

**FACTORS ASSOCIATED WITH HAND WASHING PRACTICES AMONG
SECONDARY SCHOOL STUDENTS IN NDORWA EAST CONSTITUENCY IN
KABALE DISTRICT**

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DECLARATION

I *Twinomuhwezi Benja*, declare that this piece of work titled: *Factors associated with hand washing practices among secondary school students in Ndorwa East Constituency –Kabale District*, is my original work and has never been submitted to any University/ institution for any academic award.

Signed;

.....

TWINOMUHWESI Benja.

Date:

APPROVAL

This is to certify that this research dissertation titled: *Factors associated with hand washing practices among secondary school students in Ndorwa East constituency –Kabale district*, has been carried out under my supervision and is now ready for submission to the University for Further Examination with my approval.

Name of the supervisor

Signature and date

Mr Johnson Runyonyozi

.....

DEDICATION

This work is dedicated to my beloved parents Mr. and Mrs. Jackson Magumirwa who have tirelessly supported me up to this far. It is also dedicated to my beloved wife Miracle and my dear son Jeremiah. I also dedicate it to the fellowship team members of my local church, Kanoni C.O.U who have constantly prayed for a success in my studies.

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My initial recognition goes to Almighty God whose mercy, protection; kindness and love made me to complete my research work.

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May God reward you all!

TABLE OF CONTENTS

CONTENTS	Page
DECLARATION	i
APPROVAL.....	ii
DEDICATION	iii
ACKNOWLEDGEMENT	iv
TABLE OF CONTENTS	v
LIST OF TABLES	vii
LIST OF FIGURES.....	viii
LIST OF APPENDICES	ix
LIST OF ACRONYMS.....	x
DEFINITION OF KEY TERMS.....	xi
ABSTRACT	xii
CHAPTER ONE.....	1
INTRODUCTION.....	1
1.1 Background for the study	1
1.2 Statement of the problem	5
1.3 Research questions.	7
1.4 Purpose of the study	7
1.5 Specific objectives of the study.....	7
1.7 Scope of the study	7
1.8 Significance of the study.....	8
1.9 Theoretical frame work	8
1.10 Conceptual frame work	9
CHAPTER TWO.....	11
LITERATURE REVIEW	11
2.0 Introduction	11
2.2 Factors associated with hand washing among secondary school students.....	15
2.3 Research gaps and summary	22
CHAPTER THREE	23
METHODOLOGY.....	23

3.0Introduction	23
3.1 Study Design	23
3.2. Area of Study	23
3.4 Sample size determination and sampling procedure for schools and students.	24
3.7 Data Collection methods and tools.....	25
3.8 Data management and analysis	27
3.9 Ethical considerations	28
CHAPTER FOUR.....	29
RESULTS	29
4.0 Introduction.....	29
4.1 Demographic characteristics of the respondents.....	29
CHAPTER FIVE	33
DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS	33
5.0 Introduction.....	33
5. 1 Discussion	33
5.2 Conclusion	36
5.3 Recommendations.....	36
REFERENCES	37

LIST OF TABLES

Table 1: SAMPLE SIZE DETERMINATION	25
Table 2: Demographic characteristics of the respondents	29
Table 3: Practice of hand washing among Secondary School Students	30
Table 4: Bivariate analysis Results for factors associated with hand washing among Secondary School Students.....	31

LIST OF FIGURES

Figure 1: Conceptual frame work, showing the interrelationships of hand washing practices among secondary school students.	10
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LIST OF APPENDICES

APPENDIX A: QUESTIONNAIRE FOR THE RESPONDENTS	44
APPENDIX B: KEY INFORMANT INTERVIEW GUIDE	48
APPENDIX C: OBSERVATION CHECK LIST	1
APPENDIX D: TOPIC GUIDE FOR THE FOCUS GROUP DISCUSSIONS	2
APPENDIX E: PRINT COPY OF INFORMED CONSENT	3
APPENDIX F: SAMPLE SIZE DETERMINATION USING KREJCIE AND MORGAN’S TABLE	4
APPENDIX G: A SKETCH MAP SHOWING THE LOCATION OF MY STUDY AREA NDORWA EAST CONSTITUENCY IN KABALE DISTRICT	5

LIST OF ACRONYMS

AIDS	Acquired Immune Disease Syndrome
CDC	Centre for Disease Control and Prevention
DALY	Days Adjusted Life Years
UDHS	Uganda Demographic Health Survey
DWAF	Department of Water Affairs
FDGs	Focus Group Discussions
HAI	Health Care Associated Infections
HIV	Human Immunodeficiency Syndrome
KDLG	Kabale District Local Government
MDG	Millennium Development Goal
MOH	Ministry of Health
MS	Micro Soft Word
PHMCDG	Public Health Medicine Communicable Disease Group
SAH	South Australian Health
SPSS	Statistical Package for Social Scientists
UNICEF	United Nations Children's Education Fund
VIP	Ventilated Improved Pit latrine
WASH	Water Sanitation and Hygiene
WHO	World Health Organization

DEFINITION OF KEY TERMS

Hand washing. It is defined as washing hands with plain or antimicrobial soap and water with the purpose of removing dirt, organic materials and other organisms that cause disease. Hand washing should be done after use of a toilet, before and after eating and after coughing.

Knowledge: It is defined as having adequate understanding about the steps of hand washing and its importance.

Secondary school: It means post primary institution where students progressively receive formal education from form one to form six.

ABSTRACT

Despite the world-wide Global Hand Washing Day campaign which targets school children as the most effective agents for behaviour change, there is limited documentation in various school settings. This study examined the factors associated with hand washing practices among secondary school students in Ndorwa east constituency. It was guided by two objectives; (i) to assess hand washing practices among secondary schools in Ndorwa East Constituency in Kabale district; (ii) to assess the factors associated with hand washing practices among the secondary school students in Ndorwa East Constituency. A cross-sectional study using quantitative method was conducted among 291 students from five schools. For qualitative data, the researcher used purposive sampling to identify 11 key informants (head teachers and teachers in charge of health and sanitation) and 48 participants in FGDs from the five schools. Systematic sampling was used to select students to participate in the study while simple random sampling was used to identify schools to participate in the study. Of the 291 respondents enrolled, 219(77%) washed their hands after the rest room. Factors associated with a higher likelihood of hand washing practice among secondary school students in Ndorwa East Constituency–Kabale District were being aged <18 years (aOR =8.1, 95%CI: 2.65-21.61, $p<0.001$), presence of water for hand washing(aOR =50.7,95%CI:11.50-309.38, $p<0.001$), presence of hand washing stations (aOR=7.3,95%CI:2.72-30.37, $p<0.001$), and cleanliness of hand washing stations (aOR=70.0,95%CI:10.44-605.6, $p<0.001$). The factors associated with hand washing practices were presence of water for hand washing, presence of hand washing stations in schools, cleanliness of hand washing stations. The study suggests that the school administrators should sensitize all students to continue practicing washing hands. This would help in preventing students from diseases associated with poor hand hygiene practices.

CHAPTER ONE

INTRODUCTION

1.1 Background for the study

Hand washing is defined as the act washing hands with plain or antimicrobial soap and water with the purpose of removing dirt, organic materials and other organisms that cause disease. Hand washing with soap is among the most effective and inexpensive ways to prevent infectious diseases. Every year, pneumonia and diarrhoea kill 14 million children under five, (UNICEF, 2016). This simple behaviour can save lives, cutting deaths associated with Diarrhoea by almost one-half and deaths from acute respiratory infections by nearly one-quarter. Hand washing with soap not only helps people improve their health, but also removes barriers to economic opportunity, allows children to learn and grow, and helps strengthen communities. (Curtis V, Cairncross S, 2012).

The CDC states that hand washing practices are meant to protect all from the risks of sicknesses. Hand washing should apply to the three basic rule of, before, during and after, doing certain things such as before, during and after cooking food, before and after eating, before and after treating a wound, before and after caring for a patient, after visiting the toilet and after holding a pet or a wild animal. According to the CDC, hand washing practice is easy and it's the most effective way to prevent the spreading of germs, because germs can spread from one person to another and spread throughout the entire community. (CDC, 2020).

Diarrhoea, mainly due to contaminated food and water, and poor hand washing practices affects 1.7 billion people annually across the world. It is the second largest killer of children under five years old, (WHO, 2010, and 2013).

The Global Burden of Disease Study 2015 reported that the prevalence of diseases attributable to poor hand hygiene has steadily declined since the 1990s, and that mortality and disability-adjusted life years (DALY) attributed to no hand washing have declined since 2000. Progress in reducing environmental risks was mainly driven by sizeable reductions in mortality and disease burden attributable to unsafe water, sanitation, and hygiene (WASH). Between 2005 and 2015, the number of deaths attributable to unsafe water and no hand washing with soap globally fell by more than 12%, whereas DALYs decreased by more than 20%, (Global Handwashing Partnership, 2017).

A study done by UNICEF (2014) revealed that hand washing practices among secondary school students are still poor most especially on the African continent yet proper hand washing would be useful in preventing many diseases amongst the students and the entire population. School settings are important contexts for educating students about hygienic behaviours such as hand washing practices.

In a study done by Arthi *et al.*, (2016) in India, about assessment of knowledge, attitude, and practice of hand hygiene among secondary students, it was revealed that the overall knowledge of the participants was moderate (ranging between 63.1% to 64%). When the results were analyzed based on the scoring system, only few (6.4%) scored poor.

A study done by (Steiner-Asiedu *et al.*, 2011) shows that out of 285 children who used school toilets during the study period, 257 (90.2%) indicated that they washed their hands. Out of the 257, a greater proportion, 88.3%, did the hand washing with soap. Similarly, washing hands and washing hands with soap before eating showed similar trends. The data showed that school children in the private schools were 63% less likely to wash their hands with soap after defecation, than school children from public schools.

A study by (Ejemot *et al* 2010) indicates that students who practice proper hand washing were less likely to report gastrointestinal and respiratory symptoms than students who do not practice proper hand washing. Hand washing with soap has also been reported to reduce death related to Diarrhoea by 44% and respiratory infections by 23% (UNICEF, 2013).

In Uganda, hand washing with soap by adults after using toilets increased from 36% to 37% in 2016/2017 financial year. This reflects that only three out of every ten Ugandans wash their hands with soap after using the toilet. (Celia MC Micheal, 2017).

Studies in Uganda have found a discrepancy between knowledge and practice of hand washing. For example many students in secondary schools are aware of the reasons and importance of hand washing yet majority do not properly practice hand washing during critical times like before eating food and after visiting toilets/ latrines, (WHO, 2015).

In another study by WHO, 85.6% of students had knowledge about the need to wash hands at critical times (before eating and after using the toilet), but only 24.9% practiced proper hand

washing. In the same study, the extent of hand washing practice among secondary school students showed hand washing was seldom practiced, with hand washing occurring more frequently after touching genitals than before eating meals or after using toilets. (WHO, 2012). Access to hand washing facilities in primary schools was 37%, which was 2% higher than in the previous year (Global Hand washing Day, 2010).

A study by (Chang Sun et al, 2019) in Tibetan schools in China found out that teachers have a stronger influence on students' hand washing behaviour, compared with families and peers. In remote rural areas in China, most students board in their schools and spend more time with their teachers than parents except during vacation time. (Open Shaw, J.J, 2018, Han et al, 2018). Teachers are not only responsible for imparting knowledge to students, but also guiding students' daily behaviours, including sanitary habits. Moreover, teachers are highly respected and trusted by school students. (Ma, C.F. 2018).

According to the Human Rights Commission Report (2012), Ndorwa East Constituency was among the areas in Uganda with highest cholera incidences which could be prevented by proper hand washing. Strategies by Government of Uganda and non-government Organizations such as use of tippy taps have been promoted in communities in Kabale district and yet some schools in Ndorwa East Constituency have been reported to have unfavourable environment in schools which do not favour students to wash their hands properly.

Hand washing is one of the most cost-effective investments in public health, and the economic benefit from hand washing is not unique to the prevention of diarrhoea and pneumonia, but also most healthcare associated infections (HAI), which are extremely costly to individuals, healthcare systems, and countries. (Global Handwashing Partnership, 2017). Hand washing helps in the prevention of infectious diseases that can spread from one person to another by contaminated hands and it is also an important health-promoting practice that can reduce or eliminate harmful germs (Global Handwashing Partnership, 2017). Keeping hands clean through improved hand hygiene is one of the most important ways to prevent sickness & spreading of germs to others. Good hand washing can also fight the spread of the common cold, meningitis, bronchitis, influenza, hepatitis A, and most types of infectious diarrhoea (Borchgrevink, Cha, & Kim, 2013). The burden of poor hand washing practices due to knowledge gaps and limited documentation of the factors influencing it in various settings such as schools in Ndorwa East Constituency in Kabale district – Uganda are not known. This background explains why this

study assessed the factors influencing hand washing practices among secondary school students in Ndorwa East Constituency in Kabale district Uganda because students are eager and able to learn and they are also likely to spread health promotion knowledge to their parents, family members and community members at large.

Hand Hygiene

Hand hygiene is considered a behaviour that includes hand washing with soap and water and/or hand-rubbing using hand sanitizer without water (WHO, 2009). Washing hands with soap and water removes pathogens mechanically and may also chemically kill contaminating and colonizing flora. It has long been known that practicing hand hygiene; either washing the hands with water and soap or using alcohol-based hand rub is the most effective way of preventing the spread of infectious diseases (Anderson et al., 2008). Hand hygiene is simple, easily implemented and an effective practice that can reduce the risk of infection (Zakeri, Ahmadi, Rafeemanesh, & Saleh, 2017) and also recognized to be a convenient and cost-effective means of preventing communicable diseases (Tao, Cheng, Lu, Hu, & Chen, 2013).

Public health authorities recommend a thorough washing and scrubbing of the hands before meals, during meal preparations and after using the toilet (Nadakavukaren, 2011). Washing should last for at least twenty seconds, using soap and water, drying hands with a paper towel; and turning off the faucet with a paper towel to avoid hand-to-surface contact (CDC, 2018). The practice of washing hands with water only or with soap may be influenced by both knowledge of best practice and availability of water and soap (Curtis et al., 2011). In addition to this, hand washing may require infrastructural, cultural, and behavioural changes, which take time to develop, as well as substantial resources such as trained personnel, community organization and provision of water supply and soap (Luby, 2001). Hand sanitizers are an appropriate alternative to hand washing for hand cleansing and may offer additional benefits in the school setting (Vessey, 2007).

Importance of Hand Hygiene in Disease Prevention among secondary school Students

To improve public health, it is very important to understand the role of infectious disease in our society by developing and practicing preventative efforts against infectious diseases. Hand washing prevents the direct transfer of infectious pathogens on the hands from reaching a portal of entry and the indirect transfer through food preparation and fomite transmission pathways

(Katz, 2004). Several studies posit that proper hygiene is the key to reduce occurrence of infectious diseases in different types of communities (Aiello et al., 2008). Improper hand hygiene is an important contributing factor to contracting infectious diseases among college students (Prater et al., 2016). Approximately 2.4 million deaths can be prevented annually by good hygiene practices, reliable sanitation, and drinking clean water (Rabbi & Dey, 2013).

Appropriate hand hygiene practices such as hand washing and hand sanitization can possibly result in the reduction of the spread of infection and the resulting lost days of school/work because of absenteeism (White et al., 2003). One way of reducing illness related absenteeism is to promote good hand hygiene practices as proper hand hygiene is a well-known preventive measure for many infectious diseases (Heymann, 2008).

These studies indicate that hand hygiene plays an important role in reducing illness and absenteeism in schools. Student education is an important function of an infection control program just as in healthcare settings, which would be an important factor in limiting the spread of disease in secondary schools.

Hand hygiene has been recommended as an important way of keeping individuals from diseases such as food borne parasitic infections. (Schantz PM et al 2003, Celia. M, 2019, Guisantes J et al 2014). Systematic reviews of non experimental and experimental studies related to hand washing have supported the importance of hand washing as a relevant infection control measure. (Celia. M, 2019).

1.2 Statement of the problem

Poor hand washing is the leading contributor to incidences of diarrheal diseases. Strategies by Government of Uganda and non-government Organizations such as tippy taps have been promoted in communities in Kabale district to improve hand hygiene and sanitation in schools. However, according to the Human Rights Commission Report (2012), Ndorwa East Constituency was among the areas in Uganda with cholera incidences among students and the general population. This is attributed to lapse or knowledge gap coupled with other factors about hand washing practices.

There is paucity of studies about hand washing practices and its associated factors in Ndorwa East, Kabale district. If nothing is done, incidence of diarrheal diseases will continue to rise amongst students and this will affect not only their health but also education and can lead to mortality rates to go high yet preventable. Therefore this has compelled the researcher to assess

factors associated with hand washing practices among students in Ndorwa East Constituency in Kabale district.

1.3 Justification of the study

Diarrhoeal diseases are a leading cause of mortality and morbidity in the world, and mostly results from contaminated food and water sources. Studies have shown that most of the diarrheal diseases can be eliminated by safe water and hand washing with soap after toilet and before meals. Interventions to prevent diarrhoea, including safe drinking-water, use of improved sanitation and hand washing with soap can reduce disease risk. (UNICEF, 2018).

According to the settings approach, schools are the most effective settings in which to improve health, education, and other social outcomes among large populations, (Kolbe, Jones, Bird thistle, & Vince-hitman, 2000). In addition, schools could improve these varied outcomes for students, employees, families and the wider community by simultaneously implementing action in a number of interrelated areas (Kolbe, 2005):

School settings are important contexts for educating students about the hygienic behaviours such as hand washing practices. This is because students are always eager and able to learn and they also help in spreading health promotion knowledge to their parents, family members and the community at large.

Kabale district is prone to outbreaks of diarrheal disease which can be prevented by proper hand hygiene. However, there are no studies of hand washing practices among secondary school students which have been carried out in the district. Lack of this information leaves the population at risk of further outbreaks because interventions to reduce the risk will not be designed and implemented according to need.

Hand washing behaviours and practices of secondary school students differs from those of primary school children in a sense that secondary school children are more educated and enlightened on the importance of good hand washing practices. More to that, secondary school children are mature enough in terms of age and therefore able to wash their hands properly following the recommended steps and procedures compared to primary pupils who may not do it better. This is supported by a study done by Alysaavivasbizugileye, (2014) to evaluate the

knowledge, attitude and practice of hygiene among rural school children in Ethiopia which revealed only 14.8% of 669 students who were interviewed reported actual practice of hand washing which was attributed to lack of enough knowledge on hand washing and forgetfulness.

1.3 Research questions.

1. What are the hand washing practices among secondary school students in Ndorwa East Constituency?
2. What are the factors associated with hand washing among secondary school students in Ndorwa east constituency?
3. What are the recommendations on better hand washing practices among secondary school students in Ndorwa East Constituency Kabale district?

1.4 Purpose of the study

The purpose of the study is to assess the factors associated with hand washing practices among secondary school students in Ndorwa east constituency in Kabale district. This shall contribute to the overall objective of improving the health of the students and the general population through following proper hand washing practices.

1.5 Specific objectives of the study.

1. To assess the hand washing practices among secondary school students in Ndorwa East Constituency in Kabale district.
2. To assess the factors associated with hand washing among secondary school students in Ndorwa East Constituency Kabale district.
3. To make recommendations on better hand washing practices among secondary school students in Ndorwa East Constituency Kabale district.

1.7 Scope of the study

1.7.1 Content Scope

The study focused on assessing the hand washing practices among secondary school students in Ndorwa East Constituency and assessing the factors that influence hand washing among the secondary school students in Ndorwa East constituency, Kabale district.

1.7.2 Time scope

This study was carried out in a period of six months that is from April to September 2018.

1.7.3 Geographical scope

The study was conducted amongst the secondary schools in Ndorwa East Constituency in Kabale district, South Western Region in Uganda. Ndorwa East Constituency borders Rwanda from the East and the south, Rukiga district from the North, Kabale Municipality from North West and Ndorwa West constituency in Kabale district from the west. The researcher chose Ndorwa East constituency as his study area because it is prone to outbreaks of diarrheal diseases such as cholera, dysentery among others.

1.8 Significance of the study.

The findings of this study will enable the ministry of health and the service planners to design strategies for enhancing proper hand washing practices among students and also provide baseline data for health policy makers, health planners and different researchers to carry out further large longitudinal scale studies.

It will help communities, schools & students to understand more about the importance of washing hands.

The study will help to fill the knowledge gaps about how students should wash their hands properly to remove contamination and the associated diseases like cholera and dysentery.

The study will provide information for public health practitioners, health educators and other interested stakeholders about proper hand washing practices and it will also be used as reference in the future for similar studies.

The study will also enable the researcher to acquire Masters Degree in public health as it will be one of the requirements at Kabale University.

1.9 Theoretical frame work

The study was based on the theory of Health Belief Model which was developed in the 1950s by social psychologists working at the U.S. Public Health Service to explain why many people did not participate in public health programs such as TB or cervical cancer screening (Rosenstock, 1974).

According to HBM, the likelihood that a person will follow a preventive behaviour is influenced by their subjective weighing of the costs and benefits of the action; the perception

involves elements such as, perceived susceptibility, perceived seriousness of the condition, perceived benefits of an action, perceived barriers to action, and a stimulus or cue to action.

In relation to HBM theory, students should be in position to wash their hands if they perceived that they are at a high risk of contracting diseases related to poor hand hygiene. In addition, students would also be encouraged to wash their hands if they perceived that they were likely to suffer the associated disability, pain or death and other clinical conditions which may result from diseases related to poor hand hygiene. Also, students will be in position to wash their hands if they perceive that there are benefits attached to it for example reducing the individual's health risk. The theory also implies that, students will not be able to wash their hands if there are barriers which might hinder them from doing so for example lack of safe water, soap among others.

According to HBM theory, students will always wash their hands if they are motivated and can perceive a beneficial action to take, actual change often occurs when some external or internal stimulus for example a change in health, the physician's advice, or a friend's death as a result of poor hygiene triggers action.

Apart from HBM there are two other theories which the researcher should have used but the fact the HBM was better than them, the researcher had to drop them. The theories include, (i) AIDS Risk Reduction Model (ARRM) which was introduced in 1990. This theory provides a framework for explaining and predicting the behaviour change efforts of individuals specifically in relationship to the sexual transmission of HIV/ AIDS. Catania, Kegeles and Coates, (1990), the general limitation of the ARRM model is its focus on the individual. (ii) Theory of Reasoned Action (TRA). This theory looks at how people's intentions, attitudes and beliefs can influence someone to adopt the required behaviour for example hand washing for the case of my research. Some limitations of the TRA include the inability of the theory, due to its individualistic approach, to consider the role of environmental and structural issues and the linearity of the theory components. Ajen, I., Fishbein, M. (1980)

1.10 Conceptual frame work

The figure 1 below shows the conceptual framework illustrating the inter-relationship between the independent variables, intervening variables and dependent variables in the study that

assessed factors associated with hand washing practices among secondary school students in Ndorwa east constituency

The independent variables are the factors associated with hand washing which include access to water for hand washing, installation of hand washing facilities, functionality of hand washing facilities, provision of hand washing soap, comfortable with the hours of access hand washing facilities, supervision of students, cleanliness of hand washing facilities, maintenance of hand washing facilities, poor facilities for hand washing, knowledge of students and the dependent variable is hand washing.

The intervening variable is the School environment and hand washing policies as far as hand washing is concerned. The intervening variable will therefore help to trigger the independent variables which will result into good or bad washing practices.

Independent Variable (IV)

Factors affecting hand washing

Dependent Variable (DV)

Hand washing practices

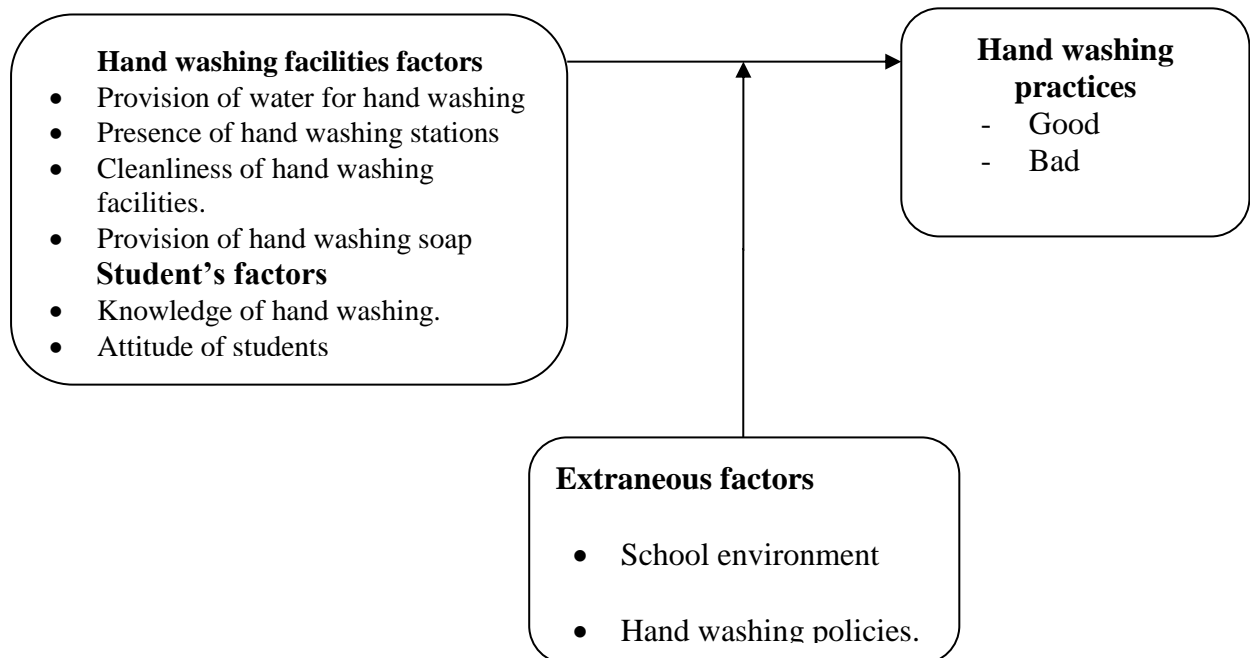


Figure 1: Conceptual frame work, showing the interrelationships of hand washing practices among secondary school students.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter presents the review of literature related to the study. The literature to underpin the study was got from different data bases; journals from PUBMED, CINHALL, HINARI, Google scholar, and hard copy text books/journals/periodicals.

The literature is presented in two subsections; hand washing practices among students and factors associated with hand washing practices among students.

2.1 Hand washing practices among secondary school students

According to Gould (2012), proper practice of hand washing eliminates most germs from our hands and can reduce Diarrhoea morbidity by 44% and respiratory infections by 23% (Parker, 1993). However, globally, the rates at which hands are washed with soap range from 0% to 34%. A study which was carried out in a rural school in Atbara region of Ethiopia reported that out of all the available toilets, only 21% had hand washing facilities and none contained soap (Kumie et al., 2005).

Recent surveys establish that U.S. adults claim to wash their hands after using public restrooms at very high rates. In 2009, 94% suggested that they consistently wash their hands (QSR, while in 2010, 96% stated that they always wash their hands after using a public restroom (Harris Interactive, 2010). Self-reports of hand washing behaviour have been criticized as unre wash their hands after using a public restroom. This is an increase from 77% in 2007, which was somewhat lower than the 2005 rate of 83%. With the exception of the Shedd Aquarium, which has seen a 3% dip in hand washing rates since 2005, all the venues saw a slight upward trend in observed hand washing rates (Harris Interactive, 2010). In 2003, hand washing rates were also observed across six North American airports, averaging 74% compliance. The highest hand washing rates were obtained in Toronto with 95% while Chicago had the lowest rate at 62% (American Society for Microbiology, 2003).The research consistently finds a gender bias in hand washing practices. Women wash their hands more frequently than men. In the 2003 study (American Society for Microbiology) it was observed that 83% of women washed their hands after using the restroom, whereas only 74% of the men did so. In a multi-year study across public attractions, women consistently wash more than men across all years

and venues (Harris Interactive, 2010). The average observed hand washing rates for women were 93% in 2010, 88% in 2007, and 90% in 2005. The equivalent rates for men were 77%, 66%, and 75%, respectively.

Hand washing may seem to be an easy task but certain measures are essential to follow in order to decrease the amount of microbes on hands in preventing infection. The steps necessary to be followed include first taking away any rings or bracelets from the wrist or fingers and wetting the hands with flowing water. Then soap is added and all folds and surfaces of the hands including the back of the hand and nails must be lathered and cleaned with the soap for not less than 15 seconds. The hands are then rinsed under running water in a rubbing movement. Once all visible foam or slippery soapy feeling on the hands is off, dry hands gently to prevent breaking the skin with paper towel or any clean towel. The tap is then turned off using the paper towel to prevent recontamination of the fingers after wash. In cases where public restrooms are used the paper towel can be used to open the door on your way out after washing hands. (Health Canada, 2009).

A study about hand washing practices among school children in Ghana shows that none of the children observed in the homes washed hands correctly, according to the standard of wetting hands, rubbing two hands for roughly 20 seconds under running water with neutral soap, However, in schools, only 7% of the total number observed for hand washing with soap before eating and 5% of the total number observed for hand washing with soap after eating did so correctly. (Steiner-Asiedu *et al.*, 2011).

A cross sectional study about hand washing knowledge and practice among school going children in Duwakot, Bhaktapur revealed that of the total, 338 (99.4%) students claimed that they did hand wash before meal and 314 (92.4%) students washed their hand after defecation . Similarly, 314 (92.3%) students used soap and water for hand washing before meal and 329 (96.8%) students washed their hand after defecation (Pratibha et al, 2017)

A study by Horton (2014) in Ethiopia conducted among 200 Colombian school children revealed that only 7% of the children reported having clean water and soap regularly available at school and only 2% of these children washed their hands with soap before eating but none washed hands after visiting the toilet. In the same country, 4 out of 10 schools that were studied did not have soap while only 2 out of 10 schools that were studied had pupils washing their hands with soap (UNICEF 2005).

Taylor *et al.* (2010) carried out a study about Hand hygiene knowledge of college students. A number of 100 students were experimented on at random in 10 different restrooms in the university to ascertain if these students in reality wash their hands. The study was split into 3 examinational categories to acquire the required feedback. These included a platform where the students would be observed, made questions in the form of a quiz to determine the knowledge field of the students about hand hygiene and how pathogens are spread, and an investigation of personal illness rates. The results of the study proposed that amongst the number of students that went into the various restrooms females had the tendency to wash their hands more often compared to males. Also, it was noticed that students in the science majoring fields had a higher probability in washing their hands than non-science majors. Further findings went on to show that students who rarely washed their hands after using the dining hall reported sick more often as compared to those who were regular in washing their hands each time they visited the restroom.

In a study that was carried out in India about assessment of knowledge, attitude, and practice of hand hygiene among secondary school students, the response of participants to attitude based questions revealed that their attitude towards hand hygiene was not satisfactory though very few of them showed positive attitude towards hand hygiene. The study further revealed that students attitude towards hand hygiene was overall poor because nearly 85% of the students agreed that they don't adhere to correct hand hygiene practice all the time, in spite of the knowledge of the respondents on hand hygiene being good. In the same study participants also agreed to various reasons for not adhering to hand hygiene like forgetfulness, and emergency cases (Arthi *et al.*, 2016).

Results from the study that was done in Indonesia about proper hand washing practices among elementary school students in Selat sub-district revealed that students with positive attitudes towards hand washing were six times more likely to wash their hands properly than students with negative attitudes. Setyautami *et al* (2012). The students who were surveyed on their attitude towards the effect of hand hygiene on health care associated infections, only 49% Of the students responded to the questions on hand hygiene attitudes and only 20% managed to identify the correct answer. (Nabavi *et al.*, 2015).

A survey undertaken by Asiedu *et al.* (2011), elaborated on the topic of hand washing practices among school children in Ghana revealed most (90.2%) of the students who visited the restroom washed hands with soap and water.

A survey undertaken by Asiedu et al. (2011), elaborated on the topic of hand washing practices among school children in Ghana revealed that 63% of the students from private schools were identified to have a less probable chance to wash hands after using the restroom, 51% less probable to wash hands before eating and 77% less probable to wash hands after eating in comparison to the public school students.

Out of seventeen questions about hand washing that students were asked in a study that was about developing hand hygiene behaviours in a primary school Turkey, it was indicated that 37.4% students were washing their hands between 30s and 1 minute, and 24.5% of the respondents reported washing their hands for 25s. (Cevizci *et al.*, 2015).

A study that was done by Le ThiThanh and Luu Ngoc Hoat(2013), on the topic Hand washing Among School Children in Northern Rural Vietnam found out that 66% of the students performed hand washing with the use of soap.

A survey on knowledge, attitude and practices which was conducted at eight secondary schools in both rural and an urban area of Thohoyandou in Vhembe district of South Africa, reported that most of the respondents practiced hand washing, especially before eating and after visiting the toilet. (Sibiya& Gumbo, 2013).

A study that was done by Le ThiThanh and Luu Ngoc Hoat (2013), on the topic Hand washing Among School Children in Northern Rural Vietnam found out that 10% of the students that who were interviewed executed the process of hand washing satisfactorily. It was also indicated in the survey on the percentage difference in the performance of hand washing with soap between 1st graders and 7th graders. It was identified that the higher the grade, the more compliant the students were towards hand washing with soap. Results showed 34% among the 1st grade were compliant with the use of soap, while the numbers were increasingly different from the 7th graders which were 67%.

Results from a study about promoting clean hands among children in Uganda (a school based intervention using ‘tippy-taps’) in the rural schools of Nakigo, Iganga district revealed that show that the proportion of students reporting ‘always or often’ washing their hands at school increased from 3.5% at a base line to 100% at the follow up. In the intervention schools, the proportion of students reporting washing their hands three or more times a day also increased from 5% to 93% after the installation of tippy taps in their schools(Zhang *et al* 2014).

A cross sectional study about hand washing knowledge and practice among school going children in Duwakot, Bhaktapur found out that almost all students (99.4%) washed their hands before meals and 92.4 % of the students reported that they practiced hand washing after defecation (Pratibha et al., 2017)

Results from the study about quantification of perception status of hand washing practice among schoolchildren in a rural area of west bengal indicated that most of the students opined that they knew the importance of personal hygiene (92.1%) and that of hand washing (92.6%). Among the study population 88.4% students knew the reasons and importance of hand washing. Among the study population 81.6% collected water from tube-well (Dhiraj *et al*, 2015).

2.2 Factors associated with hand washing among secondary school students

A study by Mbula (2013), about factors influencing implementation of hygiene practices in public secondary schools in central division of Machakos district in Machakos county in Kenya revealed that when students were asked about the provision of water for hand washing after visiting the toilet, majority of them (80.3%) indicated that water for hand washing after visiting the toilet was provided.

A study by Ramos *et al.* (2010) on the inspections of hand washing supplies and hand sanitizer in public schools was performed to identify and measure the frequency at which hand washing materials such as soap, paper towels, and hand sanitizers were being supplied in the public schools. A setting of 93 schools from 10 districts was taken as participants for the inspections undertaken by the school nurse. According to the survey, in November 2008, 90 schools submitted their results of the inspection performed and this made up 97% of returned feedback from all 10 school districts. Information gathered from the total 697 bathrooms showed that 88.8% of them had soap and 91.7% had paper towels and hand dryers for getting hands dry after hand washing is performed.

Provision of personal hygiene facilities and materials is an important factor that can promote students' PH and this is the responsibility of the parents, school and the community. Students should have access to materials needed on personal hygiene. Students need various materials in the school as well as in the home before they can effectively carry out personal hygiene. In the school these materials are needed a good restroom, potable and regular water supply for

drinking and washing of hands and other items, personal plates, cups and spoons, water bottles, towels or napkins and a neat and decent environment. There should also be a recreational centre or playground that is safe and neat for the students (BHC,2015).

A cross sectional study about hand washing knowledge and practice among school going children in Duwakot, Bhaktapur found out that out of 340 students, 103(25.2%) private school students and 63(82.9%) government school students had received hand washing knowledge from teachers. Similarly, 157 (38.4%) private school and 6 (7.9%) government school students had gathered hand washing knowledge from mother. Moreover, 83(20.3%) private and 4(5.3%) government school students obtained hand washing knowledge from father. 47 (11.5%) private and 1 (1.3%) government school students acquired hand washing knowledge from television (Pratibha M *et al*, 2017).

Results from the study by Dhiraj *et al* (2015) about quantification of perception status of hand washing practice among school children in a rural area of west Bengal revealed that 82.1% student said that they had soap in their house and 92.1% said that soap was available in their school.

A variety of resources are needed in the home by students to enable them practice personal hygiene. These include the following: uniforms, shoes, clothes, toothbrushes and toothpastes, body cream, deodorant, disinfectants, hair cream, oil, restrooms soap for washing hands, under wears, towels, nails cutters, bathrooms, iron, personal plates, spoons and cups. In addition to appropriate information provided by schools, parents should make all these materials available to them. Despite the fact that a student has appropriate information from the school, there is still the need to have all the materials and facilities needed to promote his personal hygiene at home. Students needs materials like toothbrushes, soap, toothpastes, uniforms, shoes, socks and other items for good grooming(Beth and Jones, 2014).

Funding ensures that schools have the necessary infrastructure in place to allow students to perform hand washing. (WHO, 2009). Compliance with hand washing among children is only possible if schools ensure that infrastructure and a reliable and permanent supply of hand hygiene products are available at the right times and in the right locations (WHO, 2009). Almost all studies ensured that the experimental group was supplied with adequate resources, such as alcohol-based hand rubs and soap and water throughout, to make hand hygiene as easy and convenient as possible. For example, in one Pakistan study, workers supplied families with soap as needed. (Luby *et al*, 2004). All three projects conducted in Kenya had funding from an

international organization to implement the Water Sanitation and Hygiene (WASH) project in their country, which helped to fund most of the resources. For example, they managed to install hand-washing facilities and to construct toilets (Patel, 2012, Saboori, 2013)

A study about factors influencing implementation of hygiene practices in public secondary schools in central division of Machakos district in Machakos county in Kenya revealed that majority of the students (41.1%) who formed the sample size for the study revealed that students always wash hands after visiting the toilet, while 36% indicated that students do not observe hand washing as a hygiene practice after visiting the toilet (Mbula, 2013).

In study about hand washing practices among elementary school students in Selat sub-district in Indonesia, two thirds (65.9%) of the respondents reported the availability of clean water at washing stands, 68.5% stated that soap was available at the stands, and 73.7% declared that hand washing stands were available at schools. (Setyautami, Sermisri, & Chompikul, 2012).

A survey containing questions on hand hygiene practices among middle and high school students in 11 schools in Vilnius city revealed that, majority of respondents in all countries (80% in Vilnius, 60% in the Republic of Moldova, 90% in Piatra Neamt) acknowledged having running water in the hand washbasins in the school bathroom which would enable them to wash their hands most of the times. (UNICEF 2014)

A study about promoting clean hands among children in Uganda (a school based intervention using 'tippy-taps') in the rural schools of Nakigo, Iganga district revealed that both hand washing at school and after Using the toilet increased after the introduction of tippy taps (Zhang *et al* 2014).

The simple act of washing hands with soap and water destroys different microbes causing diarrhoea diseases by 35.0% (Batram, 2015). The use of soap and water for personal hygiene helps prevent trachoma and scabies. Washing fruits and vegetables with good quality water is a recipe for good health (Lucas and Gilles, 2012). In secondary schools, water supply will be an essential factor in the students forming good personal hygiene habits which can last for a lifetime. A study of water and sewage facilities conducted by Health Canada and the Department of Indian Affairs examined 863 First Nations community water-treatment systems and 425 community sewage-treatment systems. It found that vast improvements in health, leading to economic development and poverty reduction, could be achieved by providing native communities with a good water supply and sanitation (WHO, 2014).

A survey undertaken by Asiedu *et al.* (2011), elaborated on the topic of hand washing practices among school children in Ghana revealed that majority of the students did not exercise proper hand washing using soap as a result of lack of access to hand washing supplies such as soap, towel and a clean running source of water.

A study by UNICEF in Ethiopia discovered that 1/3 of schools had water points and only 5% had hand washing facilities and all the schools never had soap. A study amongst other schools still in Ethiopia reported that only 7% of people had clean water and soap regularly available in their schools. Those that had water and soap were three times more likely to wash their hands before eating or after using toilet. Even if knowledge of hygiene exists, inadequate resources can affect proper hand washing practices negatively. (UNICEF, 2013).

A study done by Ciobanu, Dodos, & Adamonyte, (2016)., soap could always be found by 15% of students in Vilnius and Piatra Neamt, and by 12% of students in the Republic of Moldova. In most of the cases (60% in Vilnius, 66% in the Republic of Moldova and 64% in Piatra Neamt) there is either no soap provided at all, or only sometimes. No soap available is listed as the main reported reason why toilet in all 3 countries (Ciobanu, Dodos, & Adamonyte, 2016). Results from the same study indicate that only 20% of respondents from Lithuania, 16% from the Republic of Moldova and 5% from Romania report to find towels or electric hand dryers always in school bathrooms. 29% from Lithuania, 45% from the Republic of Moldova and 67% from Romania report to never have such equipment in their bathrooms (Ciobanu, Dodos, & Adamonyte, 2016).

A study done by Setyautami *et al.* (2011) on proper hand washing practices among elementary school students in Selat Nasik district Indonesia revealed that the accessibility of clean water

and soap being available at hand washing posts were viewed to be substantial predictors of washing hands properly in occasions when adapted with other influences. The results of the study further showed that there was a very low occurrence of proper hand washing amongst the elementary school students and hence there is a need of more effective hand washing promotion in schools and the need of better services to boost the prevalence on the right way of washing hands among the students, (Setyautami *et al* 2011).

Results in the study done by Sibiya and Gumbo (2013) on knowledge, attitude and practices which was conducted at eight secondary schools in both rural and an urban area of Thohoyandou in Vhembe district of south Africa, revealed that, in all the schools that were surveyed, it was found that there was no soap provided for hand washing nor were learners encouraged to bring their own soap. About $78.90 \pm 1.69\%$ of the respondents felt that teachers were not doing enough in terms of informing learners about practicing safe hygiene and sanitation. The main reason given was that the state of their toilet was generally clean, but in other schools the toilets were dirty and this might discourage the learners from using the toilets (Sibiya & Gumbo, 2013).

In a study that was carried out in rural Bangladesh about the effect of hand washing at recommended times with water and with soap on students at a risk of diarrhoea indicate that in schools where food was prepared without washing hands, students had Diarrhoea in 12.5% of monthly assessments compared to 8.3% in schools where one hand was washed with water only, 6.9% where both hands were washed with water only, and 3.7% where at least one hand was washed with soap. This puts the students at a risk of diarrheal diseases which are associated with poor hand hygiene since the majority do not wash their hands using a soap. (Luby, Halder, Huda, Unicomb, & Johnston, 2011)2.4

2.2.1 Knowledge of hand washing among secondary school students

According to CDC (2009), hand washing means washing hands with plain or antimicrobial soap. Hand washing with soap and water is always preferably more efficient in removing and reducing the amount of microbes on the hands. Horton (1996) while carrying out a study in one of the regions in Ethiopia reported that although 76.6% of the students knew that washing hands with soap after defecation was important, only 28% practiced this behaviour because sometimes soap would not be provided (Horton, 1996).

Results from a study that was about the effectiveness of hand hygiene teaching on knowledge and compliance among students in India found out that 10% of the students had moderately adequate knowledge whereas 90% of the students had inadequate knowledge during the pre-test interview. In the same study, the post test interview results about the effectiveness of hand hygiene teaching on knowledge and compliance among students in India showed that 65% of the students had adequate knowledge and 35% of the respondents had moderately adequate knowledge on hand hygiene (Aruna, & Sasikala, 2014).

According to a study that was done in Turkey about developing student's hand hygiene behaviours in a primary school, 63.5% of the students who were questioned about knowledge of temperature of water in hand hygiene answered that water needs to be warm, 71.6% of them reported that jewellery should be taken off and 97.5% reported that hands needs to be dried. Among the students who were asked about their habits of hand hygiene, 40% of them reported that they preferred using water or soap and 16% preferred using a towel. (Cevizci *et al.*, 2015).

A cross sectional study about hand washing knowledge and practice among school going children in Duwakot, Bhaktapur revealed that all the students (100%) who participated in the study had knowledge about hand washing before meal and after defecation (Pratibha *et al.*, 2017)

In a study by Amoo (2017) about knowledge and attitude of students at Centria secondary school towards effective hand hygiene in 2017 revealed that, although majority of the students washed their hands in some cases, most of them could not fully know the right procedures and techniques of proper and effective hand hygiene and the right use of alcohol hand rub in the prevention of illness.

Several interventions have been undertaken by different organizations and agencies such as Water Aid, the Centre for Disease Control and Prevention (CDC) about how to develop standard guidelines for when individuals should wash their hands. Results such interventions indicate that all individuals should wash their hands before preparing or eating food, treating cuts or wounds, and caring for someone who is ill. Hands should be washed after using the restroom, handling uncooked foods, changing a diaper, coughing or sneezing, playing with pets, handling garbage, and caring for someone who is ill. (WHO, 2012).

In a study that was about assessing secondary students knowledge of proper hand hygiene techniques, only 79.3% of the students reported that it very important for them to wash their

hands after going to toilet, 69.2% of students reported always performing hand hygiene after contact with a patient's skin, performing before patient contact, and 77.5% reported always performing hand hygiene after they have been in the dining hall. (Aquila & Community, 2014).

Out of seventeen questions about hand washing that students were asked in a study that was about developing hand hygiene behaviours in a secondary school in Turkey, it was reported that 80.5% of them washed their hands correctly before eating, 73.6% reported washing hands after eating, 91.8% after toilet, 83.4% of them after they woke up in the morning. This signified that students most these students had some good knowledge about when and why their hands should be washed (Cevizci *et al.*, 2015).

Results from the study knowledge, practice and attitude of hand hygiene among secondary schools in semi-urban communities of Sokoto, Nigeria shows that one hundred thirty two (91.7%) of the 144 respondents had good knowledge of hand hygiene. For example majority of the respondents (74.3%) knew hand hygiene to mean washing hands with soap and water and most of them knew (89.6%) knew that it should be done consistently (Ango *et al.*, 2017).

A study about oral and hand hygiene behaviour and risk of factors among in-school adolescents in four south east Asian countries shows that, in rural India the prevalence of good hand-washing (defined as “washing hands with soap and water after defecation and before eating food”) was 32.1%, and in two schools of Bangalore and Kolkata, India, 86% reported that they washed hands before eating lunch. The study also revealed that the proportions of school children reporting sub-optimal oral hygiene was lower than the proportions reported for not always washing their hands before meals (45.2%), after toileting (26.5%) and with soap (67.0%), which was more frequent than in any other country, while in Indonesian school children were the poorest in washing hands after toilet with 34.6% (Peltzer & Pengpid, 2014).

A study about promoting clean hands among children in Uganda (a school based intervention using ‘tippy-taps’) in the rural schools of Nakigo, Iganga district revealed that the proportion of students who reported that they always wash their hands after using the toilet increased from 5.5% to 65.0% in the intervention schools after they had gained hand washing knowledge from the trainings they had in their schools before the study and the percentage of students reporting no stomach pain episodes increased from 7.0% to 80.0% (Zhang *et al*, 2014).

2.3 Research gaps and summary

All external parts of the body need attention, time and care and water plays a major role in ensuring this. To achieve international development target of having the proportion of people without access to improved water and sanitation by 2015, 1.5 billion people will require access to water supply and about 2.2 billion people will require access to sanitation facilities (WHO, 2015). Other basic facilities needed in the schools include decent classrooms, water closet toilets, dustbins, water bowls, soaps, disinfectants, deodorants, tissue papers, good play grounds, napkins, incinerators (UNICEF, 2008).

Although a number of studies have been carried out relating to hand washing among secondary school students, some aspects have not been exhausted which have created research gaps that need to be filled. Such aspects include knowledge of students, enabling and inhibiting factors for hand washing among students and policy guidelines in place for promoting hand washing. For example studies about knowledge of students regarding hand washing have shown that majority of the students wash their after touching their genitals, before eating food and after visiting the toilets but nothing has been talked about whether students wash their hands after coughing, after eating food and after touching sick people and dead animals.

Studies on factors influencing hand washing among students have shown how availability of water, tippy taps and good hours of access influences ones behaviour to wash their hands but have ignored factors that contribute to poor adherence of hand hygiene like failure by school head teachers and teachers to make hand hygiene an institutional priority. Other factors which have been ignored include high workloads like being too busy for class work and knowledge deficits among students.

Studies shows that some schools follow policies and guidelines of hand washing, and have found it to be helpful in reducing the amount of microbes on hands in preventing infection. However such studies have not shown how such practices can improve the health status of students.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

Chapter three is organized under the following sub headings; research design, area of the study, sampling procedure, sample size determination, data collection methods, Data management, Data analysis and ethical considerations.

3.1 Study Design

The researcher employed a descriptive cross sectional survey research design that helped him in gathering information where little knowledge was known. A cross-sectional study using quantitative method was conducted among 291 students from five schools. For qualitative data, the researcher used purposive sampling to identify the key informants and members to participate in FGDs. The researcher used a cross sectional study design because it enables the researcher to study an independent variable and the dependent variable simultaneously which also helped him to save time and costs during the study.

3.2. Area of Study

The study was carried out in secondary schools of Ndorwa East Constituency in Kabale District, South Western Uganda. It is 409.24 KM from Kampala capital city of Uganda. Kabale district borders Rwanda from the South and East, Rukiga district from the North and Rubanda district from the West. Ndorwa East Constituency has 10 secondary schools which include Kigata High school, Harambe High school, Kamuronko S.S, Kabanyonyi Vocational S.S, Nyakigugwe S.S, ST Robert Gay Nyanja S.S, Kyanamira S.S, Kahondo S.S, Buhara S.S, and Rwesasi S.S and total number of students in these schools totals to 2300 at this study time. The researcher chose this location because Kabale district is prone to outbreaks of diarrheal disease especially Ndorwa west and Ndorwa east constituencies. In addition, Kabale is a border district, with high potential of importing cases from neighbouring districts in Rwanda. This is attributed to the study by ([Bwire et al., 2017](#)) who identified cholera hotspots along the borders of Uganda although Kabale district was not included.

According to the health sub district officer in charge of Ndorwa East Constituency, diseases such as typhoid, dysentery and other diarrheal diseases affects majority of people in the area which he attributes to poor sanitation and hygiene practices. He added that when such diseases

are not detected and treated early enough, they can cause death so first and can highly be transmitted from one person to another .Mubangizi (02/01/2018).

3.3 Study population

The study participants were secondary school students (both males and females), who were selected from different classes in the selected schools in Ndorwa East constituency in Kabale district. Other respondents were the key informants (head teachers and teachers in charge of health and sanitation).

3.4 Sample size determination and sampling procedure for schools and students.

3.4.1 Schools

The sample size for schools was determined using maximum proportion of 0.5 recommended by Krejcie and Morgan (1970). When estimating the variance of a dichotomous variable (hand washing as yes/no), Krejcie and Morgan (1970) recommends that researchers should use 0.50 as an estimate of the population proportion. This proportion will result in the maximization of variance, which will also produce the maximum sample size. In this study, therefore, 5 out of the 10 schools were used. The researcher used simple random sampling to select five schools to participate in the study. Simple random sampling was used in a way that the researcher had to write the names of all the schools in the area of study on small papers which were folded and put into a bucket. The researcher again had to shake the bucket such that the folded papers containing the names of all the schools in the area would mix up properly as a way avoiding biased selection of schools. After shaking, the researcher picked one by one from the bucket until the required number of schools was reached. As a way of maintaining the probability of each school being picked constant, the researcher kept on replacing the papers that he would find to have already been picked till the number of schools required was reached. The schools which were selected include Kigata High school, Harambe High school, Kamuronko S.S, Kabanyonyi Vocational S.S, and Nyakigugwe S.S. The total number of students in the selected schools varies from school to school for example Kigata High school has a total of 490 students, Harambe High school (158), Kamuronko S.S (280), Kabanyonyi Vocational S.S (95), and Nyakigugwe S.S has (180 students) which makes a total of 1203 students.

3.4.2 Students

The researcher used Krejcie and Morgan, (1970) table to determine the sample size of the students to be used in the study. Since the total number of students in the five schools which were selected using multi-stage sampling was 1, 203, the researcher had to subject the same number of students to Krejcie and Morgan's table and got the sample size as 291. Due a non response of 10% (participants did not show interest in answering the questions and those who were found absent) the sample size increased to 320. The researcher opted to use this method because it is standard and easy to be used in selecting the required sample size. Simple random sampling was also used to identify the respondents to participate in the study from the selected schools.

Table 1: SAMPLE SIZE DETERMINATION

S/N	SCHOOL NAME	NUMBER OF STUDENTS	NO-SAMPLED PER SCHOOL	NON RESPONSE	ACTUAL RESPONSE
1	Kigata High School	490	130	11	119
2	Kabanyonyi Vocational Secondary school	95	25	03	22
3	Kamuronko SS	280	75	09	66
4	Harambe High School	158	42	04	44
5	Nyakigugwe SS	180	48	02	40
	Total	1203	320	29	291

3.7 Data Collection methods and tools

Data collection was done using qualitative, quantitative and observational methods.

Qualitative data were collected using Focus Group Discussions and Key Informant Interviews and observation while Quantitative data were collected using semi structured interviews.

3.7.1 Qualitative data collection

3.7.1.1 Key Informant Interviews

This method was used to collect information on objectives 1 and 2. The Key informants (KI's) were purposively sampled and included in the study: Head teachers, Deputy Head teachers, Teachers in charge health, Health prefects and parents representatives were considered in each school. These helped in providing information on implementation of hand washing policies and guidelines and their utilization in secondary schools in Ndorwa East Constituency to the researcher.

3.7.1.2 Focus group discussions

This method was used to collect information for objectives 1 and 2. Focus group discussions (FGDs) were held with the students, head teachers, teachers in charge of health affairs and health prefects. This helped in providing additional information on hand washing practices among secondary school students. Purposive sampling was used in the selection of 6-12 participants to participate in each FGD. A total of two FGDs comprised students (both males and females) were conducted in each school. The FGDs were conducted using a topic guide (appendix D) and each lasted between 40 minutes to 1 hour. Participation in FGDs was by show of arms by the participants where the research would pick one by one until all the topics were exhausted. The topics for discussion included only those which were related factors influencing hand washing practices among secondary school students. Data was collected using notes and audio recorder.

3.7.1.3 Observations

This method was used to collect information for the objectives 1 and 2. An observational check list was used to find out whether students wash their for example before eating food, and after visiting latrines with the help of tippy taps and hand washing soap. Observational check list was used to find out whether the schools have enabling environment for supporting hand washing among students like installation of tippy taps and hand washing soap.

3.7.2 Quantitative data collection

Interviewing method was used to collect information for objectives 1 and 2. Semi-structured questionnaires which were designed by the researcher were used to collect the quantitative data. Questionnaires titled "Factors and knowledge associated with hand washing practices among secondary school students in Ndorwa East Constituency" (appendix A) were used in the process

of collecting quantitative data. The questionnaire involved both closed ended and open ended questions. The closed ended questions helped to capture specific and guided responses while the open ended questions allowed the participants to express themselves where the need would be. The questionnaires were administered by the researcher assisted by his research assistant.

3.7.3 Quality Control

The quality control measures that the researcher used include: adequate numbering of the questionnaires, proper identification of the informants and field editing of the questionnaires. In addition, the researcher trained the research assistant who helped him to collect the intended data. During data collection phase, the researcher together with his research assistant had to carry out supervision which helped him in getting the required data from the respondents.

3.7.3.1 Pre-testing

Pre-testing of research questionnaire was done where the researcher first selected twenty (20) students randomly in the schools which were not to participate in the study and administered to them the same questions to find out if the questionnaires would yield similar responses amongst the students as a way to ensure reliability. The researcher was responsible for editing the errors found in the questionnaire for it to be reliable.

3.8 Data management and analysis

Quantitative data were consolidated and edited, making sure that all questionnaires have proper identification numbers and that they are all complete. Data were entered and analyzed using a statistical computer package, called Statistical Package for Social Sciences (SPSS) version 20.0 and my analysis was restricted to uni-variate analysis.

First, descriptive statistics were used to analyze data regarding the demographic characteristics of respondents. The findings were presented in Table 2 as frequencies and percentages. Second, the practice of hand washing among Secondary School Students in Ndorwa East Constituency – Kabale District was presented using descriptive statistics, including frequencies and percentages in Table 3.

To find the factors associated with hand washing practices among Secondary School Students in Ndorwa East Constituency –Kabale District, descriptive statistics, including frequencies and percentages were used to determine the hand washing practices of students. Inferential statistics involving Pearson Chi Square were used. Independent factors with p-values that were ≤ 0.05 were considered to be the significant factors that influence hand washing at 95% confidence

interval. Frequencies, percentages, Chi square values, degrees of freedom (df) and p-values were presented in Table 4.

Qualitative data were first edited, making sure that all notes had proper identification numbers and that they were complete. Thematic approach was used to analyze the qualitative data following the chronology of the research objectives. Reports were organized in relation to the themes. Best quotes from the views of the participants were presented and this helped the researcher to support the emerging issues related to hand washing practices, factors and knowledge associated with good hand washing practices.

3.9 Ethical considerations

Since the study involved human beings as the respondents, the researcher had to ensure that their rights were highly protected. This included the right to privacy and dignity, right to confidentiality, and right to withhold participation. Participation was voluntary and the principle of informed consent ensured this. For those who were considered to be minors, the researcher had to seek their consent from their parents and guardians through their head teachers.

The researcher had to first seek approval of the university research committee and research ethics committee and then after went to the District Education Officer of Kabale district to ask for permission to go and collect data from the secondary students in Ndorwa east.

Before collecting data in any of the selected schools, the researcher had to first seek permission from the head teachers as a way of avoiding interruptions and delays during the study.

Lastly, the respondents' consent (Appendix E) was obtained first after explaining the purpose of the study and that they were not to be forced to answer any questions found uncomfortable for them.

3.10 Dissemination plan.

Upon the completion of this dissertation, the researcher will disseminate the findings to the education department of Kabale district, all secondary schools in Ndorwa East constituency. He will also give a copy of his book to post graduate department of Kabale University as well as the University Library which will be a future reference to other researchers. The researcher also hopes to publish his dissertation in a journal.

CHAPTER FOUR

RESULTS

4.0 Introduction

This chapter is organized under the following subheadings i.e. demographic characteristics of the respondents, hand washing practices among secondary school students and factors associated with hand washing among secondary school students in Ndorwa east constituency.

4.1 Demographic characteristics of the respondents

A total of 291 respondents participated in the study. Study participants were both males and females of secondary school aged below 12-22 years. A big number of participants were 12-17 years representing 80.1%, and the class with the highest representation was senior two with 23% (67) as indicated in Table 2.

Table 2: Demographic characteristics of the respondents

Parameter		Frequency	Percentage
Gender	Male	105	36.1
	Female	186	63.9
	Total	291	100
Age range	12-17 years	233	80.1
	18-22	58	19.9
	Total	291	100
Level of education	Senior 1	53	18.2
	Senior 2	67	23.0
	Senior 3	64	22.0
	Senior 4	54	18.6
	Senior 5	36	12.4
	Senior 6	17	5.8
	Total	291	100

Table 3: Practice of hand washing among Secondary School Students

Practice of hand washing	Response	Frequency	Percentage
Hand washing after the restroom	Yes	219	77.0
	No	72	23.0
	Total	291	100
Hand washing after coughing.	Yes	122	42.0
	No	169	58.0
	Total	291	100
Hand washing with soap before eating.	Yes	106	36.4
	No	185	63.6
	Total	291	100

The findings in the above table indicated that highest practice was washing hands after the students have been in their rest rooms (77%), followed by hand washing after coughing 122 (42%), and hand washing before eating food which accounted for 106 (36.4%). However through observations made by the researcher, it was noted that 15 out of 20 (75%) students observed at school A washed their hands after using the toilet, 15 out of 22 (68.2%) students washed their hands before eating food and 14 out of 16 students (87.5%) washed their hands after eating food. One of the key informants¹ also reported that:

“..... Most the students do not consider washing their after they have been in the dining hall to be important.”[Teacher in charge of health and sanitation at school B]

She went on and said that:

“It’s only 2 students out of 10 who can do it.” [Teacher in charge of health and sanitation at school B]

Concerning hand washing after coughing, one of the key informants replied that:

“... the practice of washing hands after coughing may necessary is not an important practice among students and teachers because it may end up consuming much of our time. You can imagine if one is to cough three times in a class. I think it is not very much necessary, may be if we can advise our students to keep coughing in the elbow and their handkerchiefs that would help us.” [Head teacher at school D]

Table 4: Bivariate analysis Results for factors associated with hand washing among

Parameter		Hand washing practice		UOR(95%CI)	p-value
		Yes, n=279 (95.9%)	No, n=12 (4.1%)		
Demographic factors					
Gender	Male	103(36.9)	2(16.7)	2.9(0.63- 13.62)	0.1711
	Female	176(63.1)	10(83.3)	Reference	
Age range	12-17 years	229(82.1)	4(33.3)	9.2(2.65-31.61)	0.001*
	18-22	50(17.9)	8(66.7)	Reference	
Level of education	Senior 1 -4	169(17.9)	8(66.7)		
	Senior 5-6	49(23.7)	4(33.3)	Reference	
Facility factors					
Presence of water for hand washing	Yes	256(91.8)	2(16.7)	55.7(11.50-269.1)	<0.001*
	No	23(8.2)	10(83.3)	Reference	
Presence of hand washing stations	Yes	249(89.2)	6(50.0)	8.3(2.52-27.37)	<0.001*
	No	30(10.8)	6(50.0)	Reference	
Provision of soap for hand washing	Yes	90(32.3)	6(50.0)	0.5(0.15-1.52)	0.2096
	No	189(67.7)	6(50.0)	Reference	
Cleanliness of stations	Yes	220(87.3)	1(8.7)	75.6(9.44-605.6)	0.001*
	No	32(12.7)	11(91.7)	Reference	
	No	151(53.9)	8(66.7)	Reference	

*significance level, $p < 0.05$.

In absence of other factors (Bivariate analysis), being aged 12-17 years (UOR = 9.2, 95%CI: (2.65-31.61): $p = 0.001$), presence of water for hand washing (UOR: 55.7, 95%CI: 11.50-269.38, $p < 0.001$), presence of hand washing stations (UOR: 8.3, 95%CI: 2.52-27.37, $p < 0.001$), and clean hand washing facilities (UOR: 75.6, 95%CI: 9.44-605.6, $p = 0.001$) were the factors associated with good hand washing practices at 95% level of significance. Other factors which

were associated with hand washing practices were functionality of hand washing stations, being comfortable with the hours of accessing hand washing stations and supervising students during hand washing by teachers and student leaders.

Data collected using the checklist by the researcher revealed that at least three out of five schools (60%) which were studied had tippy taps installed to support hand washing among students and the rest had cemented taps, 60% had water in taps for washing hands, 60% of the schools visited did not have soap for students to use while washing hands and 100 % of the schools had a reliable water source for washing hands (both tippy taps and cemented taps) in the school compounds.

Through observations made by the researcher, it was also discovered that most of facilities were clean except in one school where he found a rusted tippy tap. Through interviews with the Key informants, one of the deputy head teachers who participated revealed that:

“..... majority of the students can only attempt to wash hands only when their teachers and prefects are present in their dinning places when they are having their meals” (Head teacher at school A).

Also, during the Key informants’ interviews, it was revealed by two teachers in charge of health affairs for the two schools visited that although hand washing facilities were available many of them were not functional, one of them said:

“it is true that we have hand washing facilities in our school but they are not functional at all because we do not have a reliable source of water” [Deputy head teacher at school E].

Regarding the provision of soap for washing hands a key informant at school five said:

“..... the truth is that we do not provide soap to our students may to the teachers. This is because we find it costly to buy soap to all students, may be if the government can provide free soaps, there we can be in position of doing that”. [Teacher in charge of health and sanitation at school D].

CHAPTER FIVE

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter presents the discussion of the findings in line with the study objectives, conclusions, recommendations, and areas for further research.

5.1 Discussion

The discussion section presents hand washing practices of students and factors which are associated with hand washing practices among secondary school students as discussed below.

5.1.1 Practice of hand washing among secondary school students

This study examined the hand washing practices among secondary school students in Ndorwa Constituency in Kabale District. The study findings have revealed almost all the secondary school students were involved in the hand washing practice; most hand washing practice took place after they have been in the rest rooms. This indicates that the participants are aware that washing hands helps in removing contaminants they might have come into contact with while in the restrooms which should also be encouraged among students if they are to keep their hands clean all the times. This relates to what the health belief model which supported my study says that a person will follow a preventive behaviour such as hand washing if he or she perceives that there are benefits associated with it. The findings are in line with those of Asiedu *et al.* (2011) who found out that over 90% of school children in China who visited the restroom washed hands with soap and water.

It was also revealed that a majority of the students could not wash their hands with soap before eating food which is an indicator that they do not know the importance of soap in removing and killing disease contaminants which may be on their hands. This finding also do not relate to what the Health Belief Model talks about that a person will follow a preventive behaviour if he or she perceives that they susceptible to a risk of contacting diseases associated with poor hand washing practices such as diarrhoea, cholera and dysentery. These results are in agreement with a survey that was undertaken by Asiedu *et al.*(2011) which showed that majority of the students in China did not exercise proper hand washing using soap as a result of lack of access to hand washing supplies such as soap, towel and a clean running source of water. The results of this

study also agree with Miller (2012) who reported that being in a dining hall does not guarantee students to wash their hands with soap. This implies that there is a need to sensitize secondary school students on the appropriate times of the hand washing practices. This finding has important policy implications for health intervention and supporting the view that provision of hand washing soap to all schools would help students to avoid diseases which may be associated with dirty hands.

In this study, it was indicated that a big number of participants could not wash their hands after coughing. This practice is dangerous because it increases the chances of spreading diseases such as tuberculosis and common cold amongst the student population through hand shaking with others in case the diseased person does not wash hands after coughing. The findings are not in line with Borchgrevink (2013) who noted that keeping hands clean through improved hand hygiene is one of the most important ways to prevent sickness and spreading of germs to others, good hand washing can also fight the spread of the common cold, meningitis, bronchitis, Tuberculosis, influenza, hepatitis A, and most types of infectious diarrhoea. Therefore, the finding has important policy implications for health intervention and sensitizing the students to always wash hands even after coughing because it is helpful in removing the germs that may be associated with the cough.

5.1.2 Factors associated with hand washing among secondary school students

In this study in which the factors associated with hand washing were assessed, it was found out that presence of water for hand washing, presence of hand washing stations in schools, functionality of hand washing facilities by students to clean their hands and presence of hand washing stations that were clean were the factors associated with hand washing by students while at school. Besides, the majority of the respondents indicated that secondary school students have access to water for hand washing in their schools. This could be due to factors like access to funds from both the government and directors of private schools which would facilitate the construction of hand stations and filling them with enough water in schools where students indicated that they do not have access to water for hand washing. The field findings disagree with a similar study which was conducted by UNICEF (2005) which revealed that out of 200 Columbian school children only 7% of the children reported having clean water for hand washing. Other studies by Mbula, (2013) reported similar findings.

Majority of the secondary school students had hand washing stations in their schools. Majority of the students indicated that they had hand washing stations installed in their schools but it could be better if such hand washing stations can also be extended to schools which do not have them by the government and owners of private ones. In a related study by Setyautami, Sermsri, and Chompikul, (2012) about hand washing practices among elementary school students in Selat sub-district in Indonesia, two thirds (65.9%) of the respondents reported the availability of clean water at washing stands, 68.5% stated that soap was available at the stands, and 73.7% declared that hand washing stands were available at schools.

Further, in this study it was indicated that most secondary schools could not provide them with soap for hand washing. This practice is not good and should be discouraged in all the schools because washing hands without soap can not remove or kill germs which may be on hands and as a result students end up suffering from diseases associated with poor hand washing practices. The findings are not in line with the study by .Setyautami, Sermsri, & Chompikul (2012) where 68.5% of his study participants stated that soap was available at the stands which would encourage most of them to properly practice hand washing. These findings also disagree with Taylor (2016) who revealed that for students to wash their hands properly, they must be provided with detergents like soap if they are to prevent themselves from infections/ illnesses related to poor hand hygiene. This finding also has important policy implications because health policy stipulates that it is very important to wash hands with the help of a soap as helps to kill germs which may be dangerous to people. WHO organization states that washing hands with soap at critical times such as before meals, and after toilet use have been found to prevent hepatitis A infection, thus it is appropriate for disease control and prevention programs to as focus on hand washing as well as a preventive intervention.

In addition, the findings from this study indicated that most hand washing stations in schools were clean. This is an important practice which should be maintained because it reduces the risk of contracting diseases which are associated with poor hygiene practices diarrhoea, typhoid among others. Such findings are in line with the results of the study done by Dhiraj *et al* 2015 who revealed that clean hand washing facilities motivates people to wash their hands which minimises the risk of infection.

5.2 Conclusion

From the findings, it can be concluded that majority of secondary school students washed their hands after they have been in the rest room, after using the toilet, before after eating food and after coughing ; most hand washing practice took place after they have been in the restrooms. Although majority of the students washed their hands, most of them could not wash their hands with soap especially before eating food.

The factors associated with hand washing practices were presence of water for hand washing, presence of hand washing stations in schools, presence of soap for hand washing and cleanliness of hand washing stations. Much as presence of soap for hand washing was also associated hand washing practices in this study, it was indicated that most secondary schools could not provide soap for hand washing to students.

5.3 Recommendations

The study suggests that the school administrators and teachers should sensitize all students on assemblies and in school health clubs to continue practicing washing hands especially after using the toilets, before and after eating food and after coughing. This would help in preventing students from diseases associated with poor hand hygiene practices.

The study suggests the school administrators together with the teachers in Ndorwa East Constituency should allocate enough funds for putting up better hand washing facilities like tippy taps and soap to support hand washing among students.

The study also recommends that both school administrators and teachers should ensure that hand washings stations in schools are kept clean all the time as a way of avoiding contamination among students and teachers.

5.4 Areas for further research

Further research can be carried out on the following areas:

- i. A similar study should be carried out in tertiary institutions to establish whether similar factors are associated with hand washing practices in these institutions.
- ii. The role of supervision by teachers, parents and care takers in improving hand washing behaviours of students in secondary schools.

REFERENCES

- Aruna, S., & Sasikala, M. (2014). Effectiveness of hand hygiene teaching on knowledge and compliance of hand washing among the students at a selected school in Mugalivakkam village , Kancheepuram District, 3(4), 56–60.
- Amoo, G. H. (2017). Knowledge And Attitudes Of Students In Centria University Of Applied Sciences Towards Effective Hand Hygiene : Reduction and Prevention of Infection in the Uni- versity Campus . Bachelor Degree in Health Care , Nursing, (May).
- Anderson, J. L., Warren, C. A., Perez, E., Louis, R. I., Phillips, S., Wheeler, J., & Cole, M. (2008). Gender and ethnic differences in hand hygiene practices among college students. *American Journal of Infection Control*, 36, 361-368. doi: <https://doi.org/10.1016/j.ajic.2007.09.007>
- Ango, U. M., Awosan, K. J., Adamu, H., Salawu, S., Sani, M. M., & Ibrahim, A. H. (2017). Knowledge , Attitude and Practice of Hand Hygiene among Healthcare Providers in Semi-urban Communities of Sokoto State , Nigeria, 26(2), 1–9. <https://doi.org/10.9734/IJTDH/2017/36599>
- Aquila, T., & Community, D. (2014). Does Knowledge Make a Difference ? Assessing nursing students ' knowledge of proper hand hygiene techniques in correlation with their progression through nursing school.
- Arthi, E., Abarna, V., Bagyalakshmi, R., Anitharaj, M., & Vijayasree, S. (2016). Assessment of Knowledge , Attitude and Practice of Hand Hygiene among Nursing and Medical Students in a Tertiary Care Hospital in, 3(4), 1203–1206.
- Asiedu M. S., Van-Ess S. E., Papoe M., Setorglo J., Asiedu D. K., and Anderson A. K. (2011). Hand washing practices among school children in Ghana
- Barrett, R. & Randle, J. (2007). Hand hygiene practices: nursing
- Beth,W. & Jones N.(2014):A guide to good personal hygiene. Available on <http://www.personalhygieneand> retrieved May20,2015.
- Better Health Channel,(2015):Personal Hygiene facts.Available on <http://www> Fact sheet on personal hygiene. Retrieved January24,2015.
- Borchgrevink, C. P., Cha, J., & Kim, S. (2013). Hand washing practices in a college town environment. *Journal of Environmental Health*, 75(8), 18–24. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/23621052>

- Bwire et al (2017) Identifying cholera "hotspots" in uganda. An analysis of cholera surveillance data from 2011 to 2016.
- Catania, J.A., Kegeles, S.M., and Coates T.J. (1990). Towards an understanding of risk behavior: An AIDS risk reduction model (ARRM). *Health Education Quarterly*, 17(1), 53-72.
- Centers for Disease Control and Prevention (CDC). (2016). Show Me the Science - When & How to Use Hand Sanitizer.
- Center for Disease Control (February 14, 2013). Wash your hands
- Centers for Disease Control and Prevention (CDC). (2009). Guideline for Hand Hygiene in Health-care Settings.
- Center for Disease Control and Prevention. 2018. Wash your hands. Atlanta. From: <http://www.cdc.gov/features/handwashing/> (accessed 17 July 2018)
- Cevizci, S., Uludag, A., Topaloglu, N., Babaoglu, U., Celik, M., & Bakar, C. (2015). Developing students' hand hygiene behaviors in a primary school from Turkey: A school-based health education study. *International Journal of Medical Science and Public Health*, 4(2), 155. <https://doi.org/10.5455/ijmsph.2015.2809201430>
- Ciobanu, N., Dodos, J., & Adamonyte, D. (2016). Survey on Hygiene Knowledge, Attitude and Practice 2014-2015, (June).
- Curtis, V. and Cairncross, S. (2012). Effects of washing hands with soap on diarrhea risk in the country: a systematic review. Published by Lancet Publishing Group, London.
- Curtis, V., Schmidt, W., Luby, S., Florez, R., Touré, O., & Biran, A. (2011). Hygiene: New hopes, new horizons. *Lancet Infectious Diseases*, 11(4), 312–21. doi: 10.1016/S1473- 3099(10)70224-3
- Datta, S. S., Singh, Z., Boratne, A. V, Senthilvel, V., Bazroy, J., & Dimri, D. (2011). Knowledge and practice of handwashing among mothers of under five children in rural coastal South India. *International Journal of Medicine and Public Health*, 1(1), 33–38. <https://doi.org/10.5530/ijmedph.1.2011.6>
- Department of Health Services, Wisconsin (DHS). (2016). Infection control principles and practices for local health agencies.
- Dhiraj *et al* 2015. Quantification of perception status of hand washing practice among schoolchildren in a rural area of west bengal.

- Gachkar, L., & Moeinian, M. (2015). Knowledge, Attitudes, and Practices Study on Hand Hygiene Among Imam Hossein Hospital's Residents in 2013. *Iranian Red Crescent Medical Journal*, 17(10). <https://doi.org/10.5812/ircmj.19606>
- Global Handwashing Partnership. (2017). The State of Handwashing in 2016: Annual Review, (March), 1–11.
- Gould, D. (2012). School Toilets: Good practice guidance for schools in Wales. Published by the Welsh Government
- Guinan, M., Mc Guckin, M., & Ali, Y. (2009). The effect of a comprehensive hand washing program on absenteeism in elementary schools. *American Journal of Infectious Control*, 30, 217-20. doi: 10.1067/mic.2002.120366 .
- Handwashing, O. F. I. (2016). The republic of uganda leadership and access to safe water: key determinants of improved handwashing, 1–4.
- Health Canada. (2009). The benefits if hand washing.
- Heymann, D. L. (2008). Control of communicable diseases manual. (19th ed). Washington (DC): *American Public health association*. doi: <https://doi.org/10.1086/605668>
- Huberman (1994). The practice of Social Research. Belmont California. ISBN 0-534-05658-X
- Katz, J. D. (2004). Handwashing and hand disinfection: more than your mother taught you. *Anesthesiology Clinics of North America*, 22, 457–471. doi: 10.1016/j.atc.2004.04.002
- Kolbe, L., Jones, J., Birdthistle, I., & Vince-Whitman, C. (2000). Building the capacity of schools to improve the health of nations. In C. E. Koop, C. E. Pearson, & M. R. Schwarz (Eds.), *Critical Issues in Global Health* (pp. 212–220). San Francisco: Jossey-Bass.
- Kolbe, L., Tirozzi, G., Marx, E., Bobbitt-Cooke, M., Riedel, S., Jones, J., & Schmoyer, M. (2005). Health programs for school employees: Improving quality of life, health & productivity. *Promotion & Education*, 12, 157–161.
- Kumar, S., Loughnan, L., Luyendijk, R., Hernandez, O., Weinger, M., Arnold, F., & Ram, P. K. (2017). Handwashing in 51 countries: Analysis of proxy measures of handwashing behavior in multiple indicator cluster surveys and demographic and health surveys, 2010-2013. *American Journal of Tropical Medicine and Hygiene*, 97(2), 447–459. <https://doi.org/10.4269/ajtmh.16-0445>
- Luby, S. (2001). The role of hand washing in improving hygiene and health in low-income countries. *American Journal of Infection Control*, 29(4), 239–40. doi: 10.1067/mic.2001.1115678

- Luby, S. P., Halder, A. K., Huda, T., Unicomb, L., & Johnston, R. B. (2011). The Effect of Handwashing at Recommended Times with Water Alone and With Soap on Child Diarrhea in Rural Bangladesh : An Observational Study, 8(6). <https://doi.org/10.1371/journal.pmed.1001052>
- Lucas, A.O. & Gilles, H. M. (2012): Short textbook of public health medicine for the tropics. 5th edition. Book Power Publishers, London. 154 -159
- Mead, P.S., Slutsker, L., Dietz, V., McCaig, L.F., Bresee, J.S., Shap-iro, C., Griffin, P.M., & Tauxe, R.V. (1999). Food related death and illness in the United States. *Emerging Infectious Diseases*, 5(5), 607–625.
- Miller, M. J. 2012. Reliability and validity. Available: http://michaeljmillerphd.com/res500_lecturenotes/Reliability_and_Validity.pdf Accessed: 3 March 2013.
- Mbula, E. S. (2013). Factors influencing implementation of hygiene practices in public secondary schools in central division of Machakos district in Machakos county by Nabavi, M., Alavi-Moghaddam, Nadakavukaren, A. (2011). Food quality. Our global environment: A health perspective. *Waveland Press, Incorporated*.
- Parker, D. (1993). Participatory evaluation: Tools for managing change in water and sanitation: Technical paper No. 27; The World Bank, Washington, D.C.
- Peltzer, K., & Pengpid, S. (2014). Oral and Hand Hygiene Behaviour and Risk Factors among In-School Adolescents in Four Southeast Asian Countries, 2780–2792. <https://doi.org/10.3390/ijerph110302780>
- Prater, K. J., Fortuna, C. A., Janis, M. L., Brandeberry, M. S., Stone, A. R., & Lu, X. (2016). Poor hand hygiene by college students linked to more occurrences of infectious diseases, medical visits, and absence from classes. *American Journal of Infection Control*, 44, 66-70.
- Pratibha Manandhar, Ram Krishna Chandyo, (2017). Hand washing knowledge and practice among school going children in Duwakot, Bhaktapur Journal of Kathmandu Medical College, Vol. 6, No. 3, Issue 21, Jul.-Sep.
- Policy, C. (2012). Hand Hygiene Procedure Procedure.
- Public Health Medicine Communicable Disease Group (PHMCDG). 2014. Management of Infectious Disease in Schools.

- Rabbi, S. E., & Dey, N. C. (2013). Exploring the gap between handwashing knowledge and practices in Bangladesh: A cross-sectional comparative study. *BioMed Central Public Health*, 13, 89. doi: 10.1186/1471-2458-13-89
- Ramos, M. M, Blea, M, Trujillo, R, & Greenberg, C. 2010. Inspections of hand washing supplies and hand sanitizer in public schools.
- Resnik, D. B. 2015. What is ethics in research & why is it important? Available: <https://www.niehs.nih.gov/research/resources/bioethics/whatis/> Accessed: 15 March 2017. Last Re-viewed: 07 July 2016.
- Rosenstock IM. (1974). The Health Belief Model and preventive health behavior. *Health Educ Monogr*; 2:354-386.
- Setyautami, T., Sermsri, S., & Chompikul, J. (2012). Proper hand washing practices among elementary school students in Selat sub-district , Indonesia, 10(2). Setyautami, T, Sermsri, S, & Chompikul, J. 2011. Proper hand washing practices among elementary school students in Selat sub-district, Indonesia.
- Sibiya, J. E., & Gumbo, J. R. (2013). Knowledge, attitude and practices (KAP) survey on water, sanitation and hygiene in selected schools in Vhembe District, Limpopo, South Africa. *International Journal of Environmental Research and Public Health*, 10(6), 2282–2295. <https://doi.org/10.3390/ijerph10062282>
- South Australian Health (SAH). 2015. Clinical guideline: Hand hygiene.
- Slyne H., Philips C., and Parkes J. 2012. Infection prevention practice: how does experience affect knowledge and application.
- South Australian Health (SAH). (2012) Viral meningitis –including symptoms, treatment and prevention.
- South Australian Health (SAH). 2012. Hand hygiene.
- Steiner-Asiedu, M., Van-Ess, S. E., Papoe, M., Setorglo, J., Asiedu, D. K., & Anderson, A. K. (2011). Hand Washing Practices among School Children in Ghana. *Current Research Journal of Social Sciences*, 3(4), 293–300.
- Tao, S. Y., Cheng, Y. L., Lu, Y., Hu , H. Y., & Chen, D. F. (2013). Hand washing behaviour among Chinese adults: a cross-sectional study in five provinces. *Public Health*, 127, 620-628. doi: 10.1016/j.puhe.2013.03.005
- Taylor, J. K, Basco, R, Zaied, A, & Ward, C. (2010). Hand hygiene knowledge of college students. The importance of handwashing. (2017), (July).

The Uganda Human Rights Commission (2012). 11th Annual Report of the Uganda Human Rights Commission to the Parliament of the Republic of Uganda

Trampuz, A. and Widmer, A. F. 2018 Hand hygiene: A frequently missed lifesaving opportunity during patient care. Available: <https://portal.cou.fi/ehis/ehost/pdfviewer/pdfviewer?sid=1f339402-f5df-40ae-a51e-89e353c5fe96%40sessionmgr12&vid=1&hid=20>

UNICEF, 2016. One is too many: Ending child deaths from pneumonia and diarrhea.

UNICEF (2005). Child friendly hygiene and sanitation facilities in schools. Publication @ irc.nl

UNICEF, (2008): Wash cluster HP project. WASH –Introduction to hygiene promotion. Tools and Approaches. <http://UNICEF> Retrieved May 2015

United Nations Children's Fund, (2013). Soap, Toilets, and Taps. A foundation for Health Children. Available at: www.globalhandwashingday.org.

Vessey, J. A., Sherwood, J. J., Warn, D., & Clark, D. (2007). Comparing handwashing to hand sanitizers in reducing elementary school students' absenteeism. *Pediatric Nursing*, 33(4), 368-36872.

Vivas, A., Gelaye, B., Aboset, N., Kumie, A., Berhane, Y., & Williams, M. a. (2010). Knowledge, Attitudes and Practices of Hygiene Among School Children in Angolela, Ethiopia. *Journal of Preventative Medicine and Hygiene*, 51(1), 73–79. <https://doi.org/10.1016/j.str.2010.08.012>. Structure

White, C., Kolble, R., Carlson, R., Lipson, N., Dolan, M., Ali, Y., & Cline, M. (2003). The effect of hand hygiene on illness rate among students in university residence halls. *American Journal of Infection Control*, 31, 364-70. doi:10.1016/S0196-6553(03)00041-5

World Health Organization, (2015): Prevention of blindness. International ear Care day 2015: Making listening safe. <http://WHO> Accessed April 2015.

World Health Organization. (2012). Importance of good hand hygiene for patient safety.

World Health Organization. (2012). Hand hygiene knowledge among secondary school students.

World Health Organization, (2014): Cholera Media Centre Fact Sheets. WHO, Geneva

World Health Organization. (2009). WHO Guidelines on Hand Hygiene in Health Care First Global Patient Safety Challenge Clean Care is Safer Care.

World Health Organization. (2006). Your 5 moments for hand hygiene.

Zhang, A.J Mosa, A.S. Hay Ward and S.A. Matthews (2014). Promoting clean hands among children in Uganda: A school based intervention using ‘tippy-taps’

Zakeri, H., Ahmadi, F., Rafeemanesh, E., & Saleh, L. A. (2017). The knowledge of hand hygiene among the healthcare workers of two teaching hospitals in Mashhad. *Electronic Physician*, 9(8), 5159-5165. Doi: 10.19082/5159

APPENDICES

APPENDIX A: QUESTIONNAIRE FOR THE RESPONDENTS

Dear Respondent,

I am Twinomuhwezi Benja a student at Kabale University pursuing a Master's Degree in public health. I am carrying out an academic research on the topic "*Factors associated with Hand Washing Practices among Secondary School Students in Ndorwa East Constituency –Kabale District*". The information you give me will be confidential as it will be for academic purposes only.

Do not write your name on this questionnaire.

Thank you for your cooperation.

Yours faithfully,

.....

SECTION A: Demographic characteristics of respondents. (Tick where appropriate)

1) Gender (i)

Male

Female

2) Age.....

3) Level of education.....

SECTION B. General Knowledge on hand washing among students

1. Do you know the steps for hand washing?

A. Yes

B. No

2. Do you follow the steps for hand washing?

A. Yes

B. No

3. When should people wash their hands?

A. After visiting the toilet

- B. Before eating food
- C. After eating food.
- D. After touching the patients.

4. What is the importance of washing hands?.....

5. Is it essential to wash your hands prior to eating or dinning?

- A. Yes
- B. No

6. Is it very important for you to wash hands after dinning or eating?

- A. Yes
- B. No

7. Why is it important to wash your hands with soap before eating?

.....

SECTION C: Examining the hand washing practices among secondary school students.

8. Do you wash hands after you have been in the restroom?

- A. Yes
- B. No

9. Do you dry between your fingers and palms after washing your hands?

- A. Yes
- B. No
- C. No idea

10. Do you always wash your hands with soap before eating?

- A. Yes
- B. No

11. How many minutes/ seconds do you use in washing your hands after using the bathroom?

- A. 1 –5 seconds
- B. 6 –10 seconds
- C. 11 –30 seconds
- D. 30 –60 seconds

E. 1- 3 minutes

12. Do you wash your hands after coughing?

A. Yes

B. No

13. How often do you wash your hands during a school day?

A. Once

B. Twice

C. More than 5 times

D. More than 10 times

E. I do not wash my hands

SECTIOND: Factors associated with hand washing among students.

14. Do you have access to water for hand washing in your school?

A. Yes

B. No

15. Are there hand washing stations in your school?

A. Yes

B. No

If yes, are they functional?.....

If no how do you improvise?.....

16. Does your school provide you with soap for hand washing?

A. Yes

B. No

17. Are you comfortable with the hours that you access hand washing facilities?

A. Yes

B. No

18. Do teachers and prefects supervise you as you wash your hands?

A. Yes

B. No

19. Are there hand washing stations in your school clean?

A. Yes

B. No

If yes, explain how?.....

If no, what do you recommend to be done?.....

20. Do you feel concerned to inform school colleagues to perform hand hygiene when they fail to do so in most circumstances?

A. Yes

B. No

If yes, give reasons to support your answer.....

Thank you for your cooperation.

APPENDIX B: KEY INFORMANT INTERVIEW GUIDE

Code of the respondent.

Name of the school.....

Level of education.....

Responsibility of the respondent

.....

I would like to get your views on the hand washing practices among secondary school students in Ndorwa East Constituency in Kabale district.

1. Why is hand washing important?
2. When should people wash their hands?
3. What factors limit effective hand washing practice and promotion in your school?
4. What are the dangers of not practicing hand washing?
5. Are there hand washing facilities in your school?
6. How can hand washing be improved among secondary school students?
7. What are enabling factors for hand washing in your school?
8. Do you use soap as you wash your hands?
9. Do you follow right procedures of hand washing?

Thank you for your cooperation.

APPENDIX C: OBSERVATION CHECK LIST

Find out whether the following tools/equipment which support hand washing are available in schools and if students wash their hands at specified time.

	Yes	No
Presence of guidelines for hand washing		
Presence of tippy taps.		
Presence of water in tippy taps.		
Availability of hand washing soap.		
Hand sanitizers.		
Source of water for hand washing.		
Students washing hands after the toilet		
Students washing hands before dinning/eating		
Students washing hands after eating food.		

Appendix D: TOPIC GUIDE FOR THE FOCUS GROUP DISCUSSIONS

Name of the school.....

FGD Number

1. Do you think that hand washing is important to your health?
.....
2. What steps do you normally follow to wash your hands?
.....
3. When do you normally wash your hands?
.....
4. How many times do you wash your hands during a school day?
.....
5. Is it important for you to wash your hands after
 - (a) Eating?
 - (b) Using a latrine/ toilet
.....
 - (c) Coughing
.....
6. Could there be facilities that support hand washing in your school?
.....
7. Do teachers and prefects supervise you as you wash your hands?
.....
8. Tell me about the cleanliness of hand washing in your school?
.....
9. Who reminds you to wash your hands while at school/ home?
.....
.....

Appendix E: Print Copy of Informed Consent

ANONYMOUS SURVEY CONSENT {Factors associated with hand washing practices among secondary school students in Ndorwa east constituency}.

You are requested to participate in research supervised by Mr Johnson Runyonyozi on the assessment of Factors associated with hand washing practices among secondary school students in Ndorwa east constituency.

This survey should take about 15 to 30 minutes to complete. The goal of this survey is to understand Hand hygiene knowledge, hand washing practices and factors that influence hand washing among secondary school students. You will therefore be asked to answer questions about that topic.

Your participation in this survey is voluntary and the decision whether or not to participate will not affect your relationship with Kabale University, and refusal to participate will not involve any penalty or loss of benefits. You also need to not that there are no direct benefits for participating in this survey.


The information from this study will help health professionals help build successful promotion and intervention strategies of hand hygiene among secondary school students across the globe. This may in turn help to reduce the risk infection amongst the secondary school students as well as the entire population.

Do you agree to participate?

Yes.....No.....Date

I wish you well as you participate.

Yours,

A handwritten signature in blue ink, appearing to read 'Twinomuhwezi Benja', is written over a horizontal line.

Twinomuhwezi Benja (Principal investigator).

APPENDIX F: SAMPLE SIZE DETERMINATION USING KREJCIE AND MORGAN's TABLE

N	S	N	S	N	S
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note;” N” is population size and “S” is sample size.

Source: Krejcie and Morgan,(1970).

APPENDIX G: A sketch map showing the location of my study area Ndorwa east constituency in Kabale district.

