COMPARATIVE ANALYSIS OF WATER, SANITATION, AND HYGIENE (WASH) SITUATION AMONG PUBLIC AND PRIVATE SCHOOLS IN KIRKOS SUB CITY, ADDIS ABABA ETHIOPIA.

BY: MERKEB DEYASSO HAILE

A THESIS SUBMITTED FOR THE PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE MASTER OF SCIENCE IN FOOD SECURITY AND DEVELOPMENT STUDIES

A THESIS SUBMITTED TO THE CENTER FOR FOOD SECURITY STUDIES, COLLEGE OF DEVELOPMENT STUDIES, ADDIS ABABA UNIVERSITY

UNDER THE GUIDANCE OF

PROFESSOR MOGESSIE ASHENAFI

SEPTEMBER 2021

ADDIS ABABA, ETHIOPIA

DECLARATION

This is to declare that this thesis work entitled “Comparative analysis of Water, Sanitation and Hygiene (WASH) situation among public and private schools in Kirkos sub-city, Addis Ababa Ethiopia.” was submitted in partial fulfillment of the requirements for the award of the Degree of Master of Science in College of Development Studies Addis Ababa University, through the center for Food security is an authentic work carried out by me. All resources of material used for this thesis have been dully acknowledged.

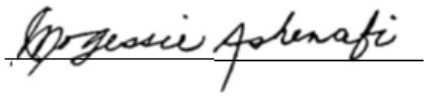
By Merkeb Deyasso Haile

Signature: ----------

Date: ----------

CERTIFICATION

This is to certify that this thesis entitled "Comparative analysis of Water, Sanitation and Hygiene (WASH) situation among public and private schools in Kirkos sub-city, Addis Ababa Ethiopia." submitted in partial fulfillment of the requirements for the award of the Degree of Master of Science in College of Development Studies, Addis Ababa University, through the Department of Food security, done by Merkeb Deyasso is an authentic work carried out by under the university guidance.

Mogessie Ashenafi		12 Nov., 2021
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Head, CFSS	Signature	Date

ABSTRACT

SDGs aim at a universal access to water, sanitation, and hygiene (WASH) and inclusive and effective learning environments for all. With this intention, a comparative study was made between two public and two private schools in two woredas in Kirkos sub-city, Addis Ababa. The problem was raised as schoolchildren lack access to adequate water, sanitation, and hygiene facilities. An objective was set to study the water, sanitation and hygiene facility with a comparison of private and public schools. A checklist based WASH evaluation was made during study visits in the selected schools. A total of randomly-selected 298 schoolchildren were interviewed using a structured questionnaire on their knowledge, attitude and practice (KAP) in water, sanitation and hygiene (WASH) facilities in their respective schools. The responses were analyzed qualitatively and quantitatively. Descriptive statistics, independent sample t-test, and one-way ANOVA were used for comparison and testing hypotheses for the difference of means. Result showed that problems of inadequacy and unavailability of drinking water, sanitation, and hygiene facilities are highly observed inside public schools. The one taking the front was found to be inadequate of drinking water in the school and others like toilet and handwashing facilities reveled. The menstrual management of all schools was found to be poor because of running water shortage inside the toilet which makes it difficult to have safe cleaning of menses. Generally, a comparative analysis was made effective on the variables concerning drinking water facility, handwashing facility, toilet facility, menstrual management, solid waste disposal, adequacy, quality and availability of WASH facility, and education and training towards WASH program among public and private schools. Investment to improve WASH facilities in public schools and education and training in WASH activities in all schools is recommended.

Keywords: *Adequacy, Availability, Hygiene, Sanitation, School, Water*

ACKNOWLEDGEMENTS

Above all, I would like to thank the Almighty God without whose blessing; it would have been not possible for all my wishes to come into reality. I would like to express my deepest gratitude to my advisor Mogessie Ashenafi (Professor) for his marked role in restructuring my work and guiding me through to recent approach study. His insightful comments for the betterment of the whole work were appreciable. My special thanks go to Tesfaldet Esubalew, without his support statistical related works could have not been completed on time. My special thanks also go to the Addis Ababa education bureau, School directors, and other staffs for their collaboration and facilitation during the study are also cordially acknowledged. I also thank the schoolchildren of Biherawi Primary School, Brass Youth Academy, New Grang Primary School and Yelibe Fana Primary School who kindly spared their time and effort and respond with interest to the process of the interview and information about their school WASH facilities.

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ABBREVIATIONS AND ACRONYMS

ANOVA	Analysis of Variance
BPS	Biherawi Primary School
BYA	Brass Youth Academy
CSAE	Central Statistics Agency of Ethiopia
COVID-19	Coronavirus disease
ENN	Emergency Nutrition Network
FAO	Food and Agriculture Organization
KAP	Knowledge, Attitude and Practices
MoE	Ministry of Education
NGOs	Non-Governmental Organizations
NGPS	New Grand Primary School
OWNP	One Wash National Program
SDG	Sustainable Development Goal
UN	United Nations
UNICEF	United Nations International Children's Emergency Fund
USAID	United States Agency for International Development
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization
YFPS	Yelibe Fana Primary School

CHAPTER ONE

INTRODUCTION

1.1. Background of the study

Appropriate Water, Sanitation, and Hygiene (WASH) facilities are required to address the sustainable development goals (SDG), namely Goal 4, to ensure inclusive and quality education for all and promote lifelong learning and Goal 6, to ensure availability and sustainable management of water and sanitation for all. The later one is also important for satisfying the 'use and utilization' pillar of food security. Household Food insecurity and poor WASH practices are identified as key underlying causes of illnesses that could result in malnutrition (ENN, 2016). If drinking water is not safe, it causes parasitic and bacterial diseases such as diarrhea and also contaminates hands and food utensils that pass pathogens to food (Mills and Cummings, 2016).

Food- and water-borne pathogens cause diarrhea which leads to malnutrition through electrolyte loss, hampering of absorption of nutrients and loss of appetite, finally weakening the immune system (WHO, 2017). Weakened immunity renders a child susceptible to diarrhea forcing it to go into the diarrhea-malnutrition-diarrhea vicious cycle (WHO/USAID/UNICEF). Unsafe sanitation and hygiene, and shortage of access to clean water create fertile ground for waterborne disease.

In Ethiopia, most schoolchildren have problems with access to clean water, sanitation, and hygiene in schools. According to UNICEF (2010), 30% of schools in Ethiopia did not have access to WASH and some of them had a toilet which were unclean, not comfortable to use and without proper handwashing facilities. In Addis Ababa also, there is a problem of inadequate access to WASH facilities in schools (Veenkant et al., 2018).

In many areas, school children are affected by health- and nutrition-related problems that constrain their ability to thrive and limit their ability to attain their education potential. These inadequate nutritional conditions, highly prevalent in several Ethiopian regions, are all believed to lead to impaired cognitive ability (MoH, 2017). These are mainly caused by problems that affect availability, adequacy and accessibility of clean water, sanitation, and hygiene in schools. When schoolchildren are affected by water-borne diseases, such as

diarrhea, their nutritional status is hampered and they lose the ability to attend classes and follow lessons attentively. .

Girls face additional challenges in accessing usable and appropriate WASH facilities. WHO (2015) estimated that 50% of malnutrition was associated with repeated diarrhea or intestinal worm infection as a result of unsafe water, inadequate sanitation, or insufficient hygiene. The undesirable outcomes of poor access to WASH in schools goes beyond the school environment as infected schoolchildren also transmit them to their families and also communities

Water and sanitation services are inadequate in many schools around the world. As a result, teachers and schoolchildren are forced to teach and learn in potentially hazardous environments (Snel et al., 2000). Because schoolchildren are spending more of their time at school every day, the status of school WASH impacts the health of schoolchildren, affects educational status and dignity, especially for girls. (UNICEF, 2020). Appropriate implementation of hygiene and education would supplement the provision of clean water and sanitation (Rahman et al., 2019).

Globally, school-based WASH measures are aimed at minimizing the incidence of diarrhea, increasing school enrolment and attendance, academic performance of schoolchildren, and influencing parent and sibling hygiene activities whereby schoolchildren serve as agents of change in their families (McMichael, 2018)

Schools with sufficient WASH facilities provide a secure water supply, a system that offers clean and adequate water, especially for handwashing and drinking, sufficient number of toilets suitable for privacy, healthy, clean, cultural, and gender-appropriate water usage for schoolchildren and other staff, including some near toilets, and sustained hygiene promotion (WHO, 2019).

As all school-age children are required to attend school in Ethiopia, increase in school enrolment has resulted an increasing demand for clean water, sanitation, and hygiene facilities in the school. But a proportional increase in supply of clean water, sanitation and hygiene facilities remain as challenges (Seid and Kumie, 2013). According to UNICEF (2007), in Ethiopia there was a significant difference in access to WASH facilities between male and female schoolchildren. Latrine to student ratio was 1:170 overall, 1:164 for boys and 1:177 for girls. This was significantly less than the optimal student to lavatory seat ratio

of 1:30 (MoH, 1996). According to recent data from the Ministry of Education (MoE, 2017), elementary schools with improved drinking water supply, upgraded latrines, and hand washing facilities with water and soap accounted for 38%, 38%, and 21%, respectively.

The majority of adolescent girls in most developing countries, including Ethiopia, reported a lack of secure, private, and clean restrooms with washing facilities at their schools, which is critical for menstrual hygiene management (MHM) practices (Tamiru et al., 2015). Girls' school attendance and performance are negatively impacted during menstruation by MHM-related issues (Korir et al., 2018). Despite the increasing global recognition of MHM as a development priority for promoting girls' school attendance, research on it has been too scanty to influence policy and practice in Ethiopia (Tamiru et al., 2015).

The aim of this study was, therefore, to make a comparative assessment of access to WASH facilities among public and private schools in a sub-city in Addis Ababa..

1.2. Statement of the problem

WASH in school programming supports sustainable development goals (SDG) for quality education and clean water and sanitation. Quality education and access to clean water and sanitation is one of the major leading factors to enhanced nutrition and food security and then to development. In most developing countries like Ethiopia, problems of school WASH exacerbate nutrition and food insecurity in the household, in the communities, and also at the country level. Failure to address WASH issues can undermine both nutrition and food security. Undernutrition is directly caused by inadequate dietary intake and/or disease and is indirectly related to many factors, including contaminated drinking water and poor sanitation and hygiene. (Juma et al., 2017). Hence studying WASH in school is important to minimize disease in school and improve nutrition and food security in the household as well as in the country. Improving access to clean water, sanitation, and hygiene in school is among the most important means of creating fruitful schoolchildren.

Considering the important role of WASH in causing food- and water-borne diseases, all schools are supposed to meet an acceptable WASH status. However, there is no study hitherto that compares the WASH status of government and private schools.

In many areas, school children are affected by health- and nutrition-related problems that constrain their ability to thrive and limit their ability to attain their education potential. These inadequate nutritional conditions, highly prevalent in several Ethiopian regions, are all

believed to lead to impaired cognitive ability (MoH, 2017). These problems are mainly caused by a shortage of availability and accessibility of clean water, sanitation, and hygiene in schools. When school children are affected by water-borne diseases, such as diarrhea, their nutritional status is hampered, and they lose the ability to attained classes and understand their lessons properly. A problem of access to clean water, inappropriate methods of removal of solid and liquid wastes, and practicing improper hygiene in school leads to health problems and malnutrition of school children.

Water, sanitation, and hygiene (WASH) related diseases caused by contaminated water can negatively affect the health and nutrition of school-age children. Girls face additional challenges in accessing usable and appropriate WASH facilities. The World Health Organization (WHO, 2015) estimates that 50% of malnutrition is associated with repeated diarrhea or intestinal worm infection as a result of unsafe water, inadequate sanitation, or insufficient hygiene. The problem of access to WASH in schools goes beyond the school children and school environment; it is also transferred to home as well as the community that they live in. In case of inadequate access to clean drinking water, children in school may be affected by waterborne diseases and they transmit them to their families and also communities.

1.3. Objectives

1.3.1. General objectives

To assess differences in availability, accessibility, and adequacy of WASH facility in public and private primary school, in selected Woredas in Kirkos sub-city, Addis Ababa.

1.3.2. Specific objective

The specific objectives to be achieved while meeting the general objective are

- Investigate student's knowledge, attitude, and practices about water, sanitation, and hygiene (WASH) in private and public schools.
- Evaluate availability and adequacy of drinking water to schoolchildren.
- Compare student latrines/toilets in terms of types, cleanliness, and accessibility to schoolchildren of all ages, functionality, gender specificity, and menstrual management.
- Evaluate conformity of handwashing facilities at schools to hygienic standards.
- Assess removal of liquid and solid waste from private and public school compounds.

1.4. Research questions

- What is the WASH status of public and private schools concerning toilets, hand washing facilities, and liquid and solid waste management?
- Do student's knowledge, attitude, and practices in WASH differ among private and public schools?
- Do WASH facilities in the school satisfy the need of schoolchildren, particularly those of girl schoolchildren?

1.5. Significance of the study

Hence the consequence of poor water, sanitation and hygiene (WASH) facilities in schools was found to be very critical in terms of health of school children, clean environment and psychosocial stress especially on female school's children regarding menstrual management. The significance of this study to identify, plan, implement, monitor and evaluate WASH facilities in schools to overcome the above-mentioned problems. From this matter the main findings on school WASH program in private and public schools could be used as a valuable data source for the betterment of WASH program implementation. This study calls governmental authority, NGOs, schools to participate on the proper WASH project to improve the teaching learning environment. This will contribute to have a long-term anticipation and regulatory measures to guarantee health, refining the socio-economic growth (which results reducing poverty). Generally, this study will open the door for other researchers to study the root cause of improper WASH facilities aiming in schools and give remedial as mitigation action. In addition, this study contributes or needed to increase student's knowledge, attitude, and practices about water, sanitation and hygiene (WASH) in school. Consequently, helps student, teachers, families and the community to understand the importance of WASH, use the facility with care and promotes collaboration to different organizations to ensure sustainable reduction of severity and impact of malnutrition, finally have a better place to live.

1.6. Scope and limitation of the study

1.6.1. Scope of the study

The scope of the study is to assess the availability of access to clean water, sanitation, and hygiene in schools of selected woredas in Kirkos sub-city of Addis Ababa, and to examine the effectiveness of the hand wash and cleanness of latrines/toilets that are in the schools

1.6.2. Limitations of the study

The study was limited only to four schools in one of the ten sub-cities of Addis Ababa due to time and financial limitations. Much more complete information might be obtained if the study includes more sub-cities and schoolchildren in Addis Ababa.

CHAPTER TWO

LITERATURE REVIEW

2.1. Water, sanitation, and hygiene (WASH)

Water, sanitation, and hygiene (WASH) are linked to every country's concern about the health of its people. It becomes a citizen's right to obtain clean drinking water, sanitation, and hygiene measures. WASH is one of the most important aspects of human life to live a healthier life. WASH strategies aim to prevent and monitor bacterial, viral, and parasitic transmission. Bad and unprotected access to WASH is a significant factor in the spread of various diseases (Gomathi S, 2018). Water and sanitation services are inadequate in many schools around the world. As a result, teachers and schoolchildren are forced to teach and learn in potentially hazardous environments (Mariëlle Snel, Eveline Bolt & Leonie Postma, 2000).

Every child has the right to have quality education including access to pure drinking water, sanitation, and hygiene (WASH) services in the school. Because schoolchildren are spending more of their time at school every day, the status of school WASH impacts the health of schoolchildren, affects educational status, and also dignity, especially for girls. (UNICEF, 2020). Every child is entitled to have access to clean drinking water and proper sanitation. Appropriate implementation of hygiene and education would supplement the provision of clean water and sanitation (Rahman et al., 2019).

Children with no access to WASH in low-income households are unable to attend school because they are affected by diarrheal disease. Around one-third of schools worldwide do not have a healthy supply of water or proper sanitation, leaving children dehydrated and less able to concentrate, and requiring schoolchildren to use insufficient latrines or to go outside the school grounds to relieve themselves. The presence of a reliable supply of water and safe, working, private toilet facilities for teenage girls may be the difference between dropping out and having an education. In addition, a lifetime of improved health for all children will start with hygiene education at school (UN, 2010).

Sanitation refers to human urine, waste, and proper disposal procedures, while hygiene refers to health and disease. Hygiene and sanitation, on the other hand, aim to build an environment

free of diseases and populated by healthy people. People must practice sanitation and hygiene regularly to achieve this goal.

Globally, school-based WASH measures are aimed at minimizing the incidence of diarrhea, increase school enrolment, school results, and attendance; and other hygiene-related illnesses, and influencing parent and sibling hygiene activities whereby children serve as agents of change in their families and homes (McMichael, 2018). Schools with sufficient facilities for water, sanitation, and hygiene (WASH) provide a secure water supply, a system that offers clean and adequate water, especially for handwashing and drinking, a sufficient number of toilets suitable for privacy, healthy, clean, cultural, and gender-appropriate water usage and handwashing facilities for schoolchildren and other staff, including some near toilets and sustained hygiene promotion (Adams et al., 2009).

School-based WASH approaches have been related to reduced absenteeism, as well as diarrhea and other illnesses. Increasing sanitation facilities by ensuring anonymity, sufficient water access and disposal options for menstrual hygiene products benefits teenage girls, in particular, empowering them and ensuring more equal services Addis Ababa city government, Splash and IRC Ethiopia (2018).

The availability of clean, healthy water in large amounts, as well as adequate sanitary and hygienic facilities, is a critical factor in improving schoolchildren's health, especially in the prevention of diseases that are prevalent in most schools. As a result, a school without running water or sanitary facilities may be a breeding ground for disease (MoH, MoE, WR and UNICEF, 2010).

Many schools in developing countries have insufficient access to water, sanitation, and hygiene facilities (McMichael, 2018). Only 51% of schools had access to sufficient water supplies and only 45% had appropriate sanitation facilities (UNICEF, 2012). Standard guidelines are issued by the Ethiopian Ministries of Health, Education, and Water Resources to ensure that school environments are clean, structurally secure, and accessible for everyone, including those with disabilities and special needs (MoE, 2012).

All institutions in the field of education should ensure compliance with building facilities. Schools will improve health and hygiene messages by offering safe and drinking water and sanitation services, and act as demonstration sites for both schoolchildren and the local community. Especially for young females, separate latrines for girls and boys should be

arranged. Clean water and adequate sanitation facilities are basic first steps for boys and girls towards a stable, safe, and secure learning environment (MoE, 2012).

As a result of school enrolment in Ethiopia, there is an increasing demand for clean water, sanitation, and hygiene facilities in the school. There is also much attention for the increment of schools and all school-age children are required to attend school. But clean water supply, sanitation and hygiene facilities with the proportion of expansion of schools remain to be challenged (Hasen and Abera, 2013).

A lack of access to water, sanitation, and hygiene (WASH) has a major impact on human health including:

- Diarrhea is a leading cause of death in children under the age of five worldwide (Liu L et al., 2012), and its persistent presence in low-income settings can contribute significantly to malnutrition
- Around two billion people are infected with parasitic infections like soil-transmitted worms, which are spread by a lack of sanitation and hygiene, while an estimated four and a half billion people are at risk of infection (Brooker S et al., 2006). Anemia stunted physical growth, and impaired cognitive development may all result from such infections (Ziegelbauer K et al., 2012).
- Nutrition-related factors such as low birth weight, stunting, and extreme wasting account for about a third of all child deaths, all of which are linked to a lack of access to water, particularly sanitation and hygiene. Owing to inadequate waste management and a lack of sanitation, many children in developing countries suffer from stunting, which is caused by severe food deficiencies and repeated ingestion of animal and human faces (Water aid, 2015).

2.1.1 Drinking water

The global population has grown exponentially from 7 billion to over 9 billion by 2050, freshwater use for human use, livestock, manufacturing, and other purposes has increased six-fold. Food production would have to double to feed an ever-increasing population, but the amount of available water and arable land will remain unchanged (Global Water Partnership, 2017). Everyone requires clean water in sufficient amounts for drinking, cooking, personal hygiene, and sanitation without jeopardizing their health or dignity. As a result, humans have a fundamental human right to healthy, clean, and freshwater (Megersa Olumana, 2018).

In Ethiopia, a statewide evaluation of school Water and Hand Washing Sanitation (WASH) facilities revealed a relatively low coverage rate of 32.5 percent in drinking water facilities (UNICEF, 2007).

Even though clean drinking water and sanitation are critical components of good health, 800 million people around the world still lack access to them, and 2.6 billion do not have access to sanitary facilities. In developed nations, these deficits are to blame for 80% of illnesses. In both rural and deprived urban areas, efficient and environmentally friendly wastewater collection and garbage disposal are the exceptions (UNICEF, 2014). Human development and well-being need clean drinking water and sanitation. Inadequate access to healthy drinking water, on the other hand, threatens people's safety and health by causing water-borne diseases and chronic intestinal infection (The Guardian, 2015).

Fresh water in adequate quantity and quality is important for all aspects of life and growth. Water and sanitation are human rights that are generally accepted by member states. Water supplies are essential to all types of production, including agriculture, manufacturing, and energy generation, as well as the maintenance of healthy ecosystems" (UN, 2018).

Poor water access can jeopardize food security at the household level due to several factors including poor hygiene; the consumption of unsafe drinking water, valuable time spent collecting water, and a loss of income due to a lack of productive water. However, when infrastructure is damaged, or crops and livestock are flooded, too much water may affect food security. According to a review of the literature, there are few objective assessments, and connections between watershed security and livelihood results are often inferred rather than rigorously tested. When the effects of watershed conservation on development, livelihoods, and food security were analyzed, the results were mixed, as they can have negative hydrological and downstream implications, as well as build winners and losers. Both inside and between watersheds, there are winners and losers. Watershed conservation and sustainable land and water management practices, on the other hand, may make a significant contribution to increasing food production and resilience if they are tailored to the particular context and implemented alongside policies that address other causes of food insecurity and poverty (Eva Ludi, 2017).

2.1.2 Toilet

According to the UNICEF, 2007, in Ethiopia there is a significant difference in access between male and female schoolchildren (latrine to student ratio): 1:170 overall, 1:164 for

boys and 1:177 for girls. This is significantly less than the national average. This is significantly less than the optimal student-to-lavatory-seat ratio of 1:30 (MoH, 1996).

It's in the best interests of schoolchildren and schools to maintain clean, hygienic and enjoyable restrooms. Open access to high quality toilet facilities is vital to kids' health and well-being. Toilets that are clean and well-maintained can have a good impact on schoolchildren' willingness and aptitude to learn, as well as their behavior, morale, and attendance. The following statistics depict the current state of WASH in schools. According to current data from the Ministry of Education (2017), elementary schools with improved drinking water supply, upgraded latrines, and hand washing facilities with water and soap account for 38 percent, 38 percent, and 21 percent, respectively. In secondary schools, enhanced water supply and latrine facilities are available to 63 percent and 54 percent of schoolchildren, respectively. The rate of non-functionality of these facilities is relatively high, ranging between 10% and 19%. Some of the facilities' services have been disrupted due to damage, a lack of a water supply system, or robbed components.

Toilet blocks must be easily accessible to pupils and allow for passive staff surveillance without invading privacy. Except in the event of individual cubicles designed for the sole use of one kid at a time, separate blocks for girls and boys aged eight and up must be available. Secondary school schoolchildren must have access to proper changing facilities and showers during PE classes. Staff restrooms should be kept separate from student restrooms, while disabled restrooms can be used by schoolchildren, staff, visitors, and volunteers (Paul Thorn, 2017).

2.1.3 Hand washing facilities

Hand washing is the act of washing hands with water and ordinary or antibacterial soap to avoid the transmission of contagious diseases. Because the skin is the body's first line of defense against bacteria, proper hand care is an important aspect of any hand hygiene program. Dermatitis, fissures, wounds, and abrasions can trap bacteria and make hand hygiene difficult (Core H., 2002). Given Ethiopia's expanding school enrollment, there is a growing demand for school hygiene and sanitation services. A safe school atmosphere is essential for promoting education and instilling improved life skills in schoolchildren. Despite the focus on expanding schools to reach all school-aged children in Ethiopia, focusing on school hygiene and sanitation remains a challenge (Hassen Seid and Abera

Kumie, 2013). Hand washing stations must be near every toilet, and washrooms must be adequately illuminated and ventilated.

Poor sanitation is a major factor in the spread of communicable diseases in developing countries. Despite the fact that there is a lot of evidence that hand washing is effective, there are still a lot of people who don't wash their hands. In most developing countries, like Ethiopia, the practice of using soap at all essential times is weak. Children, who are at high risk for diarrheal illnesses and other hygiene-related issues, are not widely explored (Alula Seyum et al., 2018).

A reliable water system that provides safe and sufficient water, particularly for hand-washing and drinking; a sufficient number of private, safe, clean, and culturally and gender-appropriate toilets for schoolchildren and teachers; water-use and hand-washing facilities, including some near toilets; and sustained hygiene (WHO and UNICEF, 2009)

2.1.4 Menstrual hygiene management (MHM)

Menstrual hygiene management (MHM) is a challenge for many schoolgirls in poor nations. Women and adolescent girls using a clean menstrual management material to absorb or collect blood that can be changed in privacy as often as necessary for the duration of the menstruation period, using soap and water for body washing as needed, and having access to facilities to dispose of used menstrual management materials (WHO,2012).

The majority of adolescent girls in most developing countries, including Ethiopia, reported a lack of secure, private, and clean restrooms with washing facilities at their schools, which is critical for MHM practices (S. Tamiru et al., 2015). In many school environments in underdeveloped nations, MHM is hampered by a lack of water, sanitation, and hygiene facilities. Girls' school attendance and performance are negatively impacted by menstruation and MHM-related issues (E. Korir, F. N. Okwara, and G. Okumbe, 2018).

MHM is still one of the most serious issues that Ethiopian schoolgirls encounter while in school. Despite the huge issues associated with menstrual hygiene, the water, sanitation, and hygiene (WASH), sexual and reproductive health, and education sectors failed to pay enough attention. Ethiopia is a country with a great deal of sociocultural variety and taboos that influence MHM practices. As a result, identifying MHM practices is critical in order to intervene appropriately (Hussein M, 2020). Only addressing the availability of resources will not be enough to fix the problem in the long run. We need a holistic approach that addresses:

girls' knowledge, attitudes, and practices; sanitary materials supply; policy environment; and physical infrastructure. Menstrual hygiene management is becoming more widely recognized as a development priority for promoting girls' school attendance. However, little research has been done and there have been few actual case studies to influence policy and practice (Selamawit Tamiru, 2015).

2.1.5 Solid and liquid waste management

All sectors of the economy generate waste. Every individual has the potential to generate waste. It dates back to the beginning of human history. Transporting rubbish away of residential areas was formerly the primary priority of authorities in order to reduce the health implications of waste. Solid waste management is a major challenge for Ethiopia, as it is for other developing countries. This is largely attributable to population expansion and fast urbanization. Many communities across the country lack the financial and institutional resources to build the municipal infrastructure required for effective solid waste management (Dagnew et al, 2012).

2.2 Conceptual framework

A sustainable student-friendly school WASH facility is basic for better nutrition and food security. It is directly related to clean, safe, adequate, and inclusive water supply, improved and inclusive latrine/toilet with health work facilities. Life-skill health education for hygiene behavior change and menstrual hygiene management practices, capacity building of schoolchildren, teachers, school supervisors, and parent, teacher, and student associations are also important for better nutrition and food security. Additionally, the proper way of solid and liquid waste removal mechanisms leads to a clean, safe, and pollution-free environment.

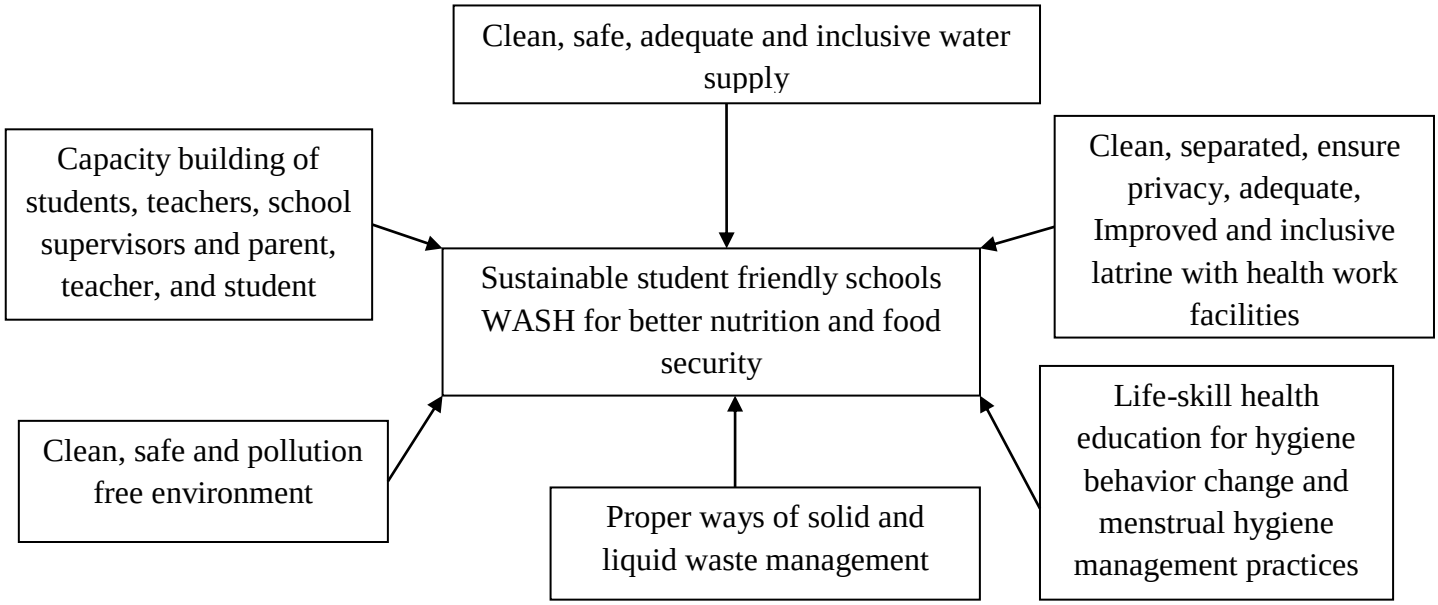

Figure 1: National School WASH Strategy and Implementation Action Plan

Source (MoE, 2017)

CHAPTER THREE

METHODS AND MATERIALS

3.1. Description of the study area

The study was carried out in selected woredas, woreda 08 and 09 of Kirkos sub-city Addis Ababa, the capital city of Ethiopia. According to UN data, the city population in 2021 is estimated at 5,005,524 people (World Urbanization prospects, 2019). It has a total area of 527 square kilometers. Kirkos sub-city is one of the eleven sub-cities of Addis Ababa. It is located at the Centre of Addis Ababa. Kirkos sub-city covers a surface area of 1472 ha and has a population size of about 220,991 (CSAE, 2007). The sub-city has eleven Woredas which contain a total of 45 primary schools, 24 private and 21 public primary schools. It also has seven private and five public secondary schools. In woreda 08 and 09 of Kirkos sub-city there are three public primary schools, three private primary schools, one public secondary school, and 1 private secondary school. Yelibe Fana Primary School and Brass Youth Academy are found in woreda 08 whereas Biherawi Primary School and New Grand School are found in woreda 09, Kirkos sub city Addis Ababa.

Yelibe Fana Primary School is a public school, located in Kazanchis, woreda 08, Kirkos sub-city, Zewditu Street. Brass Youth Academy is a private school, found in Kazanchis, woreda 08, Kirkos sub city, Zewditu Street. Biherawi Primary School is a public school located around Flamingo road, about 100m from the back gate of the Exhibition center, woreda 09, Kirkos sub city. New Grand Primary School is a private school, found about 300m west of Riche, woreda 09, Kirkos sub city.

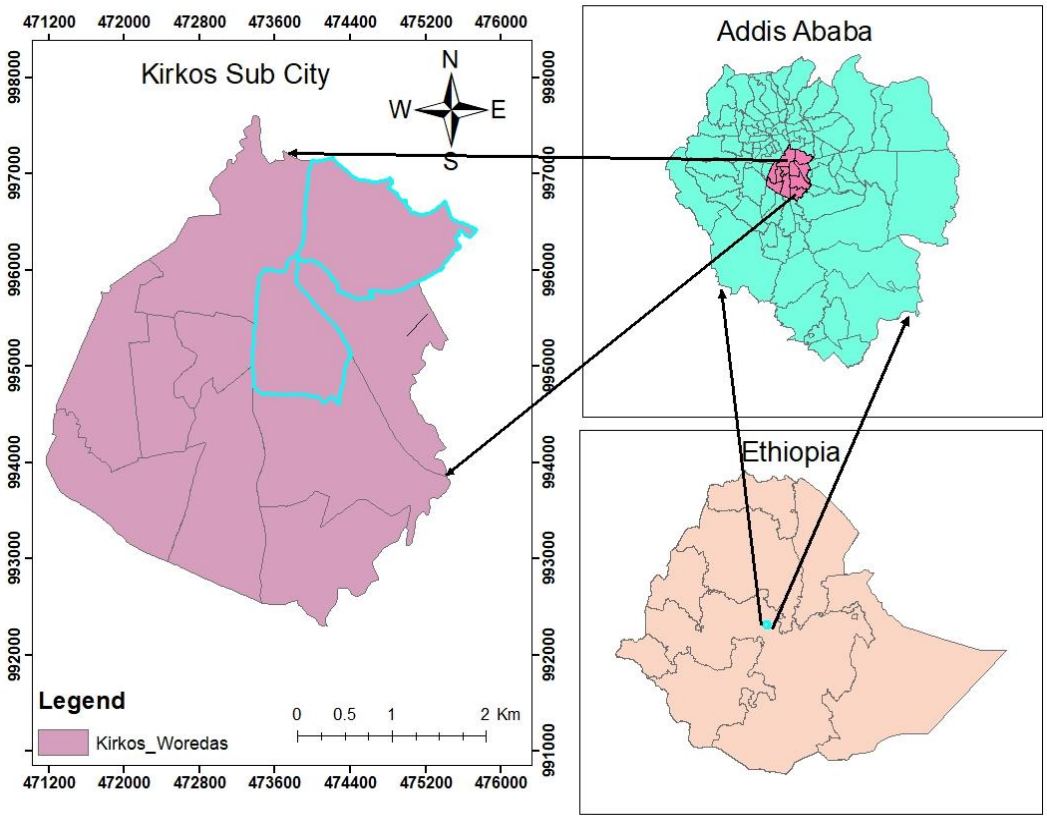

Figure 2: Geographical Maps of Ethiopia, Addis Ababa, and Kirkos Sub City.

Source (Own drawn, 2021)

3.2. Data source and study population

3.2.1. Data source

The study employed both primary and secondary sources of data to achieve the objectives stated above. Primary data on schoolchildren' knowledge, attitude, and practices about WASH in school, conformity of handwashing facilities at schools, and removal of liquid and solid wastes from school compounds was collected through structured questioner interviews with schoolchildren and staff in the selected schools. Moreover, secondary data was also collected from different sources, such as; reports from schools, books, research papers, different journals, publications, online sources, etc., was also used for completeness.

3.2.2 Study population

This study investigated the student's perception about WASH, availability, accessibility, and adequacy of drinking water in the school, student latrines/toilets in terms of types, cleanliness, and accessibility to schoolchildren. The study population included schoolchildren

and staff in the selected schools in the selected woredas. This led to inclusive research that focused on providing information for functional needs with school WASH facilities.

3.3. Research strategy and design

Quantitative analyses were used for both descriptive and inferential statistical techniques to describe means, percentages, frequencies, coefficient of variance, and standard deviations. The qualitative analyses were used for interpretations, comparisons, and arguments.

3.4. Eligibility criteria

- Included criteria; the study was employed in woreda 08 and 09 of Kirkos sub-city; it included four primary schools, two private and two public primary schools in the selected woredas. Schoolchildren in grades five to eight in the selected schools were considered.

- Excluded criteria; in woreda 08 and 09 there are six primary schools three private and three public primary schools. Of this, the study excluded two schools, one public, and one private primary school. Schoolchildren in grades one to four in the selected schools were excluded from the study.

3.5. Sampling techniques

The study was conducted in two purposively selected woredas based on logistic reasons. These are Woredas 08 and 09 of Kirkos sub-city, Addis Ababa. Two primary schools in each woreda (one public and one private school) were purposively selected based on the total number of schoolchildren per school. Schoolchildren from grades five to eight were randomly selected. Quantitative data were collected by using a structured questionnaire from randomly selected schoolchildren and stakeholders in the schools. Site observation was also made at schools to observe the water and sanitation facilities and to see the sanitation status of the school environment. Secondary data was also collected from different sources.

3.5.1. Sample size determination

The sample size was determined by using the simple random sampling techniques of Yamane (1967). It is a mathematical estimation of the number of subjects/units to be included in a study.

$$n = \frac{N}{1 + N(e)^2}$$

$$n = \frac{1169}{1 + 1169(0.05)2}$$

$$n = \frac{1169}{3.92} = 298$$

Where, n = required sample size,

N = total students,

e = expectation error (5%)

Total number of students (N) = 1169

Expectation error (e) =5% = 0.05

$$n = 298 \; Non - response \; 10\% = 298 * 10\% = 29.8 = 30$$

There were four schools with a total student number of 1169 (grade five to eight). The sample size was 298 schoolchildren. The sample size was proportionally distributed among schools, the school sample size was also distributed evenly among grades, and the grade sample size was distributed evenly among sexes (rounded off towards girls as they have a slightly higher number).

For data to be obtained through WASH observation at a school, facilities were considered with respect to the total number of schoolchildren in the school.

Table 1: Sample size distribution among schools, grades, and sex.

Kirkos Sub-city	**School**	**Type**	**Total student number**	**Grades 5 to 8**	**Proportional allocation**	**Sample size per grade**
Woreda 8	YFPS	Public	1126	557	142	36 (17M, 19F)
	BYA	Private	284	169	43	11 (5M, 6F)
Woreda 9	BPS	Public	670	325	83	21 (10M, 11F)
	NGPS	Private	328	118	30	7 (3M, 4F)
Total			2408	1169	298	TOTAL

3.5.2. Tools and techniques of data collection

Primary data was collected from the schoolchildren and other staff of the schools through interviews by using a questionnaire. The other major activities during data collection were the observation of different WASH facilities, WASH-related factors affecting student's health in the schools, while secondary data was collected through literature review and document analysis. Questionnaires were tested before implementation and an interview schedule was employed.

3.6 Study Variables

3.6.1 Independent variables

The independent variables in the study were clean, safe, adequate, and inclusive water supply, clean, separated, ensuring privacy, adequate, improved and inclusive latrine with health facilities, life-skill health education for hygiene behavior change and menstrual hygiene management practices, proper ways of solid and liquid waste management, clean, safe and pollution-free environment and capacity building of schoolchildren, teachers, school supervisors and parent, teacher, and student associations.

3.6.2 Dependent variables

Sustainable student-friendly schools WASH facilities for better nutrition and food security.

3.7 Data quality management

The study employed both qualitative and quantitative data types. The qualitative data type encompassed schoolchildren' perceptions towards school WASH. Whereas the quantitative data type focused on availability, accessibility, and adequacy of drinking water, student's latrine/toilet in terms of types, cleanliness and accessibility to all schoolchildren, accessibility to handwashing facilities at schools, and removal of solid and liquid wastes from school compounds. During interviewing the researcher was directly involved and followed up and consult the enumerators.

3.8. Techniques of data analysis

After the questionnaires were filled by schoolchildren, the data was encoded on SPSS software version 26. The encoded data were used to run different descriptive statistics, hypothesis tests, mean differences among the public and private schools. The study employed both qualitative and quantitative analysis techniques. The qualitative analyses used interpretations, comparisons, and arguments. The quantitative analyses used both descriptive and inferential statistical techniques. ANOVA test was employed to compare private and public-school means. The collected data was compiled, edited, and then analyzed using descriptive statistics and the data were analyzed by using SPSS for windows version 26.

CHAPTER FOUR

RESULT AND DISCUSSION

4.1. Result

4.1.1. Description of water, sanitation and hygiene status of schools.

The water, sanitation and hygiene status of the schools considered in this study were assessed during a study visit made by the researcher on the various facilities. The following are the findings of the observation.

Drinking water: All schools, in this study, got their water supply from the distribution system of the city's municipal water, which is expected to meet the standards of potable water. However, drinking water was not available during the time of study visit in one public school (Biherawi Primary School). Drinking water was available in all schools in the two weeks prior to the study visit but not throughout the school day in one public (Biherawi Primary School). Although interruption of water supply from hours to days was common in all parts of the city, water supply was never interrupted in one public school (Yelibe Fana Primary School) supposedly because it got water from an old line which supplied water to the Palace. On the other hand, water was not available for less than 30 days in both private schools (Brass youth academy and New Grand Primary Schools) and for more than 30 days in the other public school (Biherawi Primary School) throughout the school year. In both private and public schools, access to drinking water point of source was largely compromised for schoolchildren with limited mobility and vision, although points of water source were accessible to the smallest schoolchildren in all schools. There were varying amounts (21 to 54) of drinking water points in the different schools. However depending on the total population of schoolchildren who used these points of drinking water source, the proportion was between eight and nine school children served by one point of source, whereas in the case of public schools, the proportion was 12 to 53 school children per a point of source.

Regarding the effort of schools to make drinking water safe, none of the four schools make any treatment methods like (Filtration, boiling, chlorination, solar disinfection, ultraviolet disinfection, and others) after the water was released from the main source through the pipes inside the school premises. This is because all the schools are found around the center of Addis Ababa so the drinking water supplied by the city municipal water authority was found

to be chlorinated and already made safe for drinking. So, it was not necessary to carry out further filtration. The above-mentioned reason was also found to be the consequence for all the schools did not know whether the water source was compliant with national standards for drinking water or not.

Handwashing facilities:. All schools had handwashing facilities, but the soap was available along with water only in the private schools (Brass Youth Academy and New Grand Primary School). Both public schools (Biherawi Primary School and Yelibe Fana Primary School) does not provide soap for washing hand. Handwashing facilities with water and/or soap were located in toilets only in one private school (New Grand School) whereas they were available in the school yard within all schools this was observed during the time of the survey. While both the private schools provide detergents for handwashing with a clean hand wash facility and consistent running water at the precise moment. The current handwashing facilities were also accessible to the smallest children in school. Although, there is no record of schoolchildren with limited mobility and vision it would be difficult for schoolchildren with limited mobility or vision to use the current WASH facility as it is. It was justified by Enfield and Girma on their report on inclusiveness of disabled on the WASH facility stating that every child has the right to be treated equally, the wash facility should have been constructed considering schoolchildren with disabilities (Enfield, 2018, Girma, 2013).

Handwashing facilities with water and soap are located at the school were quantified for all public and private schools. One of the public schools (Biherawi Primary School) has in total 54 taps for handwashing but only 10 of the tap heads have soap. While the other public school (Yelibe Fana Primary School) has in total of 21 taps but only 10 of them have soap around the tap for washing. The same as public schools, private school (Brash Youth Academy) has 32 tap heads and 14 of them have soap currently available at the time of the survey. Whereas the New Grand Primary School has 31 taps but only 13 taps have soap near the washing heads. The only reason for the soaps is put around the washing facility was found out to be the spread of coronavirus (COVID-19). Ethiopian ministry of education and WHO endorsed directions before the opening of the school term to fulfill the handwashing facilities water and soap to all washing stations at the entrance, cafeteria, toilets, and at the school premises. Even though some soap was available on but they are not changed or refilled when they are exhausted. This was further justified by a report made by WHO and UNICEF in 2020 on hygiene baselines pre-COVID-19 targeting Africa counties including

Ethiopia. The report stated that out of the four schools available in Africa three of them do not have handwashing facilities without water and soap.

Efforts for the enhancement of the handwashing trend in the school were judged by asking a question whether there was a group handwashing activity conducted for all schoolchildren or not. All the schools do not have a group handwashing activity within the week. However, the only time that there will be a group handwashing activity is on the international handwashing day. According to UNICEF and WHO the previous handwashing day was held in Addis Ababa city and schools with a theme of "I wash my hands properly to save lives,". In all the schools it was mentioned as on that day both at the morning and afternoon sessions the hand washing day was celebrated. The occurrence of COVID-19 pandemic also forced each student to wash their hands with attention. Regular handwashing activities were recommended by the ministry of health (MOH), UNICEF and WHO to ensure hand hygiene practices with continued practice to save lives from the coronavirus.

Toilets: Student toilets in all schools were of the flush or pour-flush type. The toilets available are proportioned with the number of schoolchildren available was found to be (Number of toilets: Number of schoolchildren) 1:37 for Biherawi Primary School, 1:94 for Yelibe Fana Primary School and the private schools were found to be 1:36 for Brass Youth Academy and 1:14 for New Grand Primary School. This result showed both the first public schools have a high number of schoolchildren for one toilet than the private schools. This implies even though the number of schoolchildren available is less; private schools provide sufficient room for toilets for their schoolchildren. While both of the public schools provide an insufficient room of toilets for the schoolchildren as justified with the proportion (Number of toilets: Number of schoolchildren).

Figure 3 Toilet facilities in both public and private schools

Source (Author)

As far as gender of schoolchildren is considered, the toilets were separated for boys and girls. This was observed for all private and public schools. According to the manual prepared by Ministries of Health, Education and Water Resources in collaboration with UNICEF the hygiene facility inside the school should have considered the needs of both boys and girls inside the school. This could be the reason to establish privacy and a healthy learning environment so as schoolchildren will use toilets and confidentiality and without frightening. Even though, Birdthistle and co-authors recommended that the separation of toilet especially will help the girls, because of the menstrual and other hygienic conditions (Birdthistle et al., 2011).

Student toilets were cleaned at least once a day in all schools, although toilets in public schools were somewhat or not clean during the time of visit. There was, at least, one useable toilet accessible to the smallest children in only one private school, but none for children of limited mobility or vision in all schools. Except in one private school (New Grand Primary School), where toilets for schoolchildren were located within the school building, in the remaining schools, they are located within the school premises.

Fully functional lighting in toilets and appropriate anal cleansing materials were observed missing all public schools. Most of the light bulbs were broken and malfunctioned. On the contrary, only private schools have fully functional lighting in toilets and appropriate anal

cleansing materials in all the toilets available inside the school premises during the survey visit. From the hygiene trends which were found to be appreciable was septic tanks in all schools were emptied when they filled up.

Menstrual hygiene management: The menstrual hygiene management of the schools among public and private were assessed. For menstrual hygiene management, inside both of the public schools (Biherawi Primari School and Yelibe Fana Primary School) girl's toilets no water is available. Whereas public schools (Bras Youth Academy and New Grand Primary School) had only water inside the girl's toilet for MHM. These shows all the schools will not provide both water and soap for girls during their menstrual spell. A national baseline report by UNICEF in 2017 on menstrual hygiene management in Ethiopia from six regions stated that the reasons for having very poor menstrual hygiene management in schools was found to be because of the inadequacy of water in schools toilets (in which it does not even sufficient for daily drinking consumption), dirty and malfunctioning of toilets, absence of handwashing facilities and lack of confidentiality for girls are the reasons for poor menstrual management. The aforesaid reasons on the report were justified during the time of visit inside the schools especially in public schools there is no water inside the toilet which results in the toilets to be filthy.

Menstrual hygiene wastes were disposed of by the city municipal assigned personnel every week with other paper and hard wastes for the one public (Biherawi Primary School) and one private school (New Grand Primary School). Menstrual hygiene wastes would be first dumped inside a dust bin then will be deposed by the city authority All schools did not have covered bins for disposal of menstrual hygiene waste. There were other disposal mechanisms for such wastes in all schools except in one public school. On the other hand, one private school (Brass Youth Academy) has a trend of incineration of menstrual hygiene wastes with others school's hard wastes inside an incineration chamber build from brick. Despite the fact, one of the public schools (Yelibe Fana Primary School) does not have dust bins to collect menstrual hygiene wastes. So, girl schoolchildren will be forced to dump the waste inside the toilet hole or pit. Since Yelibe Fana Primary School used Pit latrines without a slab, during the hole of the toilet got full the menstrual pad will be visible from outside and causing smell and blockage.

Provisions for menstrual hygiene management (MHM) availability were also assessed among the public and private schools. Both the public schools (Biherawi Primary School and Yelibe

Fana Primary School) had a trend of supplying female menstrual hygienic pads. Sanitary pads will be provided for each girl who is alleged to face a menstrual cycle. The providing was found to be one pack per student once a month by nongovernmental organization. Both private schools do not supply any hygiene management sanitary pads for their schoolchildren regularly. However, Brass Youth Academy provides sanitary pads for their schoolchildren via the girls' club available in the school for the girls in need. On the other hand, the New Grand Primary School will offer menstrual hygiene management as training and education for girls in the counseling department. According to the review which is part of a study made by Belayneh and Mekuriyaw the education on menstrual management should be strengthened for girls because girls who have a better considerate of menses tend to have a safe and clean way of managing their menstrual bleeding. This results that poor menstrual hygiene practice can be a reason for hygienic or health-related disorders like reproductive and genitor-urinary tract infection, cervical cancer. It also can increase school absenteeism, or drop-out, poor academic performance, lower self-esteem, and poor quality of life (Belayneh and Mekuriaw, 2019).

Solid waste: Solid waste like trashed papers, toilet papers, and menstrual hygiene management wastes are collected by a municipal waste collection system in one public school (Biherawi Primary School) and one private school (New Grand Primary School). In one of the public schools (Yelibe Fana Primary School) solid wastes except for toilet paper and menstrual hygiene management wastes are also collected by the same method. However, one private (Brass Youth Academy) school incinerate wastes in the school premises inside a separated chamber shown in Figure (6) Although, it was the quickest way to dispose of waste, it pollutes the environment since the outer layer of sanitary pads are non-biodegradable plastics like polypropylene, tend to cause toxic gases which enhances pollution (Kaur et al., 2018).

Figure 4: Waste incineration chamber in Brass Youth Academy

Source: Author

All in all, the above discussion points focused based on the observational questions indicated on (Appendices A, Table 8) clustered based on the information's drinking water facility and quality, handwashing facility, toilet facility, menstrual management, solid waste disposal, adequacy, quality, availability of WASH facility, and, education and training towards WASH program. There were also similarities and differences among private and public schools included on this study, in which some of the good trends and practices should be taken as a point of reference to implement the practices in both private and public schools in order to have a sustainable WASH facility in the schools.

4.1.2 Sample respondents by sex

Based on the methodology proposed in the previous section, questionnaires were distributed to four different schools found in "Woreda" 08 and 09. Two of them are public and two are private schools. Form each school, proportional samples were taken for studying the research questions and meet the objective of this qualitative and quantitative study. The descriptive statistics of sample size are illustrated below.

Table 2: School names, types and study population by gender

		No of school children		Total
School Name		**Males**	**Females**	
Yelibe Fana Primary School	Public	68	74	142
Bherawi Primary School	Public	42	41	83
Brass Youth Academy	Private	23	20	43
New Grand Primary School	Private	12	18	30
			Total	298

The target schools were found in Kirkos sub-city "Woreda" 08 and 09 (Table 2). From Yelibe Fana Primary School 142 (68M and 74F) schoolchildren were considered. The second public school was Biherawi Primary School and 83 (42M and 41F) schoolchildren were selected. From the private schools, Brass Youth Academy and New Grand Primary School, 43 (23M and 20F) and 30 (12M and 18F) schoolchildren were selected, respectively. (Appendix B).

4.1.3. KAP of students on School WASH

Knowledge in water sanitation and hygiene was assessed in terms of reasons to wash hands and actions to take to make water safe for drinking. Most respondent students (80-84%) from both public and private school had a good knowledge about reasons for washing hands. However, regarding the actions to take to make water safe for drinking, 30-46% of schoolchildren in all schools did not know the correct actions that can eliminate harmful germs from drinking water. Total average knowledge among all schoolchildren in all schools was 57-65% (Table 3).

Table 3: Total knowledge, attitude and practice of among school children in public and private schools on school WASH.

	BPS (N=83)	**YFPS (N=142)**	**NGS (N=30)**	**BYA (N=43)**
	%	**%**	**%**	**%**
PERCEPTION				
Drinking water is safe to drink	41	44	67	77
Quality of water can affect health	39	35	57	84
Toilet facilities in school are good	62	83	79	78
Water facility in the school adequate to meet daily drinking requirements	16	50	73	56
Soap is provided outside the toilets for washing hands	8	3	60	35
School provides education on water, sanitation and hygiene	48	57	77	88
Total average positive perception	*34*	*48*	*72*	*64*
KNOWLEDGE				
Reasons to wash hands	84	80	83	84
Action to take to make water safe for drinking	46	45	30	35
Total average proper knowledge	*65*	*63*	*57*	*60*
PRACTICE				
Best practice to drink water	90	88	93	91
Wash hands with water and soap	55	65	93	93
Proper source of water in toilets	27	74	57	40
Total appropriate practice	*57*	*76*	*81*	*75*

72% of all private school children believed that drinking water in school is safe to drink and quality of drinking water can affect health. The rate in both issues is 42.5% in public schools. 72.5% of schoolchildren in public and 78.5% in private school believed that toilet facilities are good although most schoolchildren in one public school (Biherawi Primary School) were not happy with lack of adequate supply of drinking water at school. 93%% of schoolchildren in private schools and 60% of schoolchildren in public schools thought that soap was provided for washing hands and about 82.5% of schoolchildren in private schools and 52.5% of school children in public schools believed that the school provided education on water, sanitation and hygiene (WASH). Total average positive attitude in water, sanitation and hygiene was much higher among schoolchildren of the private schools (68%) than those of public schools (41%).

Practice in water, sanitation and hygiene was evaluated in terms of using appropriate utensils for drinking water, appropriate hand washing and proper source of water in toilets. The

majority (88-93%) of respondent schoolchildren in both private and public schools used appropriate utensil to drink water in a hygienic way. However, appropriate handwashing was concerned, over 93% of respondent's schoolchildren from private schools used water and soap to wash hands whereas the proportion for public schools was 60%. In general, total average appropriate practice in water, sanitation and hygiene was 66.5% for public schools and 78% for private schools.

4.1.4. Other observations

Based on (Appendices A, Table 4) public schools have a significant problem with water adequacy for daily use inside the toilet. (Table 4) which is water availability for toilet use, have F-value of 5.085 and P-value of 0.04. When compared to α-value, the P-value is less than α-value (0.04<0.05), so there is a significant influence on the availability of water in the toilet. To know which answer is more selected by schoolchildren it is mandatory to check the parameter estimator. Based on the observations, the category "never" has a significant difference from other choices like sometimes and always.

The other result was because of the inadequacy of daily water supply in the school affected or affects does not affect public schoolchildren to bring water for drinking from their home. Although, the result is not significant ((P-value α-value), (0.218 > 0.05)), most of them are bringing drinking water from home and using the tap water for drinking when it is available. Thirdly, the interaction effect of bringing water from home and non-availability of water for toilets have a significant on adequate daily water supply. (P-value 0.031<0.05 α-value). Generally, the public schools have insufficient water for daily use including for toilet use as justified by the above-mentioned reasons.

For the private school, a similar analysis was done using the general linear univariate model to test the mean difference between private school schoolchildren on from where they bring their dirking water and availability of water in the toilet. Those factors are depending on the adequate water supply for daily use.

The result indicated on (Appendices A, Table 5) was for private schools where the result is insignificance for the two factors and their interaction effect. The p-value of the question 'where do you drink water in your school' and, 'water available in the toilet', and interaction effect of both questions is greater than that of α-value for those three different cases. The multiple comparisons also show there is a balanced observation of the water. Private

schoolchildren are getting water from their homes and currently using the tap water inside their school compound.

4.1.5. Comparative analysis of WASH facilities

Based on the questioner result from the ANOVA table (Appendices A, Table 6) the toilet facility inside the school premises done with Likert scale having five different satisfaction levels and based on the difference of means for public and private school was found to Significant. This is due to F-value is 42.73 and P-value becomes 0.000. Hence P-value is less than α-value (0.000<0.05). There is a significant difference between public and private schools on the satisfaction level of the toilet facility. The reason for this significant result is from the public-school total sample around 68.4% of them chosen poor and not clean, while from the private school only 28% feel that the toilet which is available inside their school is very poor and not cleaned.

While observing the quality of drinking water inside both school types based on the schoolchildren reply, it has been found that there is a significant difference in means of public and private schoolchildren answer with p-value of 0.000 (Appendices A, Table 6) which is less than α-value (0.000<0.05) which indicates there is a significant difference on the water quality testing among the two types of schools. This can be further defensible with the effect in between and within the sample means. From the private sample size, only 4% of them knew the water is tested for quality before drinking while from the public sample size around 16% of them knew water is tested for quality, but 56% of schoolchildren in public schools and 76% of schoolchildren in private schools do not know whether it is tested for quality or not.

Another factor that was found to be significant is handwashing with soap or with water only. This factor accounts for a P-value of 0.000 which is less than alpha value (0.00<0.05). This makes the result significant. Consequently, there is a difference in how public or private schoolchildren wash their hands. The effect within the factor shows from the private sample size almost 92.2% of schoolchildren will use soap and water to wash their hands. On the contrary, from the government school schoolchildren, only 61.8% of them use both soap and water.

The reason for this is that most public schoolchildren voted that there will not be any sanitizing and hygiene products near hand wash facilities or near toilets. It has been detected

that private schools somehow fulfill roughly hygiene and water for the student. Schoolchildren who are learning in public schools also suggested that most of the time they bring their soap in the form of paper or crushing pieces of soap. Due to the current corona COVID-19 pandemic, most of them are having soap because of the frightening of the pandemic. On the other hand, most private schools prepare soap, washing facilities near the entrance, building blocks, and around toilets. This should be a benchmark for all schools in the country.

The precious factor was how schoolchildren wash their hands with and there was a significant difference between the public and private schools. Another factor that supported the previous handwashing situation is the availability of soap and other washing facilities around toilets. The factor has P-value of 0.000 which is less than alpha value (0.000<0.05) (Appendices A, Table 7) that makes the mean between public and private schools regarding soap and wash facilities around the toilet. The fact that 67.1% of total public-school schoolchildren mentioned there was never any soap or other facility around the toilet and 5% of them revealed the opposite. While private 27% of them mentioned there was no soap or other facility, and 45.2% of private school schoolchildren found appropriate soap and another facility during their restroom stay.

The accessibility of sanitation and hygiene facilities was assessed by with whom schoolchildren are sharing a toilet. Both categories of schools answered and based on the respondents, there is significant variance among public and private schools sharing as far as employees and schoolchildren sharing a toilet. It is clarified with p-value 0.026 which is less than alpha value (0.026<0.05) (Appendices A, Table 5). The significant result was supported with the group mean or observation. From public schools, 67.6% of them stated they do not share a common toilet with staff and 74% of private schoolchildren also agree with most public student's thoughts.

The other factor considered there might be a difference is any awareness, knowledge, training, and education provided by the school. A difference in the means of observations has been noticed between public and private schools. The result is backed with P-value of 0.000 which is less than the sig value or alpha value (0.00<0.05) (Appendices A, Table 5).

The significant result was backed by individual observations as follows; from the total observation of public schools, 54% of the individuals agree on education for water,

sanitation, and hygiene provided by the school. Whereas 83% of the private school individuals were provided with awareness and education concerning water, sanitation, and hygiene. The fact that many educational pieces of training are believed to have a remarkable result on any concern, so schools are recommended to give educational training for their schoolchildren, to change their mind towards the water, sanitation, and hygiene (WASH).

Generally, the questionnaire was analyzed qualitatively and quantitatively, thus eleven factors were examined for the difference in the categorical factors (public and private school). The significant factors were evaluated and supported by the individual means of the sample.

4.2 DISCUSSION

4.2.1 Drinking water and health

The first descriptive result of this work illustrates the person who suffered from unsafe drinking water. Conferring to the respondents 45% of them knew a person who suffered illness by drinking unsafe water. According to UNICEF Ethiopia report, around 60-80 percent of infectious diseases are accountable to the inadequacy of safe water. The report also mentions insufficient access to and sanitation and hygiene services are the reason for disease (UNICEF, 2016). The impact of drinking unsafe water was also examined by that Sofía Pérez in 2018, in the report it has been mentioned because of lacking safe water access, the community (including School-aged children) in Ethiopia is suffering water-borne disease and sometimes it is life costing resulting in mortality. Based on the respondents (298 schoolchildren) it can be tied up to concerning heath, drinking unsafe water was found out to be a serious problem which a lot of people could suffer and might be dying.

4.2.2 Diarrheal occurrence

Schoolchildren of public and private school's student reported a 22% occurrence of diarrhea in the school. This could be attributed to the inadequacy of safe water in the school, the absence of clean toilets, and the lack of proper sanitation. The schoolchildren (22% or 65 schoolchildren) knew the diarrheal situation. Most of the respondents of this result were from public schools (58 of them are from public schools). In 2020 Tefera Gebrehiwot studied the occurrence of diarrhea in primary school and found 30.5% diarrheal occurrence. The author also reviewed Jano's work and concluded the figure was higher. Comparing the current figure 22% it shows a little bit reduced figure. However, the reasons for this figure perhaps pointed to the poor implementation of WASH inside schools. However, there are wash facilities that exist, they may be built at the wrong position like far from the toilet, or there is no running water even for the toilet.

4.2.3 Washing hands

Even though most (244 out of 298) public and private school schoolchildren respond washing hands will remove germs and prevent infection, 40% of the schoolchildren could not get a proper washing facility. This includes soap, detergent and even running water. This is backed by WHO report in 2018 which states in Ethiopia 37 million out of 39 million schoolchildren were incapable of getting desired and elementary hygiene and sanitation facilities in their schools. This could be a very serious problem if water and proper detergents are not available

inside the school compound during this coronavirus spread the government and the school administration should have a plan and come up with a successful work to save lives and continue the teaching-learning more safely.

4.2.4 Knowledge, attitude, and practices regarding WASH

The knowledge and attitude of schoolchildren had been assessed among public and private schools. The student's responses have a significant difference (95% CI, 0.000 sig value). Private schoolchildren 72% of them have a perception that drinking water is safe to drink and 16% of them thought it is unsafe, while 12% could not tell that is enough safe or not for drinking. On the contrary, only 42% of public-school schoolchildren think it is safe to water available in the school. The could be supported by a study made by Awoke Aschale and his coauthors, it has been reported that private schools tend to have a good WASH policy than governmental schools. This was supported by their survey on Water, sanitation, and hygiene conditions relating to intestinal disease, it is more likely to occur more likely in public schools than in private schools. The reason stated as is a good wash and sanitation facilities are provided for schoolchildren inside private schools (Aschale et al., 2021).

The perception of schoolchildren was also studied towards the effect of water drinking water quality towards health. Most of the public and private schoolchildren were able to respond drinking water affects health, this is because there is a practice of some educational training about water, sanitation, and hygiene in the school. However, there is no education or training about WASH on a regulatory base rather some notices and practices are done as a campaign on water day or handwashing day. A study was performed Curtis and Cairncross in the year 2003 showed public and private schools found in Ethiopia do not facilitate and train schoolchildren and the staff about water, sanitation, and hygiene (Curtis and Cairncross, 2003). A successful project to develop a manual for designing and construction of water supply and sanitary facilities in primary schools by UNICEF in collaboration with the ministry of health, education and water resource reported that teachers, should provide education about WASH and motivate schoolchildren in the school to adopt proper hygiene and sanitation in the school.

To obtain clean and safe water to drink both private and public schoolchildren were able to respond to different options or techniques which they practice in their day-to-day life and most of them were able to use the purifying system, boiling, and using chlorine. The respondent's answer was backed by Abrham Geremew and his cooperative authors, their

study in 2018 showed that the best practices to clean water in Ethiopia. It stated boiling, adding chlorine or bleach, purification with filtration, and solar disinfection as a proper and effective way of water treatment (Geremew et al., 2018).

Figure 5: WASH facility inside private schools

Source: Author

4.2.5. Adequacy and availability of water

This study also assessed the adequacy, accessibility, and availability of water inside the private and public schools. The adequacy of water inside public schools and private schools was conducted individually. Inside public schools like Biherawi Primary School Schoolchildren are bringing drinking water from home because water is not available daily. According to Hassen Said in 2013 there are limited head units or taps for drinking water and handwashing limited number of waters taps for drinking and handwashing in addition there is no running water survive with it (Seid and Kumie, 2013). Likewise, a global baseline report by WHO in 2018 mentions from the observed 92 schools only 12% of schools had a limited drinking water service, and the rest 19% of schools had no drinking water facility with adequate running water even at the time of the survey. In this study, Over 62% of public-

school schoolchildren reported water is inadequate for drinking and washing in the school and 37% of them feel it is adequate on one or two days of the week.

Figure 6: WASH facility inside public schools
Source: Author

On the contrary inside private schools in reverse 63% of them reported there is enough water for drinking and washing. This result was supported by the mean difference of private and public schools with a significance value (p-value 0.000). Because of the after-mentioned reasons, a significant number of schoolchildren are bringing drinking water from their homes. There was appreciable effort and practice in the private schools on having a wash facility and adequate daily water supply for drinking and hand wash. By the time of the survey, schoolchildren were consuming water for drinking, it was also observed the hand wash facility was clean and plenty for schoolchildren in private schools.

The water adequacy for toilet use was assessed among public and private schools. 154 (68%) of public schoolchildren responded there was never water available inside their school and only 19 (26%) of private school schoolchildren replied the scarcity of water inside the toilet but 74 % of them agree on the presence of water inside the toilet. This result reflects there is a significance difference in the water availability inside toilets between public and private schools. Thus, results inside the public schools there is no water for toilet use. The after-mentioned problem was also testified by a report by UNICEF in collaboration with the ministry of health, education, and water resource (a project to develop a manual for designing and construction of water supply and sanitary facilities in primary schools). It states that not

only water availability inside toilets are unsatisfactory but also the existing sanitation facility was found to be hazardous because of their filthy and messed floors. The report mentions the consequence for this was a high rate of disease prevalence like diarrhea, loss of focus facilizing poor learning setting. Figuratively UNICEF over 30% of schools in Ethiopia lacks adequate water supply inside their toilet which should be used for hygiene and sanitation.

4.2.6. Toilet facilities

The toilet facility for public schools was found to be poor for 36.4 percent of the schoolchildren and in total 5% of the total student feel there is no toilet. This includes locked rooms, toilets without doors, without water, poor drainage, and filthy toilet rooms. The fact that the availability of water was found to be the root cause for the above problems. According to Harvey and Adenay report in 2009 the availability and quality of toilets in 123 schools to the survey of this work. MoE suggested standards; 14% were Sanplat or better pit latrines and 20% were unchanged traditional latrines based on that for most 40% of the toilets were ventilated with improved pit (Harvey and Adenya, 2009). However, the surveyed schools (YFPS and BPS schools) toilets were pour-flush latrines so during blocking of the pipes the floor was found to be full of urine and dirt, which will reduce the satisfaction and use of toilet as reported by (Awoke et al., 2013, Vivas et al., 2010)

4.2.7. Water quality testing

The result of water quality testing among private and public schools was found to be not appreciable because from both schools 55% of both schools do not know whether it is tested for quality or not. While the recommendation of MOE in 2017 on the national drinking water quality monitoring and Surveillance and response guideline there should be at least an indicator for quality testing and monitoring by having several schools WASH clubs trained on water quality monitoring and surveillance. However, in both public and private schools (YFPS, BPS BYA, and NGS schools) the practice of water quality testing and monitoring is not available. The idea was also by (Javaeed et al., 2018, Vivas et al., 2010) saying there should be a fund also to create a team of individuals to check and surveillance the water quality inside the schools but it was not practiced for both public and private schools.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1. Conclusion

This study was done on a comparative analysis of water, sanitation, and hygiene (WASH) situation among the public (Biherawi Primary School and Yelibe Fana Primary School) and private schools (Brass Youth Academy and New Grand Primary School) which are found in kirkos sub-city "Woreda 08 and 09" respectively. Based on the result the following conclusion was drawn;

As far as heath and drinking unsafe water is concerned both school schoolchildren reported a high number of diarrheal prevalence and a person who suffered from unsafe water drinking. There was also found to be a high level of perception towards washing hands to prevent infection. While contrasting public schools versus private schools, there were significant differences in the perception, knowledge, and practice inside a private and public school. The first was schoolchildren' attitude towards the quality of drinking water in the school (in which most of the public-school schoolchildren found unsatisfactory). In addition, the water cleaning practice also shows a significant difference between the two schools. Due to the significant inadequacy of drinking water for daily supply, schoolchildren are obligated to bring their water from their homes. This also affected the quality of the latrine and schoolchildren to have improper hand wash trend with only water. The availability of water was also in doubt because many schoolchildren were unable to get clean and enough sanitation. The toilet families were found to be appreciable inside the private schools whereas public schools needed an improvement on the latrine because of the inadequacy of water for sanitation inside the toilets. The inadequacy of water in toilets also found to be the reason for poor menstrual management of schools because water is needed to clean and wash body during menstrual cycle. According to the respondents the drinking water quality was not tested and assessed even most of them do not know about the testing. However, private schools have a substantial framework to give their student and staff education on water, sanitation, and hygiene, which should also be practiced in public schools.

Generally, the WASH facilities inside private schools were found to pe superior than that of public facilities. The root caused for all problem was found to be the inadequacy of drinking

and washing water inside both private and public schools. For the betterment of the WASH program, everyone should work in collaboration.

5.2. Recommendation

For the better implementation of WASH facility among private and public schools the following recommendations were provided;

- Benchmarking WASH practices
    - If schools have time to share experience and good WASH practices there would have been a great model to duplicate the best trend. This should be done at least once a year between private and public schools.
- Education and Training
    - Since the role of education is changing minds and thinking optimum, training and educations on water, sanitation, and hygiene should be given for staffs, schoolchildren and administrative persons there would have been a better change. There should be training provided concerning menstrual management for girls to do not confuse and traumatized while they see a menses and proper cleaning and disposal of menstrual pads.
- Having a WASH club inside the school
    - As it is recommended by MOE there should be a trained team to assess water quality and surveillance. This will help to adopt and make preventive and corrective actions towards the drinking and handwashing facilities and toilets.
- Setting evaluation criteria’s
    - From the higher authorities, there should be a standard to judge schools' wash, sanitation, and hygiene practices. Although different guidelines were developed throughout the last decade's none of them were applied and done on a ground level. So, governmental authorities and non-governmental bodies should have a field visit and give a clearer direction for the respective hierarchy.

REFERENCES

Abreham Geremew, Bezatu Mengiste, Jonathan Mellor, Daniele Susan, Esayas Alemayehu and Geremew Sahilu 2018. Appropriate household water treatment methods in Ethiopia: household use and associated factors based on 2005, 2011, and 2016 EDHS data. Environmental Health and Preventive Medicine http;//www.researchgate.net (Accessed on March, 2021)

Addis Ababa City Government, Splash and IRC Ethiopia (2018), School WASH in Addis Ababa. http;//washinschoolsindex.com (Accessed on February, 2021)

Alula Seyum Buda, Dejene Ermias Mekengo, Terefe Markos Lodebo, Abinet Arega Sadore and Bazie Mekonnen (2018); Knowledge, attitude and practice on hand washing and associated factors among public primary schools children in Hosanna town, Southern Ethiopia. http;//www.academicjournals.org (Accessed on May, 2021)

Alyssa Vivas, Bizu Gelaye, Nigusu Aboset, Abera Kumie, Yemane Berhane and Michelle A Williams 2010. Knowledge, attitudes, and practices (KAP) of hygiene among school children in Angolela, Ethiopia. http;//www.researchgate.net (Accessed on March,2021)

Arslaan Javaeed, Tayyaba Tabbasum, U Arif, S.K Ghauri, Sanniya Khan and Zarghoona Wajid, 2018. Knowledge, attitude and practices of water, sanitation and hygiene of schoolchildren in Azad Kashmir. http;//www.researchgate.net (Accessed on Jun, 2021)

Awoke Aschale et al., 2021. Water, sanitation, and hygiene conditions and prevalence of intestinal parasitosis among primary school children in Dessie City, Ethiopia. Plos One, http;//www.journals.plos.org (Accessed on April,2021)

Celia McMichael, (2018). Review, Water, Sanitation and Hygiene (WASH) in Schools in Low-Income Countries: A Review of Evidence of Impact. http;//www.pubmed.ncbi.nlm.nih.gov (Accessed on February, 2021).

Central Statistics Agency of Ethiopia, 2007. http;//www.csa.gov.et (Accessed on September, 2020).

Core H (2002). Hand Hygiene in Healthcare Settings : An Overview of health care hand washing. http;//www.cdc.gov (Accessed on January, 2021)

Cyndie Berg, 2019 Project wise; WASH in schools for everyone. http;//www.globalwa.org (Accessed on November, 2020)

Eleen Korir, Florence Nafula Okwara and Gadencia Okumbe (2018) Menstrual hygiene management practices among primary school girls from a pastoralist community in Kenya: a cross sectional survey, The Pan African Medical Journal, 2018. http;//www.unboundmedicine.com (Accessed on May, 2021)

Enfield Sue, 2018 . Mainstreaming disability and making WASH programmes inclusive. http;//www.opendocs.ids.ac.uk (February, 2021)

ENN strategy, 2016. Water for food security and nutrition. Summary of research. Emergency Nutrition Network . http;//www.ennonline.net (Accessed on December, 2020).

Eva Ludi with contributions by Lorenzo Bosi and Lindsey Jones, 2017 Water for food security. Lessons learned from a review of water-related interventions. . http;//www.odi.org (Accessed on January, 2021).

FAO, 2008. Food security information for action. Practical guides. Rome: EC - FAO Food Security Program. http;//www.fao.org (Accessed on January, 2021).

Gomathi Swaminathan, 2018; WASH (Water, Sanitation and Hygiene) http;//www.researchgate.ne wash/.sanitation (Accessed on March, 2021)

Hassen Seid and Abera Kumie 2013. The status of school sanitation facilities in some selected primary and secondary schools in Dessie City Administration, South Wello Zone, Amhara Region. http;//www.researchgate.net (Accessed on March, 2021)

Hassen Seid and Abera Kumie, 2013. The status of school sanitation facilities in some selected primary and secondary schools in Dessie city administration, South Wello Zone, Amhara region. Brief communication/case study. http;//www.ejhd.org/index.php/ejhd/article/review/ (Accessed on February, 2021).

http;//www.differencebetween.com/difference-between-hygiene-and-vs-sanitation/ (Accessed on March, 2021)

https://www.marketlinks.org/good-practice-center/value-chain-wiki/food-utilization-and-value-chain-approach. (Accessed on February, 2021).

https;//washmatters.wateraid.org/sites/jkxoof256/files/hygieneframework (Accessed on October, 2020).

Hussein Mohammed Gena, Menstrual Hygiene Management Practices and Associated Factors among Secondary School Girls in East Hararghe Zone, Eastern Ethiopia, 2020 http;//www.downloads.hindawi.com (Accessed on May, 2021)

Isolde Birdthistle , Kelly Dickson, Matthew Freeman and Leila Javidi. London; EPPI- Centre, Social Science Research Unit, Institute of Education, University of London (2011). What impact does the provision of separate toilets for girls at schools have on their primary and secondary school enrolment, attendance and completion? A systematic review of the evidence. http;//www.researchgate.net (Accessed on May, 2021)

Joanna Esteves Mills and Oliver Cumming, 2016, The impact of water, sanitation and hygiene on key health and social outcomes. Review of evidence. http;//www.unicef.org. (Accessed on December, 2020).

John Adams; Jamie Bartram; Yves Chartier; Jackie Sims; World Health Organization /UNICEF. 2009. Water, Sanitation and Hygiene Standards for Schools in Low-cost Settings. Available online: http://www.who.int/water (Accessed on December, 2020).

Juma, C., Francis Dikir; Solomon Mwaniki; Yvonne Opanga and Sarah Karanja, 2017. Study Report of Food Security and Nutrition: a case of integrated WASH and agricultural intervention in Lorroki, Samburu County. Operation Research; integration of WASH activities and agricultural model. http;//www.amaref.es (Accessed on September, 2020).

Kathrin Ziegelbauer, Penjamin Speich, Daniel Mausezahl, Robert Bos,, Jennifer Keiser and Jurg Utzinger (2012) Effect of sanitation on soiltransmitted helminth infection: Systematic review and meta-analysis http;//www.journal.plos.org (Accessed on January, 2021).

Liu L, Johnson H L, Cousens S, Perin J, Scott S, Lawn J E, Rudan I, Prof Campbell H, Cibulskis R, Li M, Mathers C and Prof Black R E for the Child Health Epidemiology Reference Group of the World Health Organization and UNICEF (2012) Global,

regional, and national causes of child mortality http;//www.thelancet.com (Accessed on January, 2021)

Mariëlle Snel, Eveline Bolt & Leonie Postma, 2000; Challenges facing school sanitation and hygiene education from the perspective of the school teacher. http;//www.ircwash.org/sites/default/files/snel-2000-challenges.pdf (Accessed on April, 2021)

Md. Mizanur Rahman, Md Arafat Ali, Anwar Parvez, Masum Shahriar, Dr. Tasmina Rahman and Dilruba Shameem, 2019. Knowledge and practice of personal hygiene among primary school schoolchildren in Dhaka, Bangladesh. http;//www.researchgate.net (Accessed on November, 2020).

Megersa Olumana Dinka, 2018; Safe Drinking Water: Concepts, Benefits, Principles and Standards. http;//www.intechopen.com/books/water-chalenges-of-an-urbinizing-world/safe-drinking-water-concept-benefits-principles-and-standards (Accessed on March, 2021)

Ministry of education, Health and Water resources in collaboration with UNICEF, 2010; Design and construction manual for water supply and sanitation facilities in primary schools in Ethiopia http;//www.unicef.org (Accessed on December, 2020).

Ministry of Health, Ethiopia. Guidelines for environmental health services in school settings. Addis Ababa, Ethiopia; Hygiene and Environmental Health Department, 1996. http;//www.ajol.info (Accessed on March, 2021)

MoE (2012). National School Health and Nutrition Strategy. FDRE, Ministry of Education . Addis Abba, Ethiopia http;//www.iapb.org (Accessed on February, 2021).

MoE (2017). National School Water, Sanitation and Hygiene (SWASH) Strategy and Implementation Action Plan. FDRE, Ministry of Education, http;//www.cmpethiopia.org (Accessed on October, 2020).

MoE, 2017. National School Water, sanitation and hygiene (SWASH) Implementation guideline. October 2017. Addis Abeba, Ethiopia. http;//www.cmpethiopia.org (Accessed on February, 2021)

MoH (2017). Ethiopia school health program framework. FDRE, Ministry of Health. corhaethiopia.org (Accessed on November, 2020).

P.A Harvey and E.A. Adenya (2009) An assessment of sanitation and hygiene in primary schools in Zambia. Water, sanitation and hygiene: sustainable development and multisectoral approaches. Proceedings of the 34th WEDC International Conference, United Nations Conference Centre, Addis Ababa, Ethiopia, Water, Engineering and Development Centre (WEDC) Loughborough University. http;//www.wedc-knowledge.lboro.ac.uk (Accessed on April, 2021)

Paul Thorn, School toilets: Guidance and regulations, 2017 http;//www.sec-ed.co.uk (Accessed on March, 2021)

Selamawit Tamiru, Kuribachew Mamo, Pasquina Acidria, Rozalia Mushi, Chemisto Satya and Lindiwe Ndebele, Towards a sustainable solution for school menstrual hygiene management: cases of Ethiopia, Uganda, south-Sudan, Tanzania, and Zimbabwe, 2015. http;//www.researchgate.net (Accessed on May, 2021)

Simon Brooker, Archie CA Clements and Don AP Bundy (2006) Global epidemiology, ecology and control of soiltransmitted helminth infections. Adv Parasitol: World Health Organisation (2012) Eliminating soil-transmitted helminthiases as a public health problem in children: Progress report 2001- 2010 and strategic plan 2011-2020. http://whqlibdoc.who.int/publications (Accessed on January, 2021).

The Guardian, 2015; Water for food security and nutrition, 2015 http;//www.theguardian.com/global-development/2015/may/15/wateraccess-food-security-land-issues-nutrition-policymaking (Accessed on March, 2021)

Tsegaye Yetmgeta, 2013. Inclusive WASH: the impact on urban livelihoods in Addis Ababa, Ethiopia. http;//www.repository.lboro.ac.uk (Accessed on May, 2021)

UN, 2018 Sustainable Development Goal 6, Synthesis Report on Water and Sanitation. http;//www.un.org/publications (Accessed on November, 2020).

UNICEF 2014; http;//www.unicef.org/wash/.sanitation (Accessed on March, 2021)

UNICEF, 2020 water, sanitation and hygiene (WASH) in school. http;//www.data.unicef.org (Accessed on January, 2021).

UNICEF, Ethiopia. National school water supply, sanitation and hygiene education situation in Ethiopia (School WASH). Addis Ababa; UNICEF, 2007. http;//www.unicef.org (Accessed on February, 2021)

UNICEF. 2010. Design and Construction Manual for Water Supply and Sanitary facility in Primary Schools http;//www.cmp.ethiopia.org (Accessed on December, 2020).

UNICEF. 2012. Raising Even More Clean Hands; Advancing health, learning and equality through WASH in schools: New York, NY, USA. http;//www.susana.org (Accessed on February, 2021).

United Nations General Assembly, 2010 Water, Sanitation and Hygiene. http;//www.unwater.org (Accessed on November, 2020).

USAID 2015, Value Chain Development Wiki. Overview of Food Utilization and the Value Chain Approach. http;//www.marketlinks.org (Accessed on February, 2021).

Val Curtis and Sandy Cairncross (2003). Effect of washing hands with soap on diarrhea risk in the community: a systematic review.http;//www.ncbinlm.gov (Accessed on Jun, 2021)

Veenkant, M., Michael Abera and Butterworth, J. 2018. School WASH in Addis Ababa, landscaping study report http;//www.ircwash.org (Accessed on October, 2020).

Water Aid, 1999. Hygiene framework. http;//washmatters.wateraid.org/sites/jkxoof256/files/hygieneframework. (Accessed on November, 2020).

WHO, 2015 Improving nutrition outcomes with better water, sanitation and hygiene; practical solution for policies and programs. http;//www.unicef.org (Accessed on January, 2021).

WHO, 2017 Diarrheal disease. http;//www.who.int (Accessed on December, 2020).

WHO, Consultation on Draft Long List of Goal, Target and Indicator Options for Future Monitoring of Water, Sanitation and Hygiene, WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation, New York, NY, USA, 2012. http;//www.washdata.org (Accessed on January, 2021)

Worku Awoke, Melkamu Bedimo and Molalign Tarekegn (2013). Prevalence of schistosomiasis and associated factors among schoolchildren attending at elementary schools in Amibera District, Ethiopia. http;//www.researchgate.net (Accessed on February, 2021)

World Urbanization Prospects, 2019-United Nations population estimates and projections of major Urban Agglomerations, http;//www.worldpopulationreview.com. (Accessed on January, 2020).

Yamane Taro, 1967. Statistics, an introductory analysis, 2nd edition. New York; Harper and Row. http;//www.sciepub.com (Accessed on November, 2019).

APPENDIX A: Anova TABLES

Table 4: General linear univariate model for public schools

Tests of Between-Subjects Effects					
Dependent Variable: Is the water facility in the school adequate to meet daily drinking and other requirements? (For public schools only)					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	7482.909[a]	8	935.364	5.023	.000
Intercept	15478.187	1	15478.187	83.127	.000
is from where you drink water in your school?	570.786	2	285.393	1.533	.218
is water available in the toilets?	2161.694	2	1080.847	5.805	.004
Interaction effect of the two questions	2027.240	4	506.810	2.722	.031
Error	40218.963	216	186.199		
Total	127772.872	225			
Corrected Total	47701.872	224			

Table 5: General linear univariate model for private schools

Tests of Between-Subjects Effects					
Dependent Variable: Is the water facility in the school adequate to meet daily drinking and other requirements? (For private schools only)					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1937.791[a]	5	387.558	1.926	.101
Intercept	9229.472	1	9229.472	45.874	.000
is from where you drink water in your school?	789.292	1	789.292	3.923	.052
is water available in the toilets?	102.054	2	51.027	.254	.777
Interaction effect of the two questions	1249.204	2	624.602	3.105	.051
Error	13479.863	67	201.192		
Total	24467.146	73			
Corrected Total	15417.653	72			
a. R Squared = .126 (Adjusted R Squared = .060)					

Table 6: Independent sample t-test for comparison of school types

	Levene's Test for Equality of Variances			df	Mean Difference	Std. Error Difference	95% CI	
		F	Sig.				Lower	Upper
1) How are the toilet facilities on the school premises?	Equal variances assumed	42.732	0.0	296	-0.392	0.277	-0.937	0.153
	Equal variances not assumed			159.72	-0.392	0.241	-0.868	0.084
2) Is the drinking water tested for quality in the school?	Equal variances assumed	33.027	0.0	296	-0.313	0.096	-0.501	-0.125
	Equal variances not assumed			173.06	-0.313	0.080	-0.471	-0.154
3) What do you wash your hands with?	Equal variances assumed	302.012	0.0	296	0.314	0.060	0.197	0.431
	Equal variances not assumed			237.26	0.314	0.044	0.227	0.401

Table 7: Independent sample t-test for comparison of school types

	Levene's Test for Equality of Variances			df	Mean Difference	Std. Error Difference	95% CI	
		F	Sig.				Lower	Upper
4) Is soap or another facility provided outside the toilets for washing hands?	Equal variances assumed	30.534	0.0	296	0.796	0.089	0.622	0.970
	Equal variances not assumed			95.889	0.796	0.106	0.586	1.006
5) Do staff and children share common toilets?	Equal variances assumed	4.978	0.026	296	-0.064	0.062	-0.187	0.058
	Equal variances not assumed			128.79	-0.064	0.060	-0.184	0.055
6) Does the school provide education on water, sanitation and hygiene?	Equal variances assumed	164.197	0.00	295	0.295	0.064	0.170	0.421
	Equal variances not assumed			162.7	0.295	0.055	0.187	0.404

APPENDIX B: PARTICIPANT INFORMATION AND CONSENT

Annex 1. Participant Information Sheet and Consent

Hello. My name is Merkeb Deyasso and I am a student at Addis Ababa University. I am conducting a study on: "Comparative analysis of WASH situation among public and private schools in Kirkos sub city, Addis Ababa Ethiopia from April to May, 2021. I will ask you questions about your knowledge, attitude and practice of WASH.

Your participation in this study will not involve any known risks or minimal risk to you. By participating in this study and answering the question you will not receive any direct benefit. However, this will help to improve the WASH situation in schools based on information obtained from you. Whatever information you shall provide will be kept strictly confidential and will not be shown to any other persons. Your identity will also remain anonymous. Participation in the study is voluntary and you can choose not to answer any individual question or all of the questions.

.....	…… ……	……
Name of respondent	Signature of respondent:	Date
……..….….....	.....	. .....
Name of researcher	Signature of researcher	Date

APPENDIX C: QUESTIONNAIRES

Perception of Water, Sanitation and Hygiene

1, What do you think about drinking water in your school? በት/ቤት ውስጥ ስላለው የመጠጥ ውሃ ምን ታስባለህ/ታስቢያለሽ?

- ◘ Safe for drinking ቢጠጣ በሽታ አያመጣም
- ◘ Unsafe for drinking ቢጠጣ ለጤንነት ጥሩ አይደለም
- ◘ Can't say ምንም ማለት አልችልም

2, Do you think the quality of water can affect health? የውሃ ጥራት ጤንነት ሊጎዳ የሚችል ይመስልሻል/ይመስልሃል?

◘ Yes አዎ ◘ No አይመስለኝም ◘ I don't know አላውቅም

3, What should be done to clean water? ውሃን ጤናማ ለማድረግ ምን መደረግ አለበት?

- ◘ Use water purifying systems የውሃ ማጣሪያ መጠቀም
- ◘ Boil ማፍላት
- ◘ Use cloth filter በጨርቅ ማጥለል
- ◘ Use chlorine ክሎሪን (ውሃ አጋር የመሳሰሉትን) መጠቀም
- ◘ Do nothing ምንም አለማድረግ
- ◘ I don't know አላውቅም

4, According to you how often should a water storage container be cleaned? እንዳንቺ ወይም እንዳንተ አስተሳሰብ የውሃ ማጠራቀሚያ በርሜል በየስንት ጊዜው መጽዳት አለበት?

◘ Every day በየቀኑ ◘ Every week በየሳምንቱ

◘ Every month በየወሩ ◘ Every 3 months በየሶስት ወሩ

◘ Never በፍጹም መታጠብ የለበትም ◘ Don't know አላውቅም

5, What is the best practice to drink water? የበለጠው የውሃ አጠጣጥ መንገድ የቱ ነው?

- ◘ With a clean container በንጹህ መጠጫ መጠጣት
- ◘ With a used container ሌላ ሰው በተጠቀመበት መጠጫ መጠጣት
- ◘ With hands እጅን ደቅኖ ከእጅ መጠጣት
- ◘ Don't know አላውቅም

6, Do you know any person who has suffered due to the use of unsafe drinking water? Select all that apply ጤናማ ያልሆነ ውሃ ጠጥቶ የታመመ ሰው ታውቃለህ/ታውቂያለሽ (መልስ የሚሆነውን በሙሉ ምረጡ)

- ◘ Family member የቤተሰብ አባል
- ◘ Relatives ዘመድ
- ◘ Neighbors ጎረቤት
- ◘ Friends ጓደኞች
- ◘ Don't know አላውቅም
- ◘ Family member, relatives, neighbors, friends, classmate/ colleague የቤተሰብ አባል፣ ዘመድ፣ ጓደኞች፣ የክፍል ልጅ፣ የት/ቤት ጓደኛ

7, How is the drinking water facility at the school? ት/ቤት ውስጥ ያለው የውሃ መጠጫ ቦታ እንዴት ነው?

- ◘ Poor መጥፎ
- ◘ Good ጥሩ
- ◘ Satisfactory በቂ
- ◘ Very good በጣም ጥሩ
- ◘ Excellent እጅግ በጣም ጥሩ

8, Is the water facility in the school adequate to meet daily drinking requirements? ት/ቤት ውስጥ ያለው የመጠጥ ውሃ አቅርቦት የዕለት ፍጆታን ለማሟላት በቂ ነው?

- ◘ Yes አዎ
- ◘ No አይደለም

9, How are the toilet facilities on the schools premises? በት/ቤቱ ግቢ ውስጥ የሚገኘው የመጸዳጃ ቤት አገልግሎት እንዴት ነው?

- ◘ Poor መጥፎ
- ◘ Good ጥሩ
- ◘ Satisfactory በቂ
- ◘ Very good በጣም ጥሩ
- ◘ No toilet መጸዳጃ ቤት የለም
- ◘ Not clean ንጹህ አይደለም

10, Are there any diarrheal episodes occurring in the school to your knowledge? እስከምታውቁት ድረስ በት/ቤት ውስጥ የተቅማጥ በሽታ ተከስቶ ያውቃል?

◘ Yes አዎ ◘ No አያውቅም ◘ Don't know አላውቅም

Practices of Water, Sanitation and Hygiene

1, From where do you drink water in your school? ት/ቤት ውስጥ ውሃ የምትጠጭው/የምትጠጣው ከየት ነው?

◘ Bring own water from home የራሴን ውሃ ከቤት ይዤ እመጣለሁ

◘ Directly from tap በቀጥታ ከቧንቧው

◘ Both ሁለቱንም

2, When do you wash your hands? እጅህን/ሽን የምትታጠበው/ቢው መቼ መቼ ነው?

◘ Whenever dirty ሲቆሽሽ ◘ Before eating ከመመገቤ በፊት

◘ After eating ከተመገብኩ በኋላ ◘ After visiting the toilet መጸዳጃ ቤት ከተጠቀምኩ በኋላ

3, Reasons for washing hands (or) why do you wash hands? እጅን የመታጠብ ምክንያቶች (ወይም) እጅህን/ሽን ለምን ትታጠቢያለሽ/ለህ

◘ Prevent infection/remove germs በሽታን ለመከላከል / ጀርሞችን ለማስወገድ

◘ Feels clean ንጹህ እንዲሆን

◘ Appears good ጥሩ እንዲመስል

4, What do you wash your hands with? እጅህን/ሽን የምትታጠበው/ቢው በምንድን ነው?

◘ Water and soap በውሃና ሳሙና ◘ Water only በውሃ ብቻ

5, Do you bring water from home to drink? የመጠጥ ውሃ ከቤትህ/ሽ ይዘህ/ሽ ትመጣለህ/ጫለሽ

◘ Yes አዎ ◘ No አላመጣም

If yes, then ask frequency? መልሱ አዎ ከሆነ መቼ መቼ?

◘ Always አብዛኛውን ጊዜ ◘ Sometimes አንዳንድ ጊዜ ◘ Daily በየቀኑ

6, Is the drinking water tested for quality in the school? ት/ቤት ያለው የመጠጥ ውሃ የጥራት ምርመራ ይደረግለታል?

◘ Yes አዎ ◘ No አይደረግለትም ◘ Don't know አላውቅም

7, When was the last time quality of water was tested in the school? ባለፈው ጊዜ በት/ቤቱ ውስጥ የውሃ የጥራት ምርመራ የተደረገው መቼ ነው?

◘ ---------- State date or month or year ጊዜውን ጥቀስ

◘ Don't know አላውቅም

8, How frequently are the water storage containers cleaned thoroughly? የውሃ ማጠራቀሚያ በርሜሎች በየስንት ጊዜው በደንብ ይጸዳሉ?

◘ Before fetching fresh water አዲስ ውሃ ከመምጣቱ በፊት

◘ Within a week በሳምንት ውስጥ ◘ Every 2 weeks በየሁለት ሳምንቱ

◘ Every month በየወሩ ◘ Every 3 months በየሶስት ወሩ

◘ Never በፍጹም አይጸዱም ◘ When it is dirty ቆሻሻ ሲሆኑ

9, Is the water treated before being available for drinking? ውሃው ለመጠጥነት ከመቅረቡ በፊት ይታከማል?

◘ Yes አዎ ◘ No አይታከምም ◘ I don't know አላውቅም

10, Are clean utensils available for drinking water? ለውሃ መጠጫ ንጹህ መጠጫዎች ይገኛሉ?

◘ Yes አዎ ◘ No አይገኙም

11, Is drinking water available in every block or floor of school? የመጠጥ ውሃ በየወለሉ (በየፎቁ) ይገኛል?

◘ Yes አዎ ◘ No አይገኝም

12, What is the source of water in the toilets of the schools? ት/ቤት ውስጥ ያሉት መጸዳጃ ቤቶች ውሃ የሚያገኙት ከየት ነው?

◘ In Buckets ከባልዲ ◘ Tap ከቧንቧ

13, Is water available in the toilets? መጸዳጃ ቤቶች ውስጥ ውሃ አለ?

◻ Always አብዛኛውን ጊዜ ◻ Sometimes አንዳንድ ጊዜ ◻ Never በፍጹም የለም

14, Is soap or another facility provided outside the toilets for washing hands? ከመጸዳጃ ቤት በውጭ በኩል እጅ ለመታጠብ ሳሙና ወይም ተመሳሳይ መገልገያ አለ?

◻ Always አብዛኛውን ጊዜ ◻ Sometimes አንዳንድ ጊዜ ◻ Never በፍጹም የለም

15, Do staff and children share common toilets? መጸዳጃ ቤቶች ሰራተኞች እና ተማሪዎች በጋራ የሚጠቀሙባቸው ናቸው?

◻ Yes አዎ ◻ No አይደሉም

16, Does the school provide education on water, sanitation and hygiene? ት/ቢቱ ስለ ውሃ ስለ ግልና አካባቢ ንጽህና አጠባበቅ ትምህርት ይሰጣል?

◻ Yes አዎ ◻ No አይሰጥም

APPENDIX D: ANSWER OF OBSERVATIONAL QUESTIONER

Table 8: Questioner filled by observation (34 questions)

No		**BPS**	**BYA**	**NGS**	**YFPS**
1	What is the main source of drinking water for the school? (Check one)				
	• Piped water	√	√	√	√
	• Tube well/borehole				
	• Covered well/spring				
	• Rainwater catchment				
	• Open well/spring				
	• Cart/tanker-truck				
	• Lake/river/stream				
	• Bottled water				
	• No water				
2	Is drinking water from the main source currently available at the school?				
	• Yes		√	√	√
	• No	√			
3	What type of student toilets/latrines are at the school? (check one – most common)				
	• Flush/Pour-flush toilets	√	√	√	
	• Pit latrines with slab				
	• Composting toilets				
	• Pit latrines without a slab				√
	• Hanging latrine (hole over water)				
	• Bucket latrine				
	• No toilets or latrines				
4	How many student toilets/latrines are currently usable (accessible, functional, and private)? Insert number	18= 1 toilet per 37 schoolchildren)	8= 1 toilet per 36 schoolchildren)	17= 1 toilet per 14 schoolchildren)	12= 1 toilet per 94 schoolchildren)
5	Are the toilets/latrines separate for girls and boys?				
	• Yes	√	√	√	√
	• No				
6	Are there handwashing facilities at the school?				
	• Yes	√	√	√	√
	• No				

7	Are both soap and water currently available at the handwashing facilities?				
	• Yes, soap and water		√	√	
	• Water only	√			√
	• Soap only				
	• Neither				
8	In the previous two weeks, was drinking water from the main source available at the school throughout each school day?				
	• Yes		√		√
	• No	√		√	
9	Is drinking water from the main source typically available throughout the school year?				
	• Yes (always)				√
	• Mostly (unavailable ≤ 30 days total)		√	√	
	• No (unavailable > 30 days total)	√			
10	Is drinking water accessible to those with limited mobility or vision?				
	• Yes				
	• No	√	√	√	√
11	Is drinking water accessible to the smallest children at the school?				
	• Yes	√	√	√	√
	• No				
12	How many drinking water points (e.g. taps) are at the school? Insert number ------	54	32	31	21
13	Does the school do anything to the water from the main source to make it safe to drink?				
	• Yes				
	• No	√	√	√	√
14	If yes, what treatment method is used?				
	• Filtration				
	• Boiling				
	• Chlorination				
	• Solar disinfection				
	• Ultraviolet disinfection				
	• Other _____				
15	Is the school's main water source compliant with national standards for drinking water?				
	• Yes				
	• No				

	• don't know	√	√	√	√
16	Is water and soap available in the girls' toilet cubicles for menstrual hygiene management?				
	Yes, water and soap				
	Water, but not soap		√	√	
	No water	√			√
17	Are there covered bins for disposal of menstrual hygiene materials in girls' toilets?				
	• Yes				
	• No	√	√	√	√
18	Are there disposal mechanisms for menstrual hygiene waste at the school?				
	• Yes	√	√	√	
	• No				√
19	How many times per week are the student toilets cleaned?				
	• At least once per day	√	√	√	√
	• 2-4 days/week				
	• Once per week				
	• Less than once per week				
20	In general, how clean are the student's toilets?				
	• Clean		√	√	
	• Somewhat clean	√			
	• Not clean				√
21	Is there at least one usable toilet/latrine that is accessible to the smallest children at the school?				
	• Yes		√		
	• No	√		√	√
22	Is there at least one usable toilet/latrine that is accessible to those with limited mobility or vision?				
	• Yes				
	• No	√	√	√	√
23	Where are the student toilets located?				
	• Within school building			√	
	• Outside building, but on-premises	√	√		√
	• Off-premises				
24	When are schoolchildren permitted to use the school toilets/latrines?				
	• At all times during the school day	√	√	√	√
	• During specific times during the school day				

	• There are no toilets available for use at the school				
25	Are culturally appropriate anal cleansing materials currently available to all schoolchildren?				
	• Yes		√	√	
	• No	√			√
26	Is there functional lighting in the student toilets on the day of the survey/questionnaire?				
	• All toilets		√	√	
	• Some toilets	√			
	• None				√
27	Are latrines or septic tanks emptied (or latrines safely covered) when they fill up?				
	• Yes	√	√	√	√
	• No				
28	Are there handwashing facilities accessible to those with limited mobility or vision?				
	• Yes				
	• No	√	√	√	√
29	Are there handwashing facilities accessible to the smallest children at the school?				
	• Yes	√	√	√	√
	• No				
30	Where are handwashing facilities with water and soap located at the school? (mark all that apply)				
	• Toilets			√	
	• Food preparation area				
	• Food consumption area				
	• Classrooms				
	• Schoolyard	√	√	√	√
	• Other _____				
31	How many handwashing facilities with water and soap are located at the school? (insert number of taps)				
	• Total number of taps ___	54	32	31	21
	• Number with water & soap___	10	14	13	10
32	How many times per week are group handwashing activities conducted for all schoolchildren?				
	• At least once per school day				
	• 2-4 days/week				
	• Once per week				

	• Less than once per week				
	• Ones per year	√	√	√	√
33	Which of the following provisions for menstrual hygiene management (MHM) are available at the school?				
	• Bathing areas				
	• MHM materials (e.g. pads)	√	√		√
	• MHM education			√	
34	How is solid waste (garbage) from the school disposed of?				
	• Collected by municipal waste system	√		√	√
	• Burned on-premises		√		
	• Buried and covered on-premises				
	• Openly dumped on-premises				

APPENDIX E: QUESTIONER FOR OBSERVATION

Core drinking water questions

1. What is the main source of drinking water for the school? (Check one)

□ Piped water
□ Tube well/borehole
□ Covered well/spring
□ Rainwater catchment
□ Open well/spring
□ Cart/tanker-truck
□ Lake/river/stream
□ Bottled water
□ No water

2 Is drinking water from the main source currently available at the school?

□ Yes □ No

3. What type of student toilets/latrines are at the school? (check one – most common)

□Flush/Pour-flush toilets
□ Pit latrines with slab
□ Composting toilets
□ Pit latrines without slab
□ Hanging latrine (hole over water)
□ Bucket latrine
□ No toilets or latrines

4. How many student toilets/latrines are currently usable (accessible, functional, and private)?

Insert number ----------

5. Are the toilets/latrines separate for girls and boys?

□ Yes □ No

6. Are there handwashing facilities at the school?

□ Yes □ No

7. Are both soap and water currently available at the handwashing facilities?

□ Yes, soap and water
□ Water only
□ Soap only
□ Neither

8. In the previous two weeks, was drinking water from the main source available at the school throughout each school day?

□ Yes □ No

9. Is drinking water from the main source typically available throughout the school year?

□ Yes (always)

□ Mostly (unavailable ≤ 30 days total)

□ No (unavailable > 30 days total)

10. Is drinking water accessible to those with limited mobility or vision?

□ Yes □ No

11. Is drinking water accessible to the smallest children at the school?

□ Yes □ No

12. How many drinking water points (e.g. taps) are at the school?

Insert number ----------

13. Does the school do anything to the water from the main source to make it safe to drink?

□ Yes □ No

14. If yes, what treatment method is used?

□ Filtration

□ Boiling

□ Chlorination

□ Solar disinfection

□ Ultraviolet disinfection

Other _____

15. Is the school's main water source compliant with national standards for drinking water?

Yes No don't know

16. Is water and soap available in the girls' toilet cubicles for menstrual hygiene management?

□ Yes, water and soap

□ Water, but not soap

□ No water

17. Are there covered bins for disposal of menstrual hygiene materials in girls' toilets?

□ Yes □ No

18. Are there disposal mechanisms for menstrual hygiene waste at the school?

□ Yes □ No

19. How many times per week are the student toilets cleaned?

□ At least once per day

□ 2-4 days/week

□ Once per week

□ Less than once per week

20. In general, how clean are the student toilets?

□ Clean

□ Somewhat clean

□ Not clean

21. Is there at least one usable toilet/latrine that is accessible to the smallest children at the school?

□ Yes □ No

22. Is there at least one usable toilet/latrine that is accessible to those with limited mobility or vision?

□ Yes □ No

23. Where are the student toilets located?

□ Within school building

□ Outside building, but on-premises

□ Off-premises

24. When are schoolchildren permitted to use the school toilets/latrines?

□ At all times during the school day

□ During specific times during the school day

□ There are no toilets available for use at the school

25. Are culturally appropriate anal cleansing materials currently available to all schoolchildren?

□ Yes □ No

26. Is there functional lighting in the student toilets on the day of the survey/questionnaire?

□ All toilets □ Some toilets □ None

27. Are latrines or septic tanks emptied (or latrines safely covered) when they fill up?

□ Yes □ No

28. Are there handwashing facilities accessible to those with limited mobility or vision?

□ Yes □ No

29. Are there handwashing facilities accessible to the smallest children at the school?

□ Yes □ No

30. Where are handwashing facilities with water and soap located at the school? (mark all that apply)

□ Toilets

□ Food preparation area

□ Food consumption area

□ Classrooms

□ School yard

Other _____

31. How many handwashing facilities with water and soap are located at the school? (Insert number of taps)

Total number of taps ___

Number with water & soap___

32. How many times per week are group handwashing activities conducted for all schoolchildren?

□ At least once per school day

□ 2-4 days/week

□ Once per week

□ Less than once per week

33. Which of the following provisions for menstrual hygiene management (MHM) are available at the school?

□ Bathing areas

□ MHM materials (e.g. pads)

□ MHM education

34. How is solid waste (garbage) from the school disposed of?

□ Collected by municipal waste system

□ Burned on premises

□ Buried and covered on premises

□ Openly dumped on premises