urinating (term referred to sending or positing). In addition, male students at Makerere University used nearby bushes to urinate a practice that contribute environmental pollution.

Students further revealed that since most toilets were soiled with urine or faeces, they used toilet paper to cover the toilet hall and place toilet paper around the toilet seat before

defecating or urinating to avoid waste flush back. Female students at both Universities were found to be keener while using the toilet. Some would first wash it with detergents like dettol or pour hot water especially those living in Africa Hall at Makerere University. Other students prepared themselves psychologically to go to the toilet once in the morning or in the evening. While others used the toilet midmorning when the toilets have been cleaned. Like adaptation measures used during water shortages, those students who had their homes or relatives within reasonable distance resorted to commuting from their homes while others especially female student are forced to engage in unwanted relations for comfort purposes.

Table 4 Adaptation Measures with Inadequate Toilet Facilities by Students with Special Needs by Gender

Adaptation measures	Makerere University			University of Dar es Salaam		
	Male	Female	Total	Male	Female	Total
Helped by friends	47	41	88	70	42	111.2
Struggle on their own	66	60	126	30	27	57
Don't know	42	43	85	26	25	51
Total	155.4	143.7	299.1	125.7	93.3	219

Survey results shows that in order for students with special needs to adapt with the ever growing inadequate toilet facilities challenges, students have had to devise several ways to address the issue. There is no significant association between adaptation measure and gender at both Universities ($p>0.05$; $X^2cal=0.65$ for Makerere University and 0.87 for University of Dar es Salaam, df=2). This ranges from being helped by friends 88% (47% male and 41% female) and 111.2 % (70% male and 42% female) at Makerere University and University of Dar es Salaam respectively. Other students with special needs struggled on their own 126% (66% male and 60% female) and 57% (30% male and 27% female at Makerere University and University of Dar es Salaam respectively. While other students 85% (42% male and 43% female at Makerere University and 51% (26% female and 25% male) at University of Dar es Salaam were not aware on how students with special needs access and utilise water and toilet facilities.

Table 5 Adaptation Measures with Inadequate Toilet Facilities by Able Students by Gender

Adaptation measures	Makerere University		University of Dar es Salaam	
	Male	Female	Male	Female
Fetch water from outside hall	72.1	65.4	64	45.7
Wait for bathroom/toilet to be cleaned			5.8	20.4
Keep water in Jerrican/container			54.3	42.9
Use disinfectant*			0.0	1.0
Careful not to step in dirt*			39.8	35.0
Walk long distance for clean toilet*	3.8	5	3.6	0.9
Use home toilet	30.7	29.9	3.0	0.9
Cover toilet with paper/tissue before use	32.4	25.3	19.2	16.2
Don't use toilet	59.3	42.4	15.9	9.0
Report to authorities	29.5	15.2	21.8	13.9
Clean toilet before use	17.0	12.5		

DISCUSSION

At Makerere University and University of Dar es Salaam, majority of male and female students agree that there are gender differences in access to and utilization of water and sanitation facilities. Relatively higher number of female students at both Universities perceived limited access to water supply than their male students counterparts. This finding corroborates with Kebirungi *et al.,* (2015) based on geo-spatial modelling of water and toilet distribution in the studied Universities. The findings are also in consistent with Freeman *et al*., (2012) who reported poor school water, sanitation and hygiene conditions disproportionately affecting girls in Nyanza Province, Kenya. Factors contributing to this status include; inadequate water availability, limited number of toilets, and distance to toilets. Subsequently, the toilets become very dirty, with wet floors, bad odour, and with inadequate safety and privacy limiting female students access to and utilization of toilets as reported by Barnes and Maddocks (2002) in the United Kingdom and Lundblad *et al*., (2005) in Sweden.

Additionally, toilet design contributed to avoidance of toilets use. Male and female students at both Universities preferred the squatting type of toilet for health benefits compared to the seating toilet. A study by Rosen *et al.,* (2008), focused on the provision of water for hand washing, in Israel. The study found no significant changes in rates of illness or absenteeism. However, similar studies in China and Egypt noted significant changes in rates of illness. Instead, differences in the frequency and timing of hand-hygiene episodes may account for the stronger reductions in rates of gastrointestinal illnesses than rates of respiratory illnesses (Jasper *et al*., (2012). Therefore, for provision of water for handwashing and handwashing materials such as soap are related to decreased absenteeism and reported illnesses as well as to increased handwashing knowledge (Jasper *et al*., (2012). Freeman (2012) indicates that access to and utilization of toilets are an essential part of menstrual management, safety and privacy among female students. Absence of water and sanitation facilities had implications on student performance as observed by Durán-Narucki (2008) and WHO (2009). Durán-Narucki reported a significant relationship between quality of physical infrastructure and student's academic achievement.

A big proportion of students don't use water for washing and bathing at both Universities and very few use water for toileting. Water, hand washing basin and soap which promotes reduction of disease after defecation are quasi inexistent at both Universities. Freeman *et al.,* (2012) highlights that water, handwashing and soap enables general cleanliness that directly impacts more on girls. Similar findings on absence of similar facilities are prevalent in several developed countries although the degree of deficiencies is higher in developing countries (Grimes *et al.,* 2015; Lopez-Quintero *et al*., 2008; Jasper *et al*., 2012; and Scott *et al*., 2007). For example, inadequate water, and hand washing basin and soap facilities were noted in a United States survey study in 2007 on a college campus, revealing that 59% of residence halls on campus provided no soap and 90% no paper towels. Thirty one percent of respondents indicated they did not wash their hands due to lack of supplies for handwashing (Jasper *et al.,* 2012). Similar findings are reported by WHO (2009), that schools in low-cost settings, often lack drinking-water and sanitation and handwashing facilities and where the facilities existed, exhibited inadequacy both in quality and quantity.

Related to drinking water, we found out that it is only at Makerere University that a few students use the University water for drinking. This can also contribute to student academic performance (WHO, 2009). Hunter *et al*., (2014) conducted a study on impact of the provision of safe drinking water on school absence rates in Cambodia. Results show an association between providing free safe drinking water and reduced absenteeism.

Several adaption measures are used by both male and female students in accessing and utilizing water and sanitary facilities. These range from moving to other halls of residence, mosques or lecture theatre with water supply and sanitary facilities. Distant locations of toilets especially during flooding in Bangaladesh require household members to walk reasonable distance to access them (Shimi *et al.*, 2010). This movement leads to time wastage and puts a toll on student's academic engagements which in turn affects student's academic performance especially for female students who have to take more time to secure safer water and sanitary facilities and environments. Time loss is also reported by Water and Sanitation Programm (2012) with approximately US $ 8.1 million and US $ 8.1 million in Uganda and Tanzania respectively is lost each year in access time on each person practicing open defecation. Almost 2.5 days are lost a year finding a private location to defecate leading to large economic losses. The report highlights shortfalls in the estimation of the cost as those without toilets, particularly women, will be obliged to find a private location for urination as well. Shimi *et al.,* (2010) indicates that as an adaptation measure during floods disasters in Bangladesh, 48 per cent people practiced defecation openly using boats or floats, 42 per cent built temporary hanging latrines, which were connected to water bodies and the rest (7 per cent) shared neighbors' or relatives' latrines that were useable. Furthermore, other adaptation measures related to toilet use are defecation/ urination was postponement and use of home toilets. The avoidance of toilets may contribute to a higher risk of associated continence-related issues like urinary tract infections (Jasper *et al*., 2012).

Student's behavior also influenced toilet access and utilization in EAUs. Some students use the toilet despite their status by stepping on toilet seat or defecate in the open around the toilet area. Nearby bushes were also being used for defecating and urinating especially by male students compared to female students who did not adapt to similar adaptation measures due to lack of privacy and need for high self-respect and esteem. These results are consistent with (Kwiringira *et al*., 2014). Other students used toilets in the neighbourhood communities. For example, students may be attracted to guesthouses, restaurants with better water and sanitation facilities not only to have their meals and drinks in those places but also to taking time to ease themselves.

On water usage, students bought water from water vendors or collected water from unhygienic sources like burst pipes without any treatment/purification, stored water in containers and bought water for drinking and for other uses. Similar adaptation measures are cited by authors like (Checkley *et al*., 2004; Shimi *et al*., 2010; Magan *et al.,* 2010; Regmi, 2015; and Nastar, 2014**)** in various studies related to water, sanitation and health in Tanzania. Factors contributing to gender disparities in access to and utilization of toilets at both Universities include distribution of water, toilets and their status. This finding supports that of (Moe *et al*., 2006; and Kebirungi *et al*., 2015). The authors found that the problems with water quality in the distribution systems were serious in middle income and developing countries due inadequate resources to maintain the distribution system infrastructure and disinfectant residual. Other factors include; gender neutral culture of infrastructural management and maintenance; non-existence of gender specific water and sanitation policies and legal frameworks in institutions of higher education; gender neutral expansion of institutions of higher education; naturalizing and universalizing of institutions of higher education; gender inequalities and political choices of distribution of financial resources in institutions of higher education; lack of gender disaggregated data and information on water and sanitation in Universities; increased demand for higher education and lack of gender responsive sanitary materials and student's practices (Kebirungi *et al*., 2015).

Students in the selected East African Universities perceived severe water and sanitation deficiencies. From a distributional perspective, there is an apparent gender inequality in availability, acceptability and accessibility to water and sanitary facilities and services (Kebirungi *et al*., 2015 and WHO, 2009). In relation to the social dimension of the apparent gender inequality is tightly linked with the political to control water and sanitary facilities by actors in the studied Universities. Provision of proper water and sanitary facilities on campus is vital in protecting students especially female students from diseases and unhealthy environment. Access and utilization of water and sanitation resources in EAUs have not been perceived by students as a right or opportunity to use, manage, control or to contest the current inadequacies (Kebirungi *et al.,* 2015). The exclusion of students in the water and sanitation management politics exacerbates gender inequalities in terms of social, economic and technical choices especially for female and students with special needs in EAUs. Apparently, limited access to and utilization of sanitary facilities are not designed to meet adequate but unique needs of female and male students. The facilities do not ensure students privacy, safety and dignity and to safeguard the welfare of the facility user's majority of whom are students. Lack of questioning the relationships of obligations and rights, and on improving the capacities of those with responsibilities to respect, protect and fulfill rights (duty bearers) to meet their obligations, and on improving the capacity of those that have rights (rights holders) to claim them is responsible for the perceived water and sanitary inadequacies in EAUs. There is considerable heterogeneity in the studied Universities and water and sanitary resources management is gendered, perpetuates gender inequality and does not promote public health principles.

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CONCLUSIONS AND RECOMMENDATIONS

In light of the above results and discussions it is concluded that male and female students are facing gender differences in access to and utilization of water and sanitation facilities in EAUs, female students being the most affected. Students use a range of adaptation measures to cope with the inadequacy in water and sanitary facilities including moving to other halls of residence, mosques or lecture theatre with water supply and sanitary facilities, buying water from vendors or collecting water from unhygienic sources like burst pipes without any treatment/purification, stored water in containers and bought water for drinking and for other uses. Subsequently this contributes to create boundaries and binaries in both Universities. This situation may affect the academic performance of students, a condition that reflects lack of prioritization of water and sanitation facilities despite the tremendous increment of students registered. It may also be interpreted as hidden socio-political control of water and sanitation facilities. This is a violation of United Nations goals of promoting gender equality, health and human rights principles. It is therefore recommended that the issue of water and sanitation facilities in East African Universities be addressed expeditiously. Further research is required to investigate gender concerns of water and sanitation management in institution of higher learning.

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