

UNIVERSITY OF EDUCATION, WINNEBA
COLLEGE OF TECHNOLOGY EDUCATION, KUMASI
SCHOOL OF GRADUATE STUDIES

**HAND WASHING PRACTICES OF STUDENTS IN JUNIOR HIGH
SCHOOLS (A SELECTION OF T. I. AHMADIYYA JUNIOR HIGH SCHOOL)**



HABIBA MORO

AUGUST, 2019

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**A Dissertation Submitted to the Department of HOSPITALITY AND
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research and Graduate Studies, University of Education, Winneba in Partial
Fulfilment of the Requirements for the award of Master of Technology
Education (Catering and Hospitality) M-Tech**

AUGUST, 2019

DECLARATION

CANDIDATE'S DECLARATION

I, HABIBA MORO, hereby declare that this dissertation is the result of my own original research and that no part of it has been presented for another Master of Technology Education (Catering and Hospitality) in this University or elsewhere. Except for references to other authorities, which have been documented, this dissertation is the result of my own work and has neither in whole nor part been presented elsewhere.

SIGNATURE:

DATE:



SUPERVISOR'S DECLARATION

I hereby declare that, the preparation and presentation of this dissertation was supervised in accordance with the guidelines on supervision of project works laid down by the University of Education, Winneba.

SIGNATURE:

DATE:

DR. (MRS) ELLEN OLU

DEDICATION

I dedicate this work to my dear family and all those who supported me, I say God bless them.



ACKNOWLEDGEMENTS

I wish to sincerely thank the Almighty God for granting me good health and knowledge to do this tiresome work. I wish also to express my sincere appreciation to my supervisor, Dr. Mrs. Ellen Olu for her professional guidance during my research work. My sincere gratitude goes to my family members for the support and encouragement given to me during the writing of this thesis.

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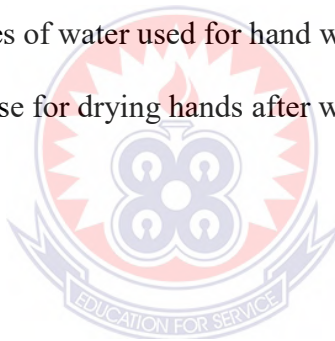


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ABSTRACT

Many studies have been carried out on hand washing practices among students in other districts of the country but the focus of this study is hand washing practices among junior high school students in the Kassena/Nankana West District of the Upper East Region of Ghana. This study aimed at establishing how junior high school students perceive hand washing and their hand washing practices both in school and at home. The practical experiment approach (pre-experimental) which relied on questionnaire and demonstration was adopted for the study. One hundred and twenty-six (126) junior high school students were purposively sampled for the study. Descriptive statistics comprising frequency tables, percentage and charts were used to analyze the data obtained. The findings of the pre-test results showed that students' general perception of hand washing and their hand washing practices were not good. The pre-test results also show that students' lack knowledge on the effect and impact of poor hand washing on their health. After the implementation of the intervention, the results (post-test) showed that students now have positive attitude towards hand washing and also practice good hand washing by using soap and warm to vigorously rub their hands and dry them using paper/disposable towel. The post-test results further revealed that students have now acquired knowledge on the effects of poor hand washing practices on their health and the impact of good hand washing practices in preventing diseases. It is recommended based on the results of the post-test that school management should plan and adopt hand washing policies for their schools and also ensure that they enforce the practices captures in the hand washing document among students to improve the health of the students. Also, school authorities, government and school health-base non-governmental organization should come to the aid of the basic schools by providing them with the needed resources such hand sanitizers, disposable towel, tippy taps, detergents, alcohol-base rub and soaps for students to use to wash their hands regularly.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Global Hand washing Day (GHD) is a campaign to motivate and mobilize people around the world to improve their hand washing habits. Washing hands at critical points during the day and washing with soap are both important. Global Hand washing Day occurs on 15 October of each year. The global campaign is dedicated to raising awareness of hand washing with soap as a key factor in disease prevention. Also, respiratory and intestinal diseases can be reduced by 25-50% if proper hand washing attitudes are practiced (Rai, 2009).

Although people around the world wash their hands with water, very few of them wash their hands with soap at critical moments such as after using the toilet, while cleaning a child and before handling food. In 2008, a UNICEF Report indicated that pneumonia, a major acute respiratory infection (ARI), is the number one cause of mortality among children under five years old, killing an estimated 1.8 million children per year. Diarrhea and pneumonia together account for almost 3.5 million child deaths annually (UNICEF, 2008). According to the Ministry of Health (MoH) (2009) hand washing with soap is very effective and the least expensive way to prevent diarrhea and acute respiratory infections (ARIs). Hand washing with soap is estimated to reduce cases of diarrhea by 30% and respiratory infections by 21% in children under the age of five (Global Hand washing Day, 2012). Hand washing is usually done together with other sanitation interventions as part of water, sanitation and hygiene (WASH) programmes. The Global Hand washing Day helps raise awareness of the importance of washing with soap, but it also makes it fun for children to get involved (Sawyer, 2011).

Proper hand washing is one of the simplest, most affordable and effective means of stopping the spread of infection via feces, body fluids, and inanimate objects. Hand washing is especially important for children and adolescents, as these age groups are the most susceptible to infections gained from unwashed hands. In addition to this due to the close proximity of children in schools and child care settings, there is a high risk for the spread of infectious disease. Proper hand washing also improves learning and teaching processes by reducing absenteeism (Besha, Guche, Chare, Amare & Kassahun, 2016). Larsen (2013) asserts that, it is important to make hand washing into a habit. Good hand washing with soap before eating and after using the toilet into a regular habit can save more lives than any single vaccine or medical intervention, cutting deaths from diarrhea by almost half and deaths from acute respiratory infections by one-quarter. Proper hygiene requires that individuals know the importance of good hygiene and develop the habits to carry it out. There are people with plenty of money but nonetheless, they lack the important habits of timely hand washing with soap, and thereby unknowingly endanger themselves and others around them (Jeffrey & Myriam, 2014). Peer influence was found to be an influential factor to increasing hand washing practices among students. For instance, in a study conducted in Kenya, researchers found that students were much more likely to wash their hands when another student is present (Pickering, Blum, Breiman, Ram, & Davis, 2014).

The study therefore concluded that peer influence is only successful, however, when students know that hand washing is a desirable action. The Centre for Disease Control and Prevention (CDC, 1996) has indicated that one of the most important measures for preventing the spread of pathogens is effective hand washing practices. This is because hand washing can remove the agents of infection both at the time that they are emitted from the primary host and prevent those reaching secondary hosts. Proper hygienic

habits such as hand washing have been shown to reduce diarrhea morbidity and life-threatening diarrhea by 42 to 48% (Curtis, Biran, Deverell, Hughes, Bellamy & Drasar, 2003), the prevalence of upper respiratory infections by 24%, (Rabie & Curtis., 2006) and the prevalence of dermatological infections by 23 to 43% (Luby, Agboatwalla, & Feikin, 2005). Unfortunately, poor knowledge on basic hygienic practices and attitudes to personal hygiene, such as hand washing has negative impact for a child's long term overall development (GHWD 1, 2008 cited in Arthur, 2014). As a result of common cold and other infectious diseases nearly 22 million school days are lost. The United Nations International Children's Emergency Fund (UNICEF) (2008) however believes that this phenomenon could be totally eradicated if proper hand washing attitudes are practiced in schools because an estimated 1.9 billion school days could be gained if the Millennium Development Goals (MDGs) related to safe water supply and sanitation are achieved and the incidence of diarrhea illness is reduced.

Also, according to (School Health and Nutrition in Developing Countries) (www.savethechildren.org), healthier children stay in school longer, attend school more regularly, learn more and become healthier and more productive adults. Oduntan, (1974) showed that hand hygiene is the most important and effective infection prevention and control measure to prevent the spread of infections. One way of achieving this is by providing schools with safe drinking water, improved sanitation facilities and hygiene education that encourages the development of healthy behaviours for life. It is for these reasons that the Water, Sanitation and Hygiene Education (WASH) programme was introduced in schools to promote healthy and hygienic practices in schools and among school children. It is also imperative to state that diarrhea is not the only health effect of poor hygiene and sanitation— cholera, dysentery, worms, trachoma, pneumonia and malnutrition could also be reduced through improved

sanitation and hygiene (Arthur, 2014). For these reasons, it is important that we make hand washing with soap an everyday habit. It against this background that this study, ‘Hand Washing Practices of Students in Junior High Schools (A Selection of T. I. Ahmadiyya Junior High School ‘A’) is being conducted in the Kassena-Nankana West District.

1.2 Statement of the Problem

According to UNICEF (2008) Pneumonia, a major acute respiratory infection (ARI), and diarrhea account for almost 3.5 million child deaths annually. However, persons in charge of public health relatively neglect the two biggest killers of children; diarrhea and ARI. According to WHO (2008), 88% of diarrheal cases worldwide are related to unsafe water, inadequate sanitation or poor hygiene. Particularly, school children are at risk due to neglect of basic personal hygiene (Postma, Getkate, & Vanwijk, 2004; Oduntan, 1974). The results in terms of morbidity and mortality are also more severe in them compared to adults. The increased problem of communicable diseases among school children due to poor hand washing practices and inadequate sanitary conditions remains a concern on the public health agenda in developing countries (Arthur, 2014). The hands are probably the single most important route for transmission of infection in the home and community, as they are often in direct contact with the mouth, nose and conjunctiva of the eyes according to (NIMPE, 2000 cited in Arthur, 2014). One effective means of preventing diseases which are transmitted via the faecal-oral route, including worm infections and epidemics of cholera and typhoid is through proper hand washing practices. Making hand washing with water and soap a daily routine and repetitive behaviour among students could be one sure way of achieving two of the Millennium Development Goals (2 and 4), which support Education and Health.

Promotion of good hygiene and hand washing practices is not only necessary but also very relevant (Bennell, 2002) due to the numerous benefits that comes with its practice. Promoting good hand washing is a participatory activity which should involve students for it stick and stay. This assertion was buttressed by a UNICEF report, which stated that, a sense of ownership that makes new behaviours more likely to be adhered to is when the children themselves are involved as active participants in promoting hand washing with soap in schools (UNICEF, 2008).

In Ghana, the School Health and Education Programme (SHEP) is to provide a comprehensive health education and services, as well as ensure availability and use of water and sanitation facilities in schools to facilitate the practice of hand washing (SHEP, 2008). Similarly, the Water, Sanitation and Hygiene (WASH) programme was introduced to augment the activities of SHEP at the school level. T. I. Ahmadiyya Junior High School is one of the numerous junior high schools located in the Paga Community in the Kassena-Nankana West district of the Upper East Region of Ghana. The school has student population of 280 housed in six classrooms with staff strength of 15 teachers and five trainee teachers on teaching practice. The school has no access to water. Students walk about 150 meters to fetch water into containers inside the classroom where they drink from and wash their hands when need be. The school has toilet and urinal facilities. It has no hand washing facilities where students could wash their after using the toilet or urinal. The question that arises is how do these students keep their hands clean before handling food and after visiting the toilet or urinal facilities? Although interventions such as the SHEP and WASH exist in schools (Tay, 2005; SHEP, 2008), studies have not been conducted to examine the effects of poor hand washing practices of students in T. I. Ahmadiyya JHS in the Kassena-Nankana West district.

1.3 Purpose and Objectives of the Study

The purpose of the study is to examine the hand washing practices of students of T. I. Ahmadiyya JHS and to demonstrate to students the proper ways of hand washing.

The study will specifically examine;

1. Students' perception of hand washing practices in their school.
2. The hand washing practices among students of the school.
3. Finally, the study will suggest hand washing strategies to improve hand washing practices among students in the selected school.

1.4 Research Questions

The following research questions guided the study;

1. What are students' perceptions of hand washing practices?
2. To what extent do students practice hand washing in their school?
3. What hand washing intervention strategies can improve hand washing practices among the students in the selected school?

1.5 Significance of the Study

The study when completed would contribute greatly in promoting healthy lifestyle among students in the selected school because it would provide solutions as to why students always catch common cold, diarrhea, ARIs and so on. The study would equip teachers and management of the selected school with adequate information and knowledge that would enable them guide students on the proper ways of washing their hands.

School caterers in the selected school would also benefit from the study in that they would be educated on proper ways of handling food to avoid cross contamination and

food borne illness. Authorities from the Kassena-Nankana West district assembly particularly the hygiene and disease control unit could the information and intervention strategies provided by the study to organize training sessions for other students and school caterers in the district so as to prevent outbreak of preventable diseases such cholera and diarrhea.

Finally, the study would serve as reference material for future researchers who may want to research into same or related area.

1.6 Delimitations of the Study

The study would have covered more schools in the Kassena-Nankana West district, but due to the complex nature of data collection, techniques of data analysis and large number of students, the study is limited to T. I. Ahmadiyya JHS in the district. Also, time constraint forced the researcher to select T. I. Ahmadiyya JHS because it is a nearby school. This could afford the researcher the needed time to implement the intervention strategies that would benefit the students.

1.7 Organization of the Study

The study would be organized under five chapters. Chapter one which is the introductory chapter would look at the background to the study, statement of the problem, purpose and objectives of the study, research questions, significance of the study, delimitations of the study, definition of terms and organization of the study.

Chapter two would review literature relevant to the topic under discussion while chapter three would discuss the methodology employed to gather data for the study. The methodology would include the research design, population, sample and sampling

techniques, research instruments, validity and reliability of the instruments, data collection procedures, data analysis plan, ethical considerations and limitations of the study.

Chapter four would present the results of the study. It would discuss the results in relation to the research questions. Finally, chapter five would look at the summary of findings, conclusions and make recommendations based on the findings of the study.

1.8 Definition of Terms

Hand washing: refers to washing of hands with soap under running water



CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter reviews relevant literature with respect to the problem under study. The review covered the following areas;

- Concept/Definition of Hand washing
- History of hand washing
- Awareness of hand washing in some countries
- Importance of hand washing
- When, how and ways to wash your hands
- Substances used for hand washing
- Policies, procedures and standards for personal hygiene and hand washing
- Empirical evidence of lack of effective hand washing by people across the world
- How to implement a hand wash programme

2.1 Concept/Definition of Hand washing

Hand washing according to Hatch and Gangarosa (1981) is the act of cleaning the hands with or without the use of water or another liquid with the use of soap or other detergent.

Hand washing is the vigorous, brief rubbing together on all surfaces of lathered hands for about 20 seconds followed by rinsing under a stream of water (www.encylopedia.com). The site further explained that it is important to dry hands completely, otherwise, leaving soap residue on the skin and incomplete drying can contribute to dermatitis. Similarly, a Wikipedia report describes hand washing as the act of cleansing the hands with or without the use of water or with the use of soap for the purpose of removing soil, dirt and or microorganism. Also, the World Health

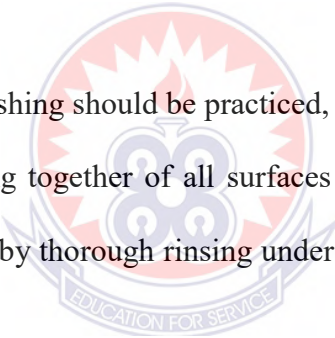
Organization's Guidelines on Hand Hygiene in Health Care (2006) defines hand washing as washing of hands with plain or antimicrobial soap and water. From the above definitions, it is clear that hand washing involves use of soap to clean the hands under running water to protect the hands from germs and bacteria. It is common knowledge that the hand is an important part of the human body and plays several roles including sending food through the mouth into the stomach. For this reason, if proper care is not taken especially among basic school pupils, the hand could serve as a medium of transfer of harmful micro-organisms not just to the individual but also from one person to another. A number of infectious diseases can be spread from one person to another by contaminated hands, particularly gastro intestinal infections and Hepatitis A (Besha, Guche, Chare, Amare & Kassahun, 2016). The Centre for Disease Control and Prevention (CDC, 1996) asserts that proper hand washing can prevent the spread of organisms. Some forms of gastroenteritis can cause serious complications, especially for young children, the elderly or those with weakened immune system.

2.2 History of Hand Washing

In the 1840s, the significance of hand transfer of pathogenic bacteria was recognized when Ignaz Semmelweiss and Oliver Wendell Holmes asserted that physicians carried the agent of 'childbed fever' on their hands. However, hand washing and disinfection to prevent spread of disease and illness was not practiced until the later part of the 19th century due to the efforts of Pasteur and Lister (Borgatta & Robbins, 1989). This knowledge has led to studies and procedures in health care settings (e.g. surgery, patient contact etc.) that minimize contamination and prevent the transfer of life threatening pathogenic microorganisms from one individual to another (Favero, 1985). Many of these studies have involved hand washing techniques and hand washing devices as well

as different soaps, detergents and antimicrobial preparations. According to the Center for disease Control [CDC] (1996), it has also become a standard practice, in the past years, for health care personnel to wear gloves in order to provide protection to themselves from blood-transmitted diseases as well as to prevent transmission of pathogens. Cruickshank and Humphrey (1987), also established that unwashed hands can transmit pathogens, especially fecal pathogens to food products after food workers uses the toilet. When consumed in food, these pathogens can cause illness and disease (Council for Agricultural Science and Technology-CAST, 1994).

In 1986, Garner and Favero recommended in the United State Guidelines for Hand Washing and Hospital Environment Control that, to prevent transmission of infectious diseases in hospitals;

- 
- a) A routine hand washing should be practiced,
 - b) A vigorous rubbing together of all surfaces of lathered hands for at least 10 seconds, followed by thorough rinsing under a stream of water. Plain soap can be used.
 - c) If bar soap is used, it should be kept on racks that allow drainage of water.
 - d) If liquid soap is used, the soap container should be replaced when empty because of the possible introduction during refilling and growth of pathogens in the liquid soap.

These recommendations are designed to prevent transfer of infectious organisms from one person to another in health care settings. Similarly, the 1997 Food and Drugs Authority Food Code [FDA Food Code] states that hand washing procedures used by food workers must be adequate to eliminate pathogenic microorganisms from hand surfaces.

The FDA Food Code recommends that;

- i. Food employees shall clean their hands and exposed portions of their arms with a cleaning compound in a lavatory that is equipped as specified by vigorously rubbing together the surface of their lathered hands and arms for at least 20 seconds and thoroughly rinsing with clean water.
- ii. Food employees shall pay particular attention to the areas underneath the fingernails and between the fingers.

According to Snyder (1994) the only standard hand washing procedure for food workers to use that assures removal of pathogenic micro-organisms (such as those from fecal sources) from fingertips, is the one developed and described by the Hospitality Institute of Technology and Management. The emphasis of this standard for hand washing is the use of fingernail brush and a large volume of flowing water.

It is common knowledge that in most food production and foodservice operations, food workers receive little or no training concerning hand and fingertip washing practices. Regulatory authorities only check to see if there is a hand wash sink in the food preparation/ production/ service area; if this hand washing area is supplied with soap; and if the sink functions properly. Checking operational hand washing facilities provides no verification that employees are washing their hands sufficiently to reduce fecal pathogens on their hands and fingertips to a safe level.

2.3 Awareness of Hand Washing in Some Countries

Hand washing is likely to be especially important where people congregate (schools, offices, shopping malls etc.), where ill or vulnerable people are concentrated (hospitals,

nursing home), where food is prepared and shared and in homes, especially where there are young children and vulnerable adults.

In America, a study conducted by UNICEF in 2008 showed that 33 percent of men don't bother to wash their hands after using the bathroom, compared to with 12 percent of women in public restrooms. The study was based on observation of more than 6000 people in four big cities. The study also found out that 92 percent of Americans indicated that they usually or always wash their hands after using the bathroom, but researchers for the American Society for Microbiology found out that only 77 percent actually do when it comes to public restrooms. There was however a six percent decline from a similar study in 2005 (UNICEF, 2008).

In Ghana, people buy a lot of soap, yet almost all of it is used for cleaning clothes, washing dishes and bathing. In a hand washing interview organized for mother, 75 percent of the mothers claimed to wash hands with soap after using the toilet, but structured observation showed that only 3 percent of mothers did so, while 32 percent washed their hands with water only (Wikipedia report, 2006). In 2003, Dr. Val Curtis studied hundreds of mothers and their children and discovered that previous health campaigns had failed because mothers often didn't see symptoms like diarrhea as abnormal, but instead viewed them as normal aspect of childhood. The studies also revealed an interesting paradox; Ghanaians use soap when they felt that their hands were dirty after cooking with oil, for example or after traveling into the city and hand washing habit was prompted by feelings of disgust and showed that parents felt deep concerns about exposing their children to anything disgusting. By 2006, Ghanaians surveyed by members of Dr. Curtis's team reported a 13 percent increase in the use of

soap after using the toilet. Another measure showed even greater impact; reported soap use before eating went up by 41 percent.

In Malawi, an approach to hand washing with soap was done by UNICEF in honouring right of children to participate in a process of developing and instituting national standards for sanitation facilities and hygiene promotion in primary schools (UNICEF, 2008). National review teams interviewed children on what they liked and disliked about their sanitation facilities and hygiene education programs. The children's candid and perceived answers were used to modify the technical designs and approach to the behavior change. Comic book from children feedback was designed for grades five and eight. Since August 2008, a cheerful animated character called 'SOPO' uses the slogan 'Did You Wash Your Hands?' to promote hand washing with soap at four critical times; after defecation, after cleaning a child, before feeding a child and before preparing food. In Pakistan, a study found out that, children in communities that received intensive hand washing interventions were half more likely to get diarrhea or pneumonia than children in similar communities that did not receive the interventions (UNICEF, 2008).

In the United Kingdom, a study conducted by Fewtrell, Kaufmann, Kay, Enanoria, Hallre and Colfolfod in 2003 found out that over a quarter of people tested at bus and train stations had fecal bacteria on their hands. They study also more people with traces of fecal bacteria in the North of England than the South and that, manual workers had cleaner hands than other people tested.

Food production workers and foodservice are taught to use correct hand and fingertip washing in preparation for work since it is the best way to guarantee removal of transient micro-organisms (Snyder, 1994). Not only is hand washing critical in foodservice and food production operations, it is also important in homes and day care

operations. Black, Dykes, Anderson, Wells, Sinclair, Grey, Borgatta and Robbins (1989) reported a study that demonstrated a decline in diarrheal illness (due to Shigella, Giardia and Rotavirus) in day care centers when employees were taught to use good hand washing procedures. Employees in the hand washing program washed their hands before handling food and after arriving at the day care center, helping a child use the toilet or using the toilet themselves.

Shigella is associated with poor hygiene. The effectiveness of the simple intervention of hand washing with soap and water in preventing the spread of shigellosis was investigated. Khan (1982) demonstrated that secondary infection rate within families in Bangladesh due to transfer of pathogenic bacteria (Shigella) decreased when people were taught to wash their hands after defecating and before eating. The study population was comprised of confirmed cases of shigellosis. These and matched controls were followed up in 10 days. Several pieces of soap and earthenware pitchers for storing water were provided to the study families and they were advised to wash their hand with soap and water after defecating and before meals. Compliance was monitored daily by observing the size of the soap and residual water. Rectal swabs of contact of both of the groups were obtained daily for culture. The secondary infection rate was 10.1% in the study group and 32.4% in the control group. The secondary case (symptomatic) rate was 2.2% in the study group and 14.2% in the control group. These results suggest that hand washing has a positive interrupting effect, even in insanitary environments.

2.4 Good Hand Washing Practices

When to wash your hands

As people, objects and surfaces are touched throughout the day, germs are accumulated on the hands. In turn, you can infect yourself with these germs by touching your eyes,

nose or mouth. Although it's impossible to keep your hands germs-free, washing your hands with soap and water frequently can help limit the transfer of bacteria, viruses and other microbes.

Hands must always be washed before;

1. Preparing food and eating
2. Treating wounds or giving medicine
3. Touching a sick or injured person
4. Inserting or removing contact lenses

Hands must always be washed after;

5. Preparing food, especially raw meat or poultry
6. Using the toilet and changing a diaper
7. Touching an animal, leashes or waste
8. Blowing your nose, coughing or sneezing into your hands
9. Treating wounds and touching a sick or injured person
10. Handling garbage or something that could be contaminated such as a cleaning cloth or soiled shoes. Of course, it is also important to wash your hands whenever they look dirty.

How to wash your hands?

It is generally best to wash your hands with soap and water. Follow these simple steps;

- i. Wet your hands with running water and apply liquid, bar or powder soap
- ii. Lather well. Rub your hands vigorously for at least 20 seconds. Remember to scrub all surfaces including the backs of your hands, wrists, between your fingers and under your fingers

- i. Rinse well and dry your hands with a clean or disposal towel or air dryer. If possible, use your towel to turn off the faucet

It must be kept in mind that antibacterial soap is no more effective at killing germ than is regular soap. Using antibacterial soap may even lead to the development of bacteria that are resistant to the product's antimicrobial agents making it harder to kill these germs in the future.

In 2008, a study was conducted by the University of Westminster Trade Group, London and sponsored by the Paper Towel Industry to compare the levels of hygiene offered by paper towels, warm air hand dryers and the more modern jet-air hand dryers. The key findings were;

- a. After washing and drying hands with the warm air dryer, the total number of bacteria was found to increase on average on the finger pads by 19.4% and on the palms by 25.4%
- b. Drying with the jet air dryer resulted in an increase on average of the total number of bacteria on the finger pads by 42% and on the palms by 15%
- c. After washing and drying hands with a paper towel, the total number of bacteria was reduced on average on the finger pads by up to 76% and palms by up to 77% (Kretzer & Larson, 1998).

Kretzer and Larson (1998) also carried out tests to establish whether there was the potential for cross contamination of other washroom users and the washroom environment as a result of each type of drying method. They found out that;

- i. The jet air dryer, which blows air out of the unit at claimed speed of 400 mph, was capable of blowing micro-organisms from the hands and the unit and potentially contaminating other washroom users and the washroom

environment up to 2 meter away. Nevertheless, the dyson air blade is the only hand dryer that uses a HEPA filter to remove over 99.9% of the air used to dry hands.

- ii. Use of a warm air hand dryer spread micro-organisms up to 0.25% meters from the dryer
- iii. Paper towels showed no significant spread of micro-organisms.

2.5 Materials used for Hand Washing

Detergents

The application of water alone is insufficient for cleaning the skin because water is often unable to remove fats, oils and proteins which are components of organic soil. However, since pathogens removed from the skin have to be rinsed away, there must be reasonable flow of water. Therefore, the removal of micro-organisms from the skin requires the addition of soaps or detergents to water. Currently, most products sold as 'soaps' are actually detergents, so that is the substance most used to wash their hands.

Warm Water

Warm water that is comfortable for washing hands is not hot enough to kill bacteria. Bacteria grow much faster at body temperature (37°C). However, warm soapy water is more effective than cold soapy water at removing the natural oils on your hands which hold soils and bacteria. Contrary to popular belief however, scientific studies have shown that using warm water has no effect on reducing the microbial load on hands (Laestadius & Dimberg, 2005).

Solid Soap

According to McBride (1984), solid soap, because of its reusable nature, may hold bacteria acquired from previous uses, yet, it is unlikely that any bacteria are transferred to users of the soap as the bacteria are rinsed off with the foam. It has been demonstrated that bacteria from contaminated solid soap (without antibacterial activities) are not transferred from person to person during common use (Heinze & Yackovich, 1988). These studies demonstrate that solid soap is inherently antibacterial and will not likely support the growth of bacteria. Larson (1995) recommended in the American Infection Control Guideline that if solid soap is used, it should be provided in small bars that can be changed frequently with soap racks to promote drainage.

Liquid Hand Soap

Many regulatory agencies forbid the use of solid soaps for employee's hand washing and have mandated the use of liquid hand soaps or detergents for hand washing. The use liquid soap has not been demonstrated to be better for removing transient microorganisms than the use of plain bar soap for washing hands and fingers. Liquid soap products are frequently available in dispenser containers or bottles. Hospital studies have shown that dispenser must be replaced and not refilled. *Pseudomonas* spp, a pathogen present in many health care facilities has been shown to grow and multiply in some liquid hand soap and detergent products. This is another reason many manufacturers add disinfectants to their liquid soaps (Sawyer, 2011).

The data collected from hand washing researches indicate that regular hand soap or detergents (bar or liquid) are effective for hand washing for personnel in most food production or foodservice facilities. In aseptic food production facilities, where food with very low pathogen/total plate count must be prepared (e.g. infant formula, tube

feedings), sterile gloves should probably be used after the hands are properly washed (Rabie & Curtis, 2006).

Hand Dryers

After hands are washed and rinsed, they must be thoroughly dried. Blow dryers should not be used because they accumulate microorganisms from toilet aerosols and can cause contamination of hands as they are dried by the drier (Knights, Evans, Barras & McHardy, 1993). It is also apparent that many individuals do not dry their hands thoroughly when using a blow drier; hence, moisture, which is conducive to microbial growth, remains on hands or people dry their hands on their clothing.

In a hand drying study reported by Redway, Knights, Bozoky, Theobald and Hardcastle (1994), standard techniques were used to identify and count the bacteria associated with hand washing and drying under natural conditions. Average bacterial counts were reduced when towels (either cloth or paper) were used to dry hands, the most significant decrease being with paper towels. Hot air dryers produced a highly significant increase in all bacteria on hands (a 43.6% rise in some skin and enterobacteria, which is indicative of fecal contamination of hands). In a further study, Redway, *et al* (1994) reported that bacteria were isolated from swabs taken from air flow nozzle and air inlet of 35 hot air dryers in 9 types of locations (including hospitals, eating places, railway stations, public houses, colleges, shops and sports clubs). Bacteria were relatively numerous in the air flows and on the inlets of 100% of dryers sampled and in 97% of the nozzles. *Staphylococci* and *micrococci* (probably from the skin and hair) were blown out of all the dryers sampled for these type of bacteria, and 95% showed evidence of potential pathogens *S. aureus*. At least 6 species of enterobacteria were isolated from air flows of 63% of the dryers indicating fecal contamination. Redway, *et al* (1994)

concluded that hot air dryers have the potential for depositing pathogenic bacteria onto the hands and body and those bacteria could also be inhaled as they are distributed into the general environment whenever dryers are running. It was suggested that the use of hot air dryers should be carefully considered on health grounds, especially in sensitive locations.

Cloth roller towels are not recommended because they become common-use towels at the end of the roll and can be a source of pathogen transfer to clean hands. Brodie (1995) demonstrated that staphylococci can be transmitted by use of a communal towel for drying hands after washing and recommended that paper towels be used for drying hands. The use of roller towels for drying hands in food production facilities is banned by most regulatory agencies.

According to Coates, Hutchinson and Bolton (1987) campylobacter jejuni could survive hand washing with soap and water if hands were not dried thoroughly with paper towels. Thus, drying hands completely with single-use, disposable paper towels are the preferred method of hand drying in food service and food production facilities.

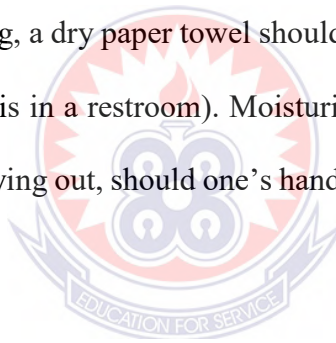
Hand Lotions

Hands may become dry and irritated with frequent hand washing, and therefore there is a tendency for personnel to want to use hand lotions. However, the use of hand lotions in food production and food service units is discouraged, as it is in health care units, because of possible contamination of these products (Becks & Lorenzoni, 1995). If the use of hand lotion is allowed, only small packets or small bottles of lotion should be allowed on the premises so that they are replaced frequently. According to Becks and Lorenzoni (1995), the use of hand lotion products should be monitored.

Soap and Water

Conventionally, the use of soap and warm running water and the washing of all surfaces thoroughly, including under fingernails is seen as necessary. One should rub wet, soapy hands together outside the stream of running water for at least 20 seconds, before rinsing thoroughly and then drying with a clean towel, disposable or otherwise (Heinze & Yackovich, 1988).

In a study conducted by the Tufts University in 2007, it has been shown that the use of towel is a necessary part of effective contaminant removal, since the washing action separates the contaminants from the skin but does not completely flush them from the skin- removing the excess water (with the towel) also removes the suspended contaminants. After drying, a dry paper towel should be used to turn off the water (and open the exit door if one is in a restroom). Moisturizing lotion is often recommended to keep the hands from drying out, should one's hands require washing more than a few times per day.



Hand Antiseptics

A hand sanitizer or hand antiseptic is a non-water-based hand hygiene agent (CDC, 2009). Enough hand antiseptic or alcohol rub must be used to thoroughly wet or cover both hands. The front and back of both hands and between and the ends of all fingers are rubbed for approximately 30 seconds until the liquid, foam or gel is dry. The use of a hand antiseptic or alcohol rub is much quicker and more effective than hand washing with soap and water. Hand antiseptics and alcohol rubs with moisturizers will also not dry out the skin or hand. Liquid hand antiseptics are much more effective germ killers than gel and foam hand sanitizers. To use in a medical or surgical setting, a sterile stainless bowl is filled with antiseptic and both hands are dipped and rinsed in the liquid

up to the elbows. The hands and lower arms are removed from the liquid, rubbed and allowed to dry. After drying in approximately 30 to 60 seconds, the healthcare provider is gloved and gowned.

Alcohol rubs and antiseptics (biocides) kill micro-organisms. Current scientific evidence has not demonstrated a link between the use of topical antimicrobial formulation and antiseptic or antibiotic resistance. Antiseptic (biocides) have multiple (thousands) of nonspecific killing sites on and in the microbial cell which cannot easily mutate. Antibiotics and antibacterial soaps (triclosam) have one very specific killing site on and in the microbial cell which can easily mutate. Antibiotic resistance has no effect on the effectiveness of antiseptic (Larson, 1995). Alcohol rubs and combination hand sanitizers are effective at killing germs on the hands. Many clinical studies have shown that alcohol rubs containing two germs killers (i.e. alcohol and chlorhexidine gluconate or benzalkonium chloride) are significantly better germ killers than alcohol rubs containing alcohol alone (Hibbard, 2005). However, alcohol rub sanitizers are not appropriate for use when the hands are visibly dirty, soiled. Visible soiling of any sort on the hands must be washed with soap and water because alcohol-based hand rubs are less effective in the presence of organic materials. In addition, alcohols may not be as effective against non-lipid-enveloped viruses (e.g. *noroviruses*) as enveloped viruses but they are still effective. Hand antiseptics and soap and water will not kill the endospores of bacteria (e.g. *clostridium difficile* and *anthrax*) and spores of protozoa (e.g. *giardia lamblia*) but soap and water may wash them down the drain. When such micro-organisms are like to be encountered, soap and water hand washing followed by use of a good hand antiseptic is preferable.

Hand washing with hand sanitizer (hand antiseptic) is effective in cleaning staph *aureus* and the bacteria that are causing these staph infections, but alcohol-based hand sanitizers and soap and water are not effective in killing spore forming organisms because alcohol or soap will not destroy spores. Washing hands with soap and water may wash the spore down the sink.

Hand Washing with Wipes

Hand washing using hand sanitizing wipes is also recommended by the Center for Disease Control as a convenient alternative during travelling in the absence of soap and water in non-acute health care settings (Becks & Lorenzoni, 1995). This hygienic behaviour has been shown to cut the number of child deaths from diarrhea (the second leading cause of child deaths) by almost half and from pneumonia (the leading causes of child deaths) by one-quarter (WHO Report, 2008). There are five critical times in washing hands with soap and/or using of a hand antiseptic related to fecal-oral transmission: after using the bathroom (private or public), after changing a diaper, before feeding a child, before eating and before preparing food or handling raw meat, fish or poultry or any other situation leading to potential contamination (Hibbard, 2005). To reduce the spread of germs, it is also better to wash the hands and/or use a hand antiseptic before and after attending to a sick person.

For control of *staphylococcal* infections in hospitals, it has been found that the greatest benefit from hand-cleansing came from the first 20% of washing and that every little additional benefit was gained when hand cleansing frequency was increased beyond 35%. Washing with plain soap results in more than triple the rate of bacterial infectious diseases transmitted to food as compared to washing with antibacterial soap (Garner & Favero, 1986). Comparing hand-rubbing with alcohol-based solution with hand

washing with antibacterial soap for a median time of 30 seconds each showed that the alcohol hand-rubbing reduced bacterial contamination 26% more than the antibacterial soap. But soap and water is more effective than alcohol-based hand rubs for reducing H1N1 influenza, a virus and clostridium difficile spores from hands (Hibbard, 2005).

2.6 Policies, Procedures and Standards for Personal Hygiene and Hand Washing for Food Production and Foodservice Personnel

According to the FDA Code of Hygienic Practice for Food Service establishment in the hospitality industry policy document (2013), the following are measures to be observed by food production and foodservice facilities throughout the country. They are;

Employee Responsibility

- Employees are responsible for using safe food handling methods as trained and instructed, and for practicing good personal hygiene. Employees must be able to describe these procedures and practices.
- All employees who come into contact with the food in the course of their work shall be medically certified to handle food prior to employment and shall undergo the food handler's test at least every six (6) months.
- Food service employees shall keep their hands and exposed portions of their arms clean by thoroughly washing their hands and the exposed portions of their arms (or surrogate prosthetic devices for hands or arms) with soap and warm water, including lathering hands for at least 20 seconds. This includes immediately;
 - Before putting gloves on,
 - After using tobacco products,
 - Before or after eating,

- Before starting work,
 - Upon reentering the kitchen and
 - After using the washroom or being potentially contaminated by other means.
- When washing hands, employees shall use only a designated hand washing sink and shall not clean their hands in a sink used for food preparation, ware washing or in a service or a curbed cleaning facility used for the disposal of mop water and similar liquid waste.
 - Employees shall keep their fingernails clean and trimmed to no longer than the tips of the fingers and shall not wear fingernail polish or artificial fingernails when working with exposed food.
 - Approved hand sanitizers and chemical hand sanitizing solutions used as a hand dip shall be used only after the thorough washing of hands.
 - Adequate measures shall be taken to prevent perspiration from contaminating foods, food contact surfaces, equipment and utensils.
 - The clothing of all employees shall be clean.
 - Employees preparing and/or handling food shall use effective and clean, disposable or easily cleanable nets or other hair restraints approved by the regulatory authority and this shall be worn properly to restrain loose hair including beards and mustaches longer than one half inch (1/2").
 - Employees who prepare food shall limit the jewelry worn on their hands and arms to one plain ring and watch.
 - Employees shall not use tobacco in any form while engaged in food preparation or service and in areas used for equipment or utensil washing, food preparation or food storage. Employees shall only use tobacco products in designated areas.

- Employees shall consume food only in designated areas separate from food preparation and serving areas, equipment or utensil areas and food storage areas.

Personal Cleanliness

Every employee must bathe daily and use a deodorant to control body odour. Employees will use only mild perfumes or colognes that will not interfere with the aroma of food. Employees will wear clean, closed-toe shoes and clean uniforms or full aprons or smocks over street clothing. Clothing or outer covering will be replaced if it becomes dirty while working.

Individual Illness

No employee who is known to have a communicable illness which could be transferred directly by the employee or by employee contact with food will work in the food preparation and service of food. Supervisors must be notified by employees if their illness symptoms include nausea, diarrhea and vomiting or any other illness that is serious enough to be diagnosed by medical personnel. If an employee's illness is not severe and symptoms are not acute, the employee can be assigned to tasks that do not involve food handling or can be excused from work altogether until he/she is completely well. Illness must not be passed on to customers or other employees.

Personnel Facilities

- Adequate toilet and hand washing facilities (at least 1 per 12 employees) shall be provided for employees and these shall be accessible at all times
- Hand washing sinks shall also be located in or immediately adjacent to toilet rooms or vestibules. Sinks used for food preparation or for washing equipment or utensils shall not be used for hand washing and vice versa.

- Hand washing soap or detergent shall be available at each lavatory. A supply of sanitary towels dispensed from an approved dispenser or a hand-drying device shall be conveniently located in each lavatory area.
- A sign shall be posted above every hand washing facility that reminds employees to wash their hands. A diagram describing the approved procedure shall be displayed above each hand washing facility in the food preparation areas and the wash rooms.
- Toilet rooms shall be completely enclosed and shall have tight fitting, self-closing doors with solid surfaces. Doors shall be closed except during cleaning, or maintenance.
- Toilet facilities provided for food employees must be conveniently located and readily accessible to food employees and other authorized persons when the establishment is in operation. Conveniently located means the toilet facilities shall not open directly into the food preparation area and should be located within 200 feet, by a normal pedestrian route of all areas of the food service operation and not more than one floor- to-floor flight of stairs.
- Other authorized persons and customers may use the same toilet facilities with food employees provided they do so without entering the food storage, food preparation, or food service areas or the dishwashing or utensil storage areas of the establishment.
- Toilet fixtures and receptacles shall be kept clean and in good repair. A supply of toilet tissue in an appropriate wall mounted holder shall be provided at each toilet at all times. Easily cleanable receptacles shall be provided for waste materials and it should be covered at all times.

2.7 Empirical evidence on lack of effective hand washing by people across the world

In 1996, a national survey was conducted to assess hand washing behaviour of adults in the United States by the American Society for Microbiology. Out of the over 7000 people who participated in the study, 78% of the participants were more likely to say they wash their hands after changing a diaper and 81% before handling or eating food. The study however found out that 48% of the participants said they did not wash up after petting an animal, 33% coughing or sneezing and 22% handling money. The study also reported the observed hand washing behaviour of adults in public restrooms located in 5 major cities (New York, Chicago, San Francisco, Atlanta and New Orleans). Out of the 2,129 people observed using a restroom in Penn Station in New York, only 60% washed their hands. Chicagoans washed their hands most often (78% of adults observed) after going to a public restroom followed by adults in New Orleans (71%), San Francisco (69%) and Atlanta (64%). Across all cities, women washed their hands more often than men: 74% versus 64% (American Society for Microbiology, 1996).

While hand washing is a simple and easy task, studies have shown that personnel in both health care and foodservice industries have incorrect hand washing habits. Sixty percent of foodservice personnel in one study were reported not to wash their hands (Dewit & Kampelmacher, 1984) as required by these types of positions. According to Seligmann and Rosenbluth (1975), the food handler is one link in the complex multiphase process of contaminated food-infection-enteric diseases. Marriott (1989) asserts that of greatest concern is contamination of hands and forearms by transient microorganisms from feces. Clothing can become contaminated from pieces of fecal matter collected on the hairs around the anal region. When people use the toilet, their

hands or forearms may become contaminated with intestinal microorganisms which include *C. perfringens*, *shigellae*, *salmonellae*, *hepatitis A* virus and other enteric bacteria (Graham, 1980). Thus, these contaminated hands/forearms can transfer intestinal microbes to food, equipment and other workers in the food storage and preparation areas unless correct personal hygiene and adequate hand washing procedures are followed.

A study monitored restroom hand washing compliance by foodservice workers at a managed care facility and two commercial foodservice operations was conducted by Ecolab (1996). The study found out that the workers at the managed care facility had the best compliance. This was thought to be due to the emphasis on hand washing by management personnel as well as the trained and continued in-service instruction of employees.

Ecolab (1996) study also monitored the number of daily hand washings for each employee in the kitchen area. The results indicated that monitoring hand washing was beneficial for increasing and maintaining employee compliance with hand washing.

Horwood and Minch (1991) reported the results of numbers and types of bacteria obtained from 34 hand washing samples obtained in 22 foodservice establishments in the Cambridge, Boston and Massachusetts areas (cafeterias, lunch rooms, drug stores and restaurants). The range in total plate count was 6,200 to 16,000,000,000 per mi. *E. coli*, hemolytic staphylococci and hemolytic streptococci were found in samples. Based on these findings, the researchers concluded that the hands of food handlers must be clean. The researchers also stressed that food handlers must be given instruction and that management must assume the responsibility for daily education and enforcement of hand washing.

2.8 How to Implement a Hand Wash Program

Several studies and literature (Horwood & Minch, 1991; Ecolab, 1996; Sawyer, 2011; Larsen, 2013; Besha, Guche, Chare, Amare & Kassahun, 2016; Jeffrey & Myriam, 2014; CDC, 1996; Rabie & Curtis, 2006; Luby, Agboatwalla, & Feikin, 2005) have elaborate extensively the steps and procedures on how to implement a hand wash program/activity. To institute a hand wash program, teachers can follow the standard management four-step quality assurance cycle.

Plan for Prevention

- i. Every employee could be shedding high levels of pathogens from their bodies every day without feeling sick. Hands carry pathogenic microorganisms on the surface of the skin of the body to food. Because pathogens are at the highest level on fingertips after using the toilet, the most critical control points is the use of a fingernail brush during hand washing after defecating to assure that fecal pathogens are removed from fingertips.
- ii. Employees must also be informed and trained to use good hand washing methods at home in order to prevent transmission of pathogens from other family members and pets to themselves and to work.
- iii. Employees in food production, preparation and service must be trained to use hand soaps/detergents to lather and remove oil and dirt from the hands and fingertips. They must recognize that using a fingernail brush creates friction and removes microorganisms from fingertips and surface of the hands as 'soapy' lather is created and rinsed away with lot of warm flowing water (about 110 to 120F).
- iv. Write a safe hand washing policies, procedures and standards training and operations manual. Include a policy that if at any time the hand wash sink runs

out of supplies or is non-functional, the problem will be corrected immediately by the employees or persons-in-charge will be notified immediately. Also, include a policy that everyone (this includes both personnel and any other individuals who have permission to visit the facility) must wash their hands using the fingernail brush when coming into the kitchen, food production, food service area or they will not be allowed entrance. If anyone comes to the kitchen without washing their hands, persons-in-charge will be notified immediately and corrective action will be taken.

How to Organize and Train for Prevention

- i. Set up the hand sink with suppliers. Suppliers should include hand soap or detergent (either bars of soap or liquid soaps or detergents acceptable), fingernail brush and an adequate supply of paper towels.
- ii. Assemble employees. Hand out the employee lesson sheet. Demonstrate correct hand washing procedures
- iii. Test employees. Coach them until they know the answers to all of the test questions. Have them demonstrate the correct hand washing procedure. This is an excellent method of demonstrating thorough hand washing. Participants wash 'fluorescent germs' from their hand and observe the effectiveness of the hand washing methods. Refresher training should be given to all employees twice a year.
- iv. Perhaps 2 or 3 people in the organization who are highly motivated in term of hand washing can be designated as hand wash trainers. This will free authorities from doing all the training.

Operate and control

- i. During operations, persons-in-charge should watch employees, catch them washing their hands correctly and compliment them. It takes constant positive reinforcement to make hand washing a habit
- ii. Commitment must be demonstrated. Ensure that all kitchen visitors and management personnel when entering the kitchen, set the example by washing their hands using the right procedures
- iii. If any employee at any time see a hazardous act or situation, he/she must have no hesitation in reporting it to his/her supervisor or manager or saying something to the individual(s) involved

Measure, Coach and Feedback

- i. Regular employee safety assurance committee meetings must be held. Use employee suggestions and improve the safe hand washing process. Keep employees informed about how many days of 100% hand washing have transpired
- ii. Coach employees to constantly improve their safety performances
- iii. Plan and implement improved procedures and goals. Go back to Plan for Prevention (the first step in the QA cycle) and improve your operation procedures. When this simple quality assurance cycle is followed, safe hand washing will be assured.

2.9 Summary of Literature Review

The literature reviewed covered the concept/definition of hand washing, history of hand washing and awareness of hand washing in some countries. The importance of hand washing, when, how and ways to wash your hands and substances used for hand

washing were also discussed. Policies, procedures and standards for personal hygiene and hand washing were also discussed. Finally, the literature looked at empirical evidence of lack of effective hand washing by people across the world and how to implement a hand wash program.



CHAPTER THREE

METHODOLOGY

This chapter of the research report discusses the methods used in gathering data for the study. Sub-topics to be discussed under this chapter include research design, population, sampling and sampling procedures, research instruments, validity and reliability of the instruments, data collection procedures, data analysis plan and ethical considerations.

3.1 Research Design

According to Asamoah-Gyimah and Duodu (2007), research design is a plan outlining how information is to be gathered from subjects for an assessment or evaluation that includes identifying the data gathering method(s), the instruments to be used, how the instruments will be administered, and how the information will be organized and analyzed (Worgu, 1991). Also, Trochim (2006) explains that research design provides the glue that holds the research project together. From the above definitions, a research design can thus be described as the overall plan for collecting data in order to answer the research questions.

The research design used for this study was the practical experiment approach (pre-experimental) which relied on questionnaire and demonstration to gather data for the study. According to Atindanbila (2013), experimental designs are designs used to test the cause-effect relationship by collecting evidence to demonstrate the effect of a variable on another. Creswell (2009) explains that with pre-experimental designs, the researcher studies a single group and provides an intervention during the experiment. The study employed descriptive survey to find out attitudes (Creswell, 2009) of students

on hand washing practices at the school and the extent of hand washing practices in basic schools in the district as a whole.

The pre-experimental design was chosen because it will afford the researcher the opportunity to demonstrate to the students and also take them through proper hand washing steps and practices which will go a long way in reducing if not totally eradicating the incidence of habitual sickness among students.

3.2 Research Population

Kusi (2012) describes population as a group of individuals or people with the same characteristics and in whom the researcher is interested. Also, Ary, Jacobs and Razavieh (1990) believe that population involves all the people, objects and institutions who are the subjects of the study. The target population refers to the population that the researcher would ideally like to generalize to (Asamoah-Gyimah & Duodu, 2007). For this study, the target population is all public junior high school students in the Kassena-Nankana West District and the accessible population for this study was students of T. I. Ahmadiyya Junior High School.

T. I Ahmadiyya Junior High School was selected for the study because it is close to the researcher and also the fact that the school does not have access to water and hand washing facilities.

3.3 Sample and Sampling Procedure

According to Asamoah-Gyimah and Duodu (2007), sample is the proportion of a universe or population selected for observation and analysis. T. I. Ahmadiyya Junior High School has a total population of one hundred and sixty-six (126) pupils for the

2018/2019 academic year according to the data obtained from the head teacher of the school. The table below gives the breakdown of the population of the school.

Table 3.1: Breakdown of student population of T. I. Ahmadiyya JHS

Class	Enrollment		Total
	Boys	Girls	
Form 1	20	22	42
Form 2	21	24	45
Form 3	23	16	39
Total	64	62	126

Source: School logbook, 2018/2019 academic year

The researchers purposively selected all the students in the school totaling one hundred and twenty-six (126). The purposive sampling technique was adopted because the numbers involved were manageable and also offers the researchers the opportunity to collate views from experts (Creswell, 2009; Atindanbila, 2013).

3.4 Research Instruments

Questionnaire (pre-test and post-test questionnaire) was the instruments used for collecting data for the study. A structured questionnaire contains predetermined standardize questions or items meant to collect numerical data that can be subjected to statistical analysis (Kusi, 2012). It is beneficial to use questionnaire whenever the sample size is large enough to make it uneconomical for reasons of time or funds to observe or interview every subject (Asamoah-Gyimah & Duodu, 2007). Koul (1997) cited in Kusi (2012) also thinks a questionnaire is a popular means of collecting all kinds of data in research. Dampson and Mensah (2014) on their part suggested that, in order to gather information about respondents' opinion on how far they agree or

disagree on a statement given, the questionnaire is the ideal instrument. For these reasons, a structured questionnaire was used to gather background information from the students on hand washing practices.

3.4.1 Questionnaire

The questionnaire (pre-test and post-test), designed by the researcher was used to gather data on hand washing practices among basic school students. The pre-test questionnaire contains items on general hand washing knowledge and practices of students before the experiment (intervention) was conducted. The post-test questionnaire contains items on students' experience, knowledge and benefits after going through the intervention (experiment). Most of the items on the questionnaire were close ended type of statements to ensure accurate and objective responses from the students. Fixed statements demanding 'yes' or 'no' answers were also used.

3.5 Validity and Reliability of Instruments

According to Atindanbila (2013) validity and reliability are means to ensuring that the researcher produces the right information for a particular study. Validity and reliability also help the researcher to construct research instruments that would elicit the needed responses from respondents (Atindanbila, 2013; Creswell, 2009).

3.5.1 Validity

Validity is one of two key pillars that hold the findings of every research work. An account is valid or true, if it represents accurately those features of phenomena that it is intended to describe, explain or theories (Hammersey, 1987) cited in (Winter, 2000). In other words, a questionnaire is said to be valid if it measures what it is intended to measure.

Face and content validity were the two approaches adopted by the researcher to test the validity of the questionnaire. To check for face and content validity of the instrument, the researcher gave copies of the instrument to her supervisor, colleague students in the same department to scrutinize and comment on the items on the instrument. Their suggestions on issues such as ambiguous and lengthy statements were noted and considered.

This common sense approach to validity is often important in convincing laypersons because according to Roberts (2000) face validity is making a decision about the appropriateness of use of some particular measuring instrument in a given assessment situation through the process of simple inspection of that instrument.

3.5.2 Reliability

Reliability is the next key pillar aside validity that holds the findings of every research work. Reliability refers to the consistency of a measure (Cherry, 2014). According to Easterby-Smith, Thorpe and Lowe (2002), reliability measures the stability of an instrument if administered on the same individual on two different occasions. For a survey, reliability is more straightforward if all respondents are presented with the same standardized questions (Robson, 2002). An instrument is thus, considered reliable if we get the same results when it is administered repeatedly. It is against this background that the researcher conducted a pilot study to determine the reliability of the research instrument. After the pilot study, IBM SPSS (version 21) was used to analyze the data from the pilot study to determine the internal consistency (Cronbach's alpha reliability co-efficient) of the questionnaire. At the end of the analysis, the Cronbach's alpha values of the aggregated factors spanned between 0.68 and 0.84.

According to Leech, Barrette and Morgan (2005), alpha value of 0.70 and above indicates a reasonable internal consistency and alpha values between 0.60 and 0.69 indicate minimally adequate reliability. Ary, Jacobs and Razavieh (1990) explain that if the results are used to make decisions about a group or for research purposes, reliability coefficients of 0.50 to 0.60 are accepted.

Aside the individual alpha values of the aggregated factors which were reliable, the overall internal consistency of the instrument (questionnaire) was 0.86. Hence the research instrument was accepted and deemed reliable for the study.

3.6 Data Collection Procedures

The questionnaires were administered personally by the researcher that gave her the opportunity to interact with the students, explained in details the rationale for the research to the students. Adequate time was given to the students to answer the questionnaire before collecting them. The researcher checked to ensure that all questions on the questionnaire were answered. Clarifications were given to students who asked for more explanations on items that were not clear to them.

3.7 Data Analysis Plan

The researcher collected data using questionnaire. Before analyzing the data collected, the researcher checked for completeness of the questionnaire by going through the answered questionnaires one after the other. It was realized that all the items on the questionnaire were answered fully. This could be attributed to the fact that the researcher is a teacher in the Paga Community. The data collected from the instrument was analyzed quantitatively. According to Dampson and Mensah (2014) research data can be analyzed quantitatively by means of graphs, charts, frequencies, percentages,

averages and ratios. In view of this, descriptive statistics was used to analyze the data gathered from the questionnaire. The responses were coded and descriptive statistics for the items were then generated using the IBM Statistical Package for Social Sciences (SPSS, version 21) for analysis.

3.8 Ethical Considerations

According to Kusi (2012), ethics in educational research are those issues that are related to how the educational researchers conduct themselves or their practices and the consequences of these on the people who participate in their research. Ethical issues that were considered in this study are informed consent, confidentiality and anonymity.

3.8.1 Informed Consent

Students were informed about the purpose of the study, how it will be carried out and the role they (students) are expected to play, the kind of data to be collected and how it would be reported. This was to give the students the choice to decide whether to participate or not to participate in the study. This kind of information was also necessary because people make decisions to participate in a study depending on the quality of information they receive about it (Kumar, 1999). It was therefore very prudent to equip students with the needed information so as to get them to participate in the study. Students' consent and permission were sought for before administering the instruments.

3.8.2 Confidentiality and Anonymity

Cohn et al (2007) cited in Kusi (2012) explain that confidentiality means that although researchers know who has provided the information or are able to identify participants from the information given, they will in no way make the information known publicly.

By this, the researcher made sure that the information provided by participants was treated with care so that it does not get to unauthorized persons who are not connected to the study in any way. The data collected from students was also used for the purpose of the study only. In some instances, envelopes were given to students who felt unsecured of their response to seal their response. This was to assure them of the high level of confidentiality that the researcher attached to their response. These ethical issues were protected by ensuring that students do not provide their names and addresses on the questionnaire.



CHAPTER FOUR

RESULTS, FINDINGS AND DISCUSSIONS

4.0 Introduction

This chapter presents and discusses the results of the study. The presentation of the results is presented and analyzed according to the research questions. In all, one hundred and twenty-six (126) students participated in both the pre-test and post-test.

4.1 Presentation of Results

4.1.1 Background Information of Respondents

The table below displays the table respondents' age and gender.

Table 4.1: Respondents' age and gender

Age	Gender		Total
	Male	Female	
13 - 15 years	18	22	40
16 - 18 years	30	22	52
19 years and above	15	19	34
Total	63	63	126

Source: Field data, 2019

The results from Table 4.1 indicate that 40 students comprising 18 males and 22 females said their ages were from 13 – 15 years old. Also, 52 students (30 males and 22 females) affirmed that their ages range from 16 – 18 years old and 34 students consisting of 15 males and 19 females said they were 19 years and above. From the age distribution, it can be seen that the youngest student was 13 years old and the oldest was above 19 years old. The age distribution shows that all the respondents were of school going age

and can contribute meaningfully to issues regarding hand washing and hand washing practices in their school.

4.1.2 Perception of Hand Washing Practices among Students in Schools (Pre-Test)

Research question one sought to find out students' perception of hand washing practices in schools. The responses of the students to the various items under this theme on the questionnaire are discussed below.

Table 4.2: Students' views on frequency of provision of materials for hand washing

	How regular do school authorities provide materials for hand washing in school?						Total	Total %
	Very regular		Not regular		Total	%		
	Yes	%	No	%				
Do the school authorities make materials for hand washing always available at vantage points?	3	2.3	23	18.3	26	20.6		
	5	4.0	95	75.4	100	79.4		
Total	8	6.3	118	93.7	126	100		

Source: Field data, 2019

The information displayed in Table 4.2 show that majority, 79.4% of the students said that the school authorities do not make materials for hand washing available at vantage points within the school. Only 20.6% of the students affirmed that school authorities provide them with hand washing materials at vantage points. Out of this 20.6% of the students, 18.3% of them said the provision of the hand washing materials by school authorities was not regular. The results imply that more education and sensitization needs to be done especially for the school authorities on the need to regularly provide students with hand washing materials in the school.

Table 4.3: Students' responses on type of material provided for hand washing

Type of material	No of students	Percentage (%)
Hand washing bowl with water	88	69.8
Flowing water and detergent	29	23.0
Others (specify)	9	7.1
Total	126	100

Source: Field data, 2019

The results from Table 4.3 indicate that the type material that is normally provided for hand washing in the school. The results show that majority, 69.8% (n = 88) of the students stated that school authorities provide them with hand washing bowl with water where all students will have to wash their hands. This result suggests that school authorities need to step their efforts when it comes to hand washing to avoid the outbreak of diseases among the students.

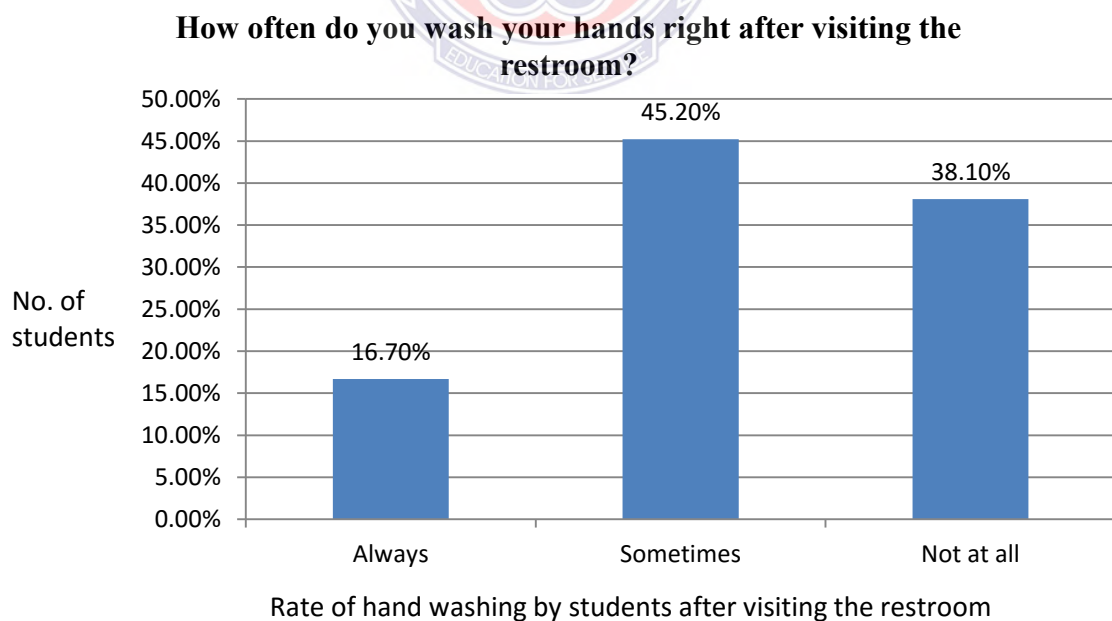


Figure 4.1: Chart showing students' response on frequency of hand washing after visiting the rest room

Figure 4.1 shows the responses of students on the frequency of hand washing after visiting the restroom. The results show that 45.2% of the students said they sometimes wash their hand after visiting the restroom. Also, 38.1% of the students said they never wash their hands after visiting the restroom. Only 16.70% said they always wash their hand after visiting the restroom. The results suggest that students do not attach any importance to hand washing and do not see any wrong with it.

Table 4.4: Hand washing practices at home and school

Item	Yes		No		Total	Total
	Freq.	%	Freq.	%	Freq.	%
Do your parents advise you or educate you on hand washing practices?	73	57.9	53	42.1	126	100
Do your teachers advise you or educate you on hand washing practices?	35	27.8	91	72.2	126	100

Source: Field data, 2019

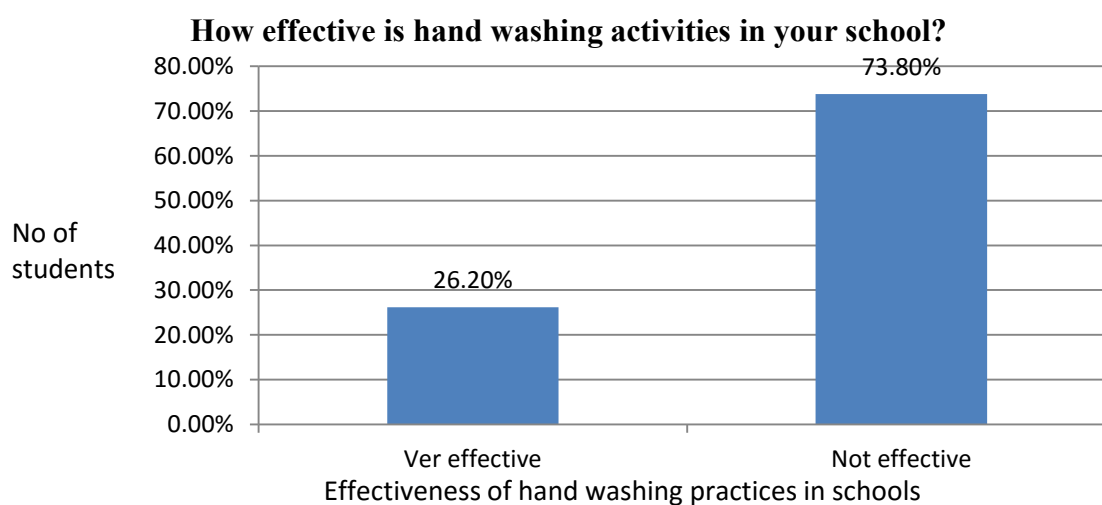
Table 4.4 shows the advice and education students receive on hand washing both at home and in the school. The results show that 57.9% (n = 73) of the students said they receive advise or education at home on hand washing while 42.1% (n = 53) said they do not get any advice/education on hand washing at home. The results however indicate that majority, 72.2% of students said they do not get any advice or education on hand washing practices at school. This confirms the students earlier position that they are not provided materials for hand washing in school by school authorities.

Table 4.5: Response on importance of hand washing among teachers and colleagues

Item	No of students	Percentage (%)
Low priority	51	40.5
Moderate priority	41	32.5
High priority	19	15.1
Very high priority	15	11.9
Total	126	100

Source: Field data, 2019

When the students were asked to state the level of importance both teachers and students attach to hand washing practices in the school, their responses show that 40.5% (n = 51) of the students indicated the both teachers and students show low priority to hand washing practices while 32.5% (n = 41) of the students said that teachers and students show moderate priority to hand washing practices in the school. The results imply that more needs to done in the school for both teachers and students to realize the importance of hand washing in their lives.

**Figure 4.2: Bar chart showing effectiveness of hand washing practices in schools**

Results from figure 4.2 show that 73.8% of the students believed that hand washing activities are not effective in their school.

The pre-test results presented show that students' perception of hand washing practices is negative judging from their responses to the various items on the questionnaire. These responses imply that students need some intervention to help them change their perception on hand washing practices to a positive one.

4.1.3 Hand Washing Practices among Students in Schools (Pre-Test)

Table 4.6: Students hand washing practices

Practices	Yes		No	
	Freq.	%	Freq.	%
Visiting the toilet	47	37.3	79	62.7
Eating food	102	81.0	24	19.0
Touching raw meat	48	38.1	78	61.9
Touching rubbish	51	40.5	75	59.5
Playing games	30	23.8	96	76.2

Source: Field data, 2019

The pre-test hand washing practices among students show that 62.7% of the students said they do not wash their hands after visiting the toilet. However, 81.0% of the students affirmed that they wash their hands after eating food. The results further show that 61.9% of the students do not wash their hands after touching raw meat and 59.5% said they don't wash after touching rubbish. Also, 76.2% of the said they do not wash their hands after playing games. These results are very alarming considering the dangers associated with unhealthy hand washing practices.

Table 4.7: Ways of hand washing among students

How do you wash your hands?	No of students	Percentage (%)
With water only	76	60.3
Using soap and cold water	35	27.8
Using hand antiseptics	3	2.4
Using sanitizers	2	1.6
None of the above	10	7.9
Total	126	100

Source: Field data, 2019

Table 4.7 shows ways of hand washing among students. The results show that 60.3% (n = 76) of the students stated that they wash their hands with only water while 27.8% (n = 35) said the use soap and cold water to wash their hands. A few of the students indicated that they use hand antiseptics and sanitizers. However, 7.9% (n = 10) of the students said the use none of the above ways in hand washing. This implies that students need to be taken through some intervention to help improve their ways of hand washing.

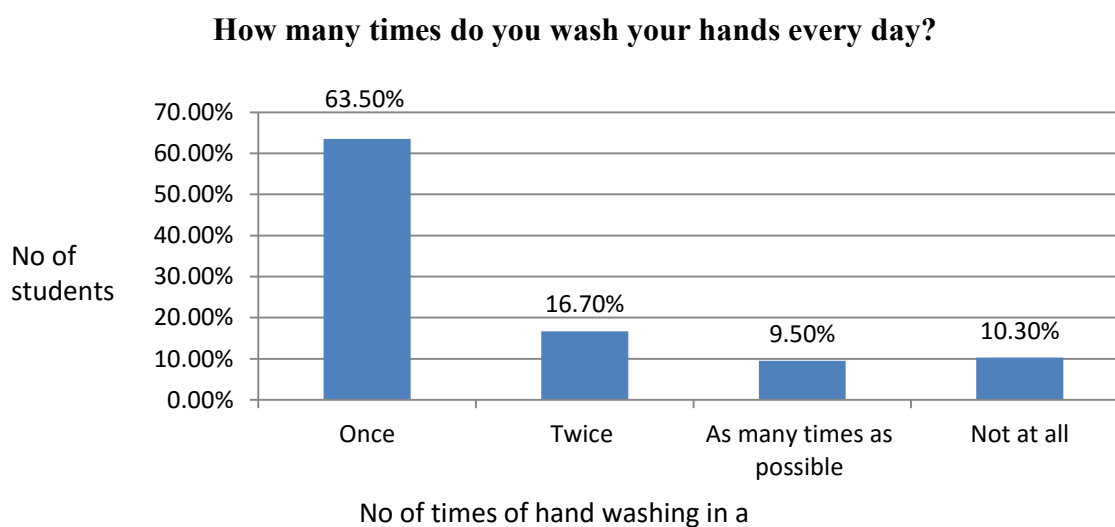
**Figure 4.3: Frequency of hand washing of students**

Figure 4.3 displays the number of times students wash their hands in a day. The results show that majority of the students wash their hands once in a day. This translated into 63.5% of the students ticking this item on the questionnaire. The results also show that 16.7% of the students wash their hands twice a day. Only 9.5% of the students wash their hands as many as possible within a day. Again, 10.3% of the said they don't wash their hands at all in a day. These if not handled and treated as soon as possible will have negative repercussions on the health of the students in the future.

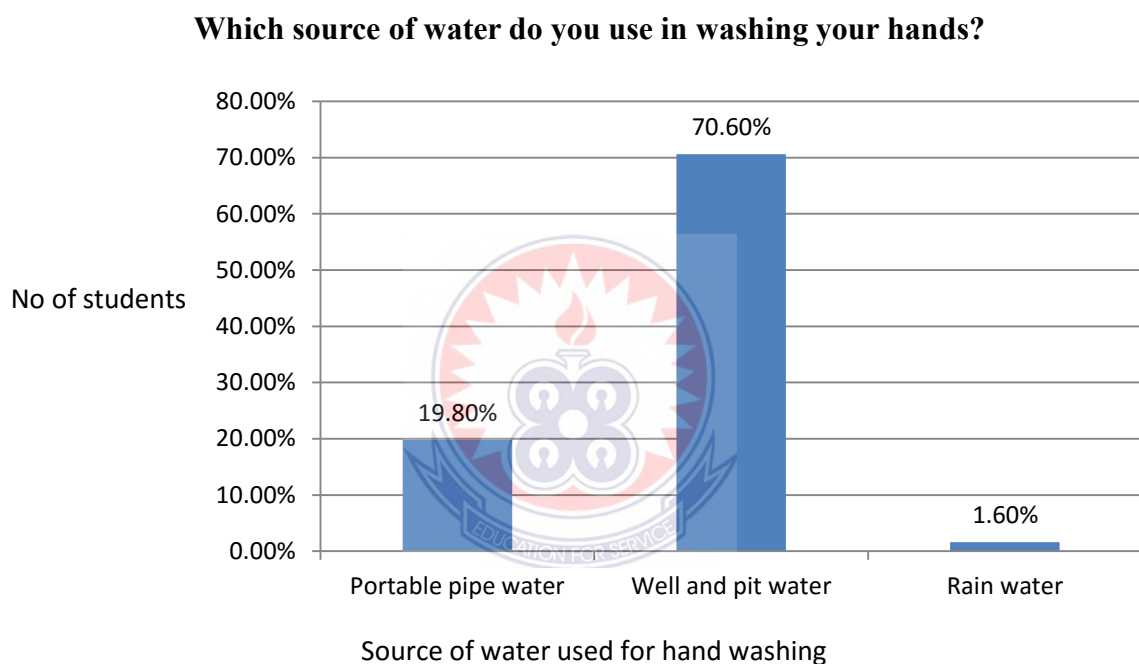


Figure 4.4: Chart showing sources of water used for hand washing by students

The results displayed in figure 4.4 suggest that the most popular source of water used by the students to wash their hands is well and pit water. This reflected in the students' response as majority, 70.6% of them affirming to this item on the questionnaire. The results again show that 19.8% of the students said they use portable pipe water for washing their hands and only 1.6% indicated that they use rain water for washing their hands.

Table 4.8: Hand washing items

Item	Yes		No		Total	Total %
	Freq.	%	Freq.	%		
Do you normally use warm water in washing your hands?	45	35.7	81	64.3	126	100
Do you routinely use alcohol-based hand rub for hand washing?	46	36.5	80	63.5	126	100
Do you dry or wipe your hands after washing them?	67	53.2	59	46.8	126	100

Source: Field data, 2019

From Table 4.8, it is clear that 64.3% of the students do not use warm water in washing their hands. Also, 63.5% of the students do not use alcohol-based hand rub for washing their hands. However, 53.2% of the students affirmed that they dry or wipe their hands after washing them. Even though the responses from the students are not good enough, there is something to smile for as majority of them dry their hands after washing.

Which type of materials do you use in drying your hands after washing?

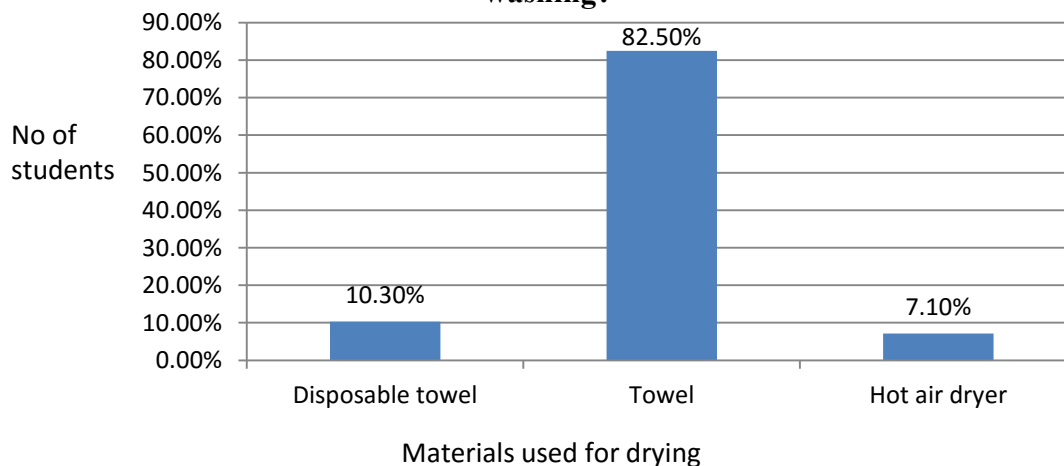


Figure 4.5: Materials students use for drying hands after washing

The students' responses represented in figure 4.5 shows that 82.5% of the students said they use towel to dry their hands after washing them and 10.3% indicated that they use disposable towel while 7.1% said they use hot air dryer to dry their hands after washing.

4.1.4 Hand Washing Intervention Strategies (Pre-Test)

Table 4.9: Hand washing policy in school

Item	Yes		No		Total	Total
	Freq.	%	Freq.	%	Freq.	%
Is your school having a plan/policy for hand washing?	32	25.4	94	74.6	126	100
Is this plan/policy effectively implemented in your school?	15	11.9	110	88.1	126	100
Do school authorities occasionally train students on good hand washing methods?	50	39.7	76	60.3	126	100
Do school authorities provide materials such as soap and detergents for hand washing in your school?	57	45.2	69	54.8	126	100

Source: Field data, 2019

From the responses of the students displayed in Table 4.9, it is clear that the school does not have hand washing policy for the school and the students. The results also show that school authorities do not provide any occasional hand training for the students. Finally, the results further show that school authorities do not provide hand washing materials such soap and detergents for hand washing.

Table 4.10: Impact of hand washing on students' health

Item	Very low	Low	High No.	Very high
	No. (%)	No. (%)	(%)	No. (%)
What is the effectiveness of hand washing in preventing diseases?	59 (46.8)	46 (36.5)	15 (11.9)	6 (4.8)
In general, what is the impact of hand washing in preventing diseases?	40 (31.7)	52 (41.3)	10 (7.9)	14 (11.1)
What is the impact of poor hand washing practices on the health of students?	52 (41.3)	48 (38.1)	17 (13.5)	9 (7.1)

Source: Field data, 2019

From the responses of the students displayed in Table 4.10, it is seen that 83.3% (n = 105) of the students think that the effectiveness of hand washing in preventing diseases is low. Similarly, 73.0% (n = 92) of the students also think that generally, hand washing practices has no impact in preventing diseases. Finally, majority, 79.4% (n = 100) of the students believe that the impact of poor hand washing practices on the health of students is low. The results show students do not have much knowledge regarding the effectiveness of hand washing practices in preventing diseases. The results again suggest that students lack knowledge regarding the impact of poor hand washing practices on the health of students and therefore need to be taken through series of intervention to increase and improve their knowledge good hand washing practices.

Intervention

After the pre-test, the researcher realized that the students' perception about hand washing and their hand washing practices was nothing to write home. This prompted the researcher that there was the need for an intervention to help improve the situation. The researcher organized a two-day training and education session for both the teachers and students in the school where she took the teachers and students through step-by-step hand washing procedures using soap under running water. The researcher recommended the use of pipe borne water for hand washing at all times. She (researcher) also explained to both the students and teachers the dangers associated with unhygienic/bad hand washing to the health of the individual concerned. The researcher again encouraged the school authorities to prepare a hand washing policy for the school and make thoughtful efforts to implement the policy. Finally, the researcher encouraged the school authorities to always make hand washing materials available at all times in the school for the students to use. The researcher believes that this would help reduce if not totally eliminate the incidence or outbreak of diseases in the school among students.

After the intervention, the researcher went back to the school after two weeks to administer the same questionnaire again (post-test) to the students. The results of the post-test are discussed.

4.2 Perception of Hand Washing Practices among Students in Schools (Post-Test)

Table 4.11: Students' views on frequency of provision of materials for hand washing

		How regular do school authorities					
		provide materials for hand				Total	Total
		washing in school?					
		Very	%	Not	%		
regular		regular					
Do the school authorities	Yes	113	89.7	2	1.6	115	91.3
make materials for hand	No	4	3.2	7	5.5	11	8.7
washing always available at							
vantage points?							
Total		117	92.9	9	7.1	126	100

Source: Field data, 2019

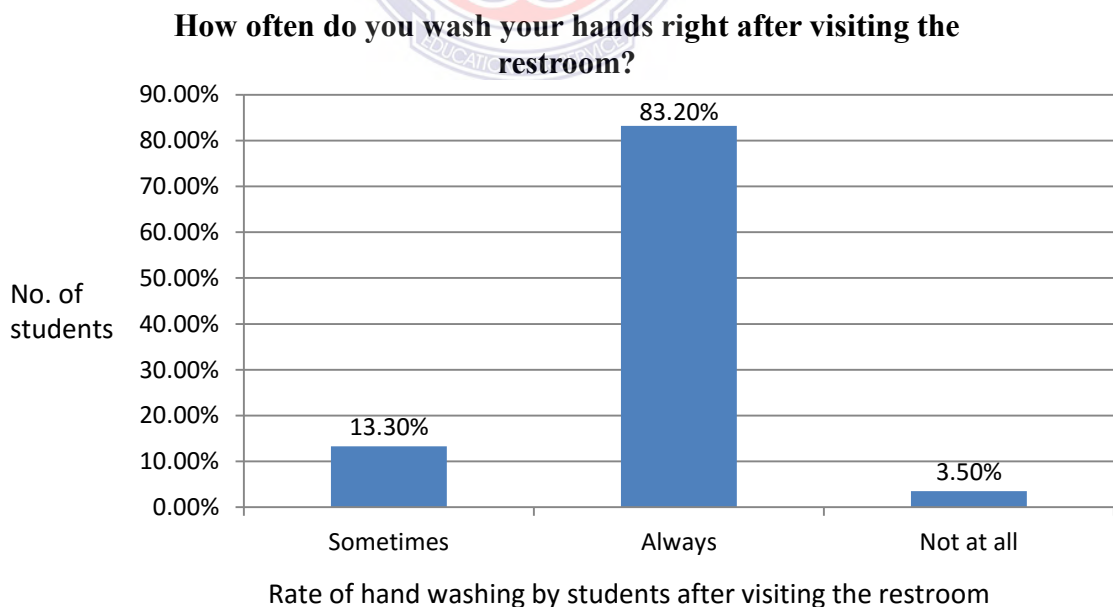
The results displayed in Table 4.11 show that majority, 91.3% (n = 115) of the students affirmed that the school authorities make materials for hand washing available at vantage points within the school. Out of this 91.3% of the students, 89.7% (n = 113) of them said the provision of the hand washing materials by school authorities was very regular. The results is an improvement over the results displayed in Table 2 where majority of the students said that school authorities do not provide materials for washing hands in the school.

Table 4.12: Students' responses on type of material provided for hand washing

Type of material	No of students	Percentage (%)
Hand washing bowl with water	15	11.9
Flowing water and detergent	109	86.5
Others (specify)	2	1.6
Total	126	100

Source: Field data, 2019

The results from Table 13 indicate that there has been an improvement in the type material that is provided for hand washing in the school. For instance, the results show that majority, 86.5% (n = 109) of the students stated that school authorities now provide them with flowing water in a basin and detergent to wash their hands. This result suggests that school authorities are making efforts to control or prevent the outbreak of any disease through hand washing practices in the school.

**Figure 4.6: Chart showing frequency of hand washing after visiting the rest room**

From figure 4.6 it can be seen that there has been a change students' behaviour when it comes to hand washing. The results show that many, 83.2% of the students now wash their hands after visiting the restroom. Only 13.3% of the students sometimes now wash their hand after visiting the restroom. However, there are still 3.5% of the students who still never wash their hands after visiting the restroom. The change of students' behaviour regarding the frequency of hand washing could be attributed to the intervention by the researcher and also the practice of routine hand washing recommended by Garner and Favero (1986).

Table 4.13: Hand washing practices at home and school

Item	Yes		No		Total	Total
	Freq.	%	Freq.	%	Freq.	%
Do your parents advise you or educate you on hand washing practices?	93	73.8	33	26.2	126	100
Do your teachers advise you or educate you on hand washing practices?	120	95.2	6	4.8	126	100

Source: Field data, 2019

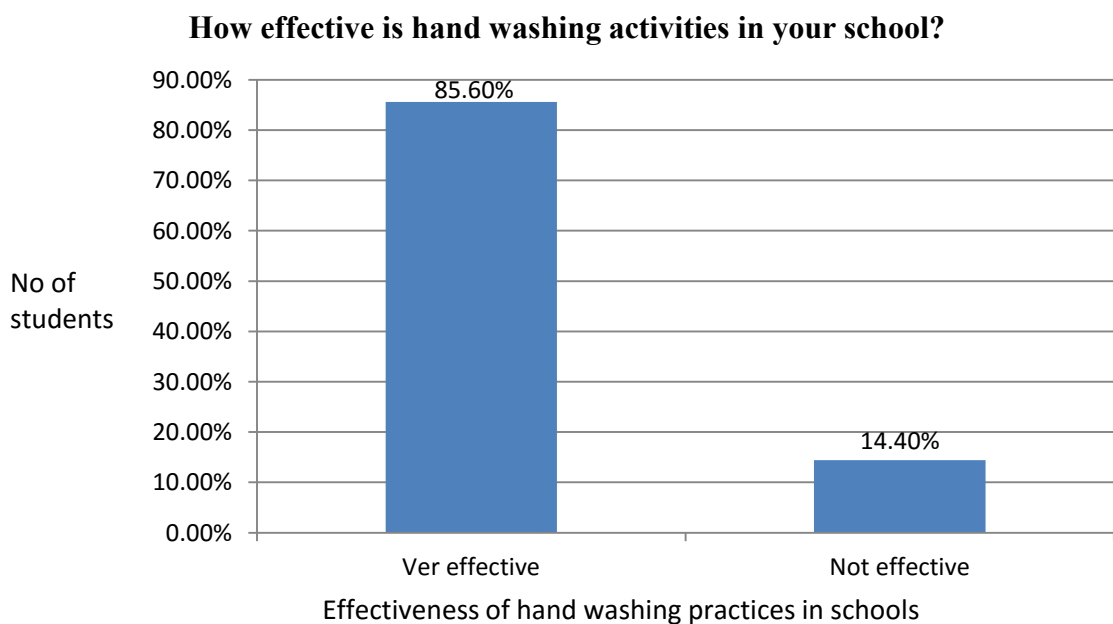
Table 4.13 shows an improvement in the teachers' efforts in advising or educating students on hand washing practices compared to Table 4. The results show that 73.8% (n = 93) of the students said they now receive advise or education at home on hand washing and 95.2% (n = 120) of students said they now receive advice or education on hand washing practices from their teachers at school. This practice at home and in school is a good way of training the students to practice good personal hygiene which is one of the sure ways of preventing diseases.

Table 4.14: Importance of hand washing among teachers and colleagues

Item	No of students	Percentage (%)
Low priority	8	6.3
Moderate priority	16	12.7
High priority	58	46.1
Very high priority	44	34.9
Total	126	100

Source: Field data, 2019

The responses of students displayed in Table 4.14 show that both teachers and students attach importance to hand washing practices in the school. For instance, the results show that a total of 81.0% (n = 102) of the students indicated the both teachers and students show high priority to hand washing practices while 12.7% (n = 16) of the students said that teachers and students show moderate priority to hand washing practices in the school.

**Figure 4.7: Bar chart on effectiveness of hand washing practices in schools**

The results from figure 7 shows that 85.6% of the students now believed that hand washing activities are very effective in their school due to the actions of the teachers and the interventions of the researcher.

The post-test results discussed above imply that students' perception of hand washing practices has improved tremendously judging from their responses to the various items on the post-test questionnaire. These responses also suggest that students have developed positive attitude towards hand washing which would go a long way in helping improve their personal hygiene and health in general.

4.3 Hand Washing Practices among Students in Schools (Post-Test)

Table 4.15: Students hand washing practices

Practices	Yes		No	
	Freq.	%	Freq.	%
Visiting the toilet	126	100	0	0
Eating food	124	98.4	2	1.6
Touching raw meat	118	93.7	8	6.3
Touching rubbish	122	96.8	4	3.2
Playing games	114	90.5	12	9.5

Source: Field data, 2019

The post-test hand washing practices among students show that all the students said they now wash their hands after visiting the toilet. Also, 98.4% of the students affirmed that they wash their hands after eating food. The results further show that 93.7% of the students wash their hands after touching raw meat and 96.8% said they wash after touching rubbish. Again, 90.5% of the said they wash their hands after playing games

which was not the case previously. These results showed a complete shift as compared to the pre-test results in Table 7. There has been an improvement in students' hand washing practices after going through the intervention.

Table 4.16: Ways of hand washing among students

How do you wash your hands?	No of students	Percentage (%)
With water only	26	20.6
Using soap and cold water	95	75.4
Using hand antiseptics	3	2.4
Using sanitizers	2	1.6
None of the above	0	0
Total	126	100

Source: Field data, 2019

Table 4.16 shows that 75.4% (n = 95) of the students wash their hands with soap and cold water while 20.6% (n = 26) use only water to wash their hands. A few of the students said that they use hand antiseptics and sanitizers. This suggests that students are beginning to see the important role of soap in cleaning the hands from germs during hand washing. These results also support the recommendation of Larson (1995) on the use soap and water in hand washing. Again most of the students use soap and water to wash their hands because it is easy and cheap to obtain water and soap at all times. This is in line with the Health Organization's Guidelines on Hand Hygiene in Health Care (2006) which explained hand washing as washing of hands with plain or antimicrobial soap and water.

How many times do you wash your hands every day?

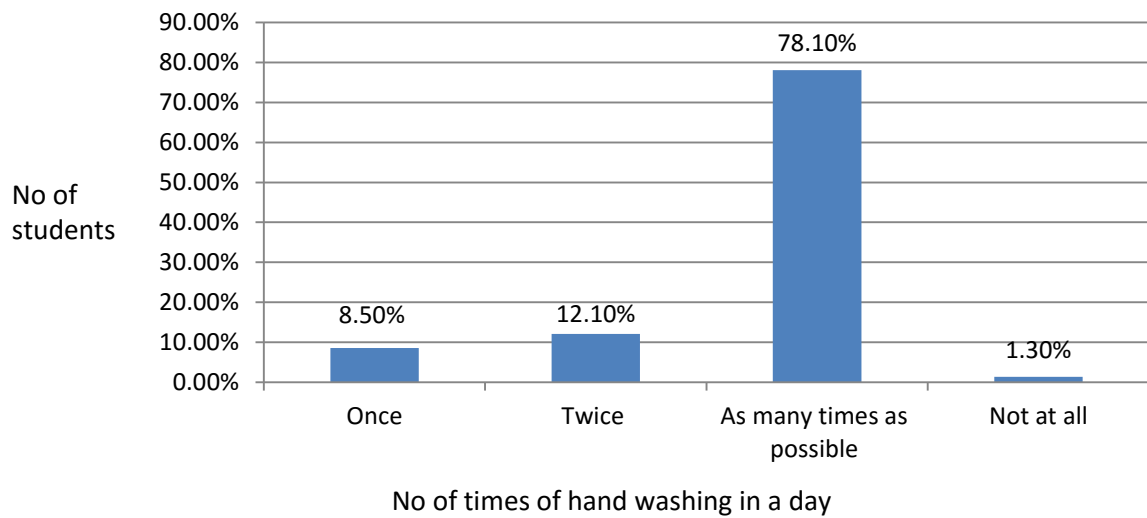
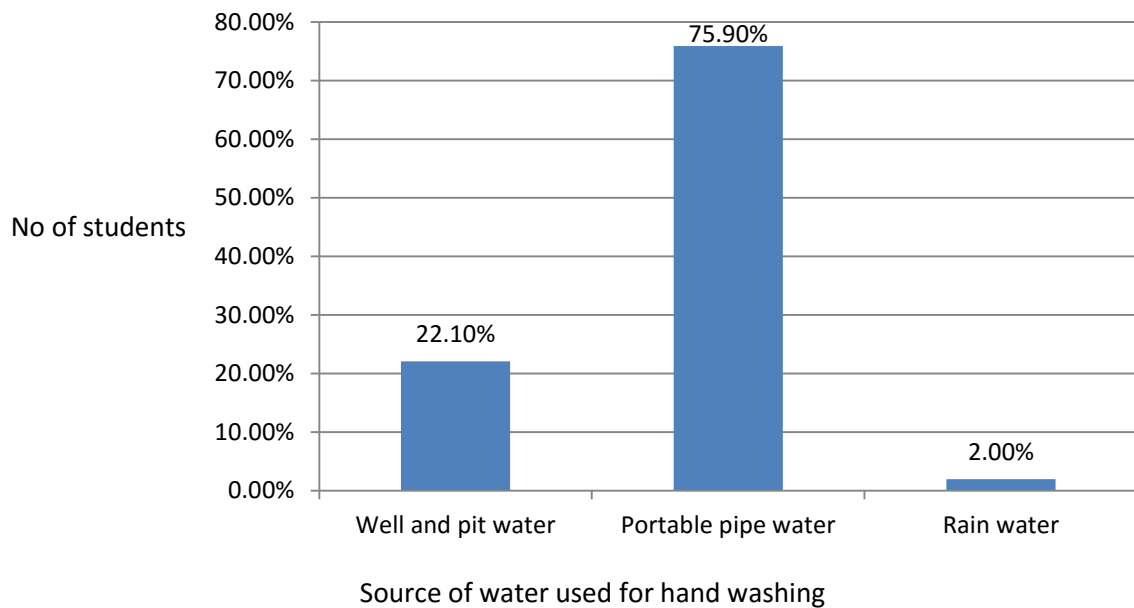


Figure 4.8: Bar chart showing frequency of hand washing among students

Figure 4.8 above displays the number of times students wash their hands within a day. The results show that majority of the students wash their hands as many times as possible in a day. This translated into 78.1% of the students ticking this item on the questionnaire (post-test). The results also show that 20.6% of the students wash their hands once or twice a day. Before the intervention most of the students wash their hands once, twice or not at all in a day. But after the intervention, their attitude has changed. The reason for the change in attitude regarding hand washing could be that these students want to prevent catching diseases. This confirms Garner and Favero (1986) recommendation that in order to prevent transmission of infectious diseases, one has to routinely wash his/her hands vigorously by rubbing together all surfaces of lathered hands for at least 10 seconds and then followed by thorough rinsing under running water.

Which source of water do you use in washing your hands?**Figure 4.9: Chart showing sources of water used for hand washing by students**

The results displayed in figure 4.9 suggest that the most popular source of water used by the students to wash their hands is portable pipe water. Hitherto, students were using well and pit water for washing their hands. This positive attitude by the students could be attributed to the knowledge gained after the intervention.

Table 4.17: Hand washing items

Item	Yes		No		Total Freq.	Total %
	Freq.	%	Freq.	%		
Do you normally use warm water in washing your hands?	99	78.6	27	21.4	126	100
Do you routinely use alcohol-based hand rub for hand washing?	46	36.5	80	63.5	126	100
Do you dry or wipe your hands after washing them?	114	90.5	12	9.5	126	100

Source: Field data, 2019

The results displayed in Table 4.17 shows that 78.6% and 36.5% of the students use warm water and alcohol-based hand rub respectively in washing their hands. Also, 90.5% of the students affirmed that they dry or wipe their hands after washing them. The results corroborate Laestadius and Dimbery (2005) assertion that warm soapy water is more effective than cold soapy water at removing the natural oils on your hands which hold soils and bacterial.

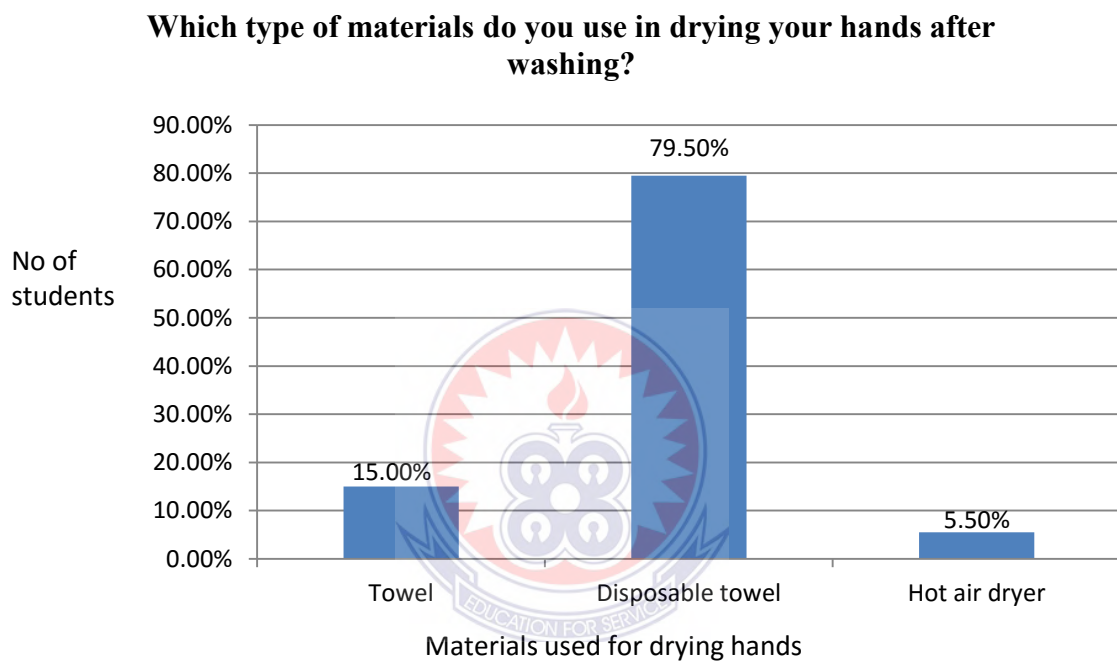


Figure 4.10: Materials students use for drying hands after washing

The students' responses represented in figure 4.10 shows that 79.5% of the students now use disposable towel to wipe their hands after washing them and 15.0% indicated that they still use towel while 5.5% said they use hot air dryer to dry their hands after washing. According to Coates, Hutchinson and Bolton (1987) to prevent the survival of campylobacter jejuni after washing hands with soap and water, one needs to dry hands thoroughly with paper towels.

4.4 Hand Washing Intervention Strategies (Post-Test)

Table 4.18: Hand washing policy in school

Item	Yes		No		Total	Total
	Freq.	%	Freq.	%	Freq.	%
Is your school having a plan/policy for hand washing?	118	93.7	8	6.3	126	100
Is this plan/policy effectively implemented in your school?	115	91.3	11	8.7	126	100
Do school authorities occasionally train students on good hand washing methods?	121	96.0	5	4.0	126	100
Do school authorities provide materials such as soap and detergents for hand washing in your school?	124	98.4	2	1.6	126	100

Source: Field data, 2019

From the responses of the students displayed in Table 4.18, it shows that 93.7% (n = 118) of the students affirmed that the school now has a hand washing policy for the school and the students. The results also show that 91.3% (n = 115) of the students believed that school authorities implement this hand washing policy effectively to the benefit of the student body. Again, 96.0% (n = 121) of the students agreed that the school authorities occasionally train them on good hand washing methods. Finally, the results further show that 98.4% (n = 124) of the students indicated that school authorities provide students with hand washing materials such soap and detergents for hand washing. The school authorities having realized the importance of hand washing in preventing diseases have developed a hand washing policy and are implementing this policy for the benefit of the students.

Table 4.19: Impact of hand washing on students' health

Item	Very low	Low	High No.	Very high
	No. (%)	No. (%)	(%)	No. (%)
What is the effectiveness of hand washing in preventing diseases?	0 (0)	2 (1.6)	54 (42.9)	70 (55.6)
In general, what is the impact of hand washing in preventing diseases?	2 (1.6)	4 (3.2)	65 (51.6)	55 (43.7)
What is the impact of poor hand washing practices on the health of students?	4 (3.2)	9 (7.1)	44 (34.9)	69 (54.8)

Source: Field data, 2019

The responses of the students displayed in Table 4.19 show that 98.5% (n = 124) of the students were of the view that the effectiveness of hand washing in preventing diseases is very high. Similarly, 95.3% (n = 120) of the students also think that generally, the impact of hand washing in preventing diseases is high. Finally, majority, 89.7% (n = 113) of the students believe that the impact of poor hand washing practices on the health of students is very high. The results show students have now recognized that effective hand washing practices prevent the spread of diseases. The results also imply that when resources for hand washing are provided in schools, it will make a very high impact in diseases prevention as suggested by Borgatta and Robbins (1989) that providing materials for hand washing and disinfection prevent spread of diseases and illness in schools. Finally, the results again suggest that after the intervention, the students have recognized that poor hand washing practices affect their health and therefore saw the need to practice good hand washing always. This is in line with the findings of a study conducted in Pakistan by Wikipedia in 2006 which found out that children in

communities that received intensive hand washing interventions were half more likely to get diarrhea or pneumonia than children in similar communities that did not receive the intervention.

Table 4.20: Inclusion of hand washing practices in school' syllabus

Does your school syllabus include hand washing practices?	No. of students	Percentage (%)
Yes	12	9.5
No	114	90.5
Total	126	100

Source: Field data, 2019

From Table 4.20, it is clear that there is no hand washing practices in the school curriculum. This shows that the educational curriculum planners do not consider hand washing practices in planning the curriculum for the schools. It is believed that when hand washing practices are included in the schools' curriculum it will go a long way in training in the students on best practices when it comes to hand washing. The study of Ecolab (1996) found out that workers of a foodservice facility had the best hand washing compliance due to the emphasis on hand washing by management personnel as well as the training and continued in-service instruction of employees by the facility. This could also be the case when hand washing practices are included in the schools' curriculum.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter of the study is the concluding chapter which discusses the summary of the study, draws conclusions based on the results and findings of the study and makes some recommendation to policy makers and stakeholders on best practices regarding hand washing.

5.1 Summary

The purpose of the study is to examine the hand washing practices of students of T. I. Ahmadiyya JHS in the Kassena/Nankana West District of the Upper East Region of Ghana and to demonstrate to students the proper ways of hand washing procedures which can lead to prevention of diseases. The research design used for this study was the practical experiment approach which relied on questionnaire and demonstration to gather data for the study. The study used questionnaire as the main instrument for collecting data for the study. Data collection was done in two phases. The phase one was the pre-intervention data collection (pre-test) and the phase two was the post-intervention data collection (post-test). Both the pre-test and post-test data were analyzed using descriptive statistics (frequency tables, charts and percentages). Analysis of the pre-test results show that students' general perception of hand washing and their hand washing practices were nothing to write home about. Findings from the pre-test also show that students' lack knowledge on the effect and impact of poor hand washing on their health. However, after implementing the intervention by demonstrating how to properly wash hands in a step-by-step manner to both the students and authorities of the school, the narratives changed. The post-test results showed that students now have positive attitude towards hand washing and also practice good hand

washing by using soap and warm to vigorously rub their hands and dry them using paper/disposable towel. The post-test results further revealed that students have now acquired knowledge on the effects of poor hand washing practices on their health and the impact of good hand washing practices in preventing diseases.

5.2 Conclusions

The researcher wish to conclude based on the results of the post-test that students' thinking about hand washing as a practice to prevent diseases and as a means of improving personal hygiene has improved tremendously due to the intervention by the researcher. This has resulted in students now washing their hands as many times as possible in a day.

Also, it is concluded that generally, students now adopt best hand washing practices by using soap under running water pipe borne water to wash their hands after visiting the toilet, after eating, after touching raw meat and rubbish and after playing games.

Finally, it is concluded based on the post-test results that students hand recognized the effectiveness of good hand washing practices in preventing spread of diseases and also promoting personal hygiene in the lives.

5.3 Recommendations

The following recommendations are made based on the results of the study. It recommended that;

1. School authorities and government agencies in charge of school health and education should increase the education on hand washing in Junior High

Schools in the Kassena/Nankana West District so as to develop in the students, best hand washing practices mindset.

2. School management should plan and adopt hand washing policies for their schools and also ensure that they enforce the practices captures in the hand washing document among students to improve the health of the students.
3. School authorities, government and school health-base non-governmental organization should come to the aid of the basic schools by providing them with the needed resources such hand sanitizers, disposable towel, tippy taps, detergents, alcohol-base rub and soaps for students to use to wash their hands regularly.
4. The district school health and education programme coordinator at the district education office should organize periodic training sessions for basic school teachers on best hand washing practices, these teachers will in turn train and educate their students from time to time.
5. School authorities should provide materials and resources for hand washing at vantage points in the school premises. This will encourage and motive students to wash their hands at all times.
6. School curriculum planners of Junior High Schools should include hand washing practices in the schools' academic syllabus. This will help raised students who will develop positive mindset about hand washing, personal hygiene and sanitation in general.

5.4 Suggestions for Further Studies

The researcher wish to suggest that future researchers should include more basic schools in the district in a similar study to see if the findings could be the same. Future

researchers can also replicate similar studies in selected senior high schools in the district.



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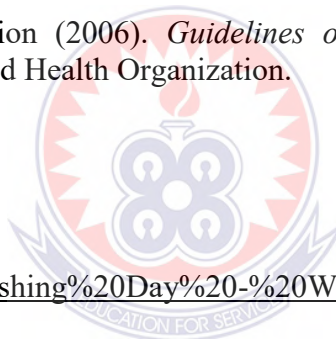
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APPENDIX

UNIVERSITY OF EDUCATION, WINNEBA-KUMASI CAMPUS

FACULTY OF EDUCATION AND COMMUNICATION STUDIES

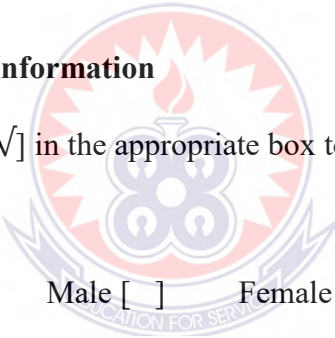
DEPARTMENT OF CATERING AND HOSPITALITY

QUESTIONNAIRE FOR STUDENTS

This questionnaire is designed to solicit your views on hand washing practices among students of basic schools in the Kassena/Nankana West District. It is solely for academic purposes. The responses provided on this questionnaire will be kept confidential and used for the research purposes only. Your candid opinion on the issues raised on this questionnaire is required.

Section A: Background Information

Please respond by ticking [] in the appropriate box to represent your opinion.

- 
1. Your gender Male [] Female []
 2. Your age
 1. 13 – 15 years []
 2. 16 – 18 years []
 3. 19 years and above []
 3. Indicate your class
 1. Form 1 []
 2. Form 2 []
 3. Form 3 []

Section B: Perception of Hand Washing among Students

4. Do the school authorities make materials for hand washing always available at vantage points?
1. Yes []
 2. No []
5. How regular do school authorities provide materials for hand washing in school?
1. Very regular []
 2. Not regular []
6. Which type of material/facility is normally provided?
1. Hand washing bowl with water []
 2. Flowing water and detergent []
 3. Other (specify)..... []
7. Are you provided with water to wash your hands always?
1. Yes []
 2. No []
8. Which type of water do you use in washing your hands during school hours?
1. Water flowing from tap []
 2. Water in a basin []
 3. Others (specify)..... []
9. How often do you wash your hands right after visiting the restroom?
1. Always []
 2. Sometimes []
 3. Not at all []

10. Do your parents advise you or educate you on hand washing practices?

1. Yes []

2. No []

11. Do your teachers advise you or educate you on hand washing practices?

1. Yes []

2. No []

12. Among all your colleagues and teachers how important is hand washing at your school?

1. Low priority []

2. Moderate priority []

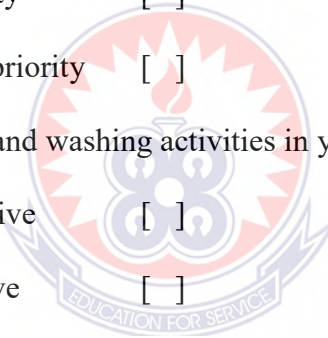
3. High priority []

4. Very high priority []

13. How effective is hand washing activities in your school?

1. Very effective []

2. Not effective []



Section C: Hand Washing Practices among Students

14. Do you wash your hands every day before/after?

- | | | |
|------------------------|---------|--------|
| 1. Visiting the toilet | Yes [] | No [] |
| 2. Eating food | Yes [] | No [] |
| 3. Touching raw meat | Yes [] | No [] |
| 4. Touching rubbish | Yes [] | No [] |
| 5. Playing games | Yes [] | No [] |

15. How do you wash your hands? Tick [] all applicable

- | | |
|------------------------------|-----|
| 1. With water only | [] |
| 2. Using soap and cold water | [] |
| 3. Using hand antiseptics | [] |
| 4. Using sanitizers | [] |
| 5. None of the above | [] |

16. How many times do you wash your hands every day?

- | | |
|------------------------------|-----|
| 1. Once | [] |
| 2. Twice | [] |
| 3. As many times as possible | [] |
| 4. Not at all | [] |

17. Which source of water do you use in washing your hands?

- | | |
|--------------------------|-----|
| 1. Well and pit water | [] |
| 2. Portable pipe water | [] |
| 3. Rain water | [] |
| 4. Others (specify)..... | [] |

18. Which form of soap do you use in washing your hands?

1. Soap and detergents []
2. Solid soap []
3. Antibacterial soap []
4. Hand antiseptic []

19. In what ways do you wash your hands?

1. Using soap and water []
2. Hand antiseptics []
3. Sanitizers []
4. None of the above []

20. Do you normally use warm water in washing your hands?

1. Yes []
2. No []

21. Do you routinely use alcohol-based hand rub for hand washing?

1. Yes []
2. No []

22. Do you dry or wipe your hands after washing them?

1. Yes []
2. No []

23. Which type of materials do you use in drying your hands after washing?

1. Disposable towel []
2. Towel []
3. Hot air dryer []



Section D: Hand Washing Intervention Strategies

24. Is your school having a plan/policy for hand washing?

1. Yes []

2. No [] * If 'No' jump to question 26.

25. Is this plan/policy effectively implemented in your school?

1. Yes []

2. No []

26. Do school authorities occasionally train students on good hand washing methods?

1. Yes []

2. No []

27. Do school authorities provide materials such as soap and detergents for hand washing in your school?

1. Yes []

2. No [] * If 'No' jump to question 29.

28. How often are these materials provided by the school authorities?

1. Very often []

2. Not often []

29. Are there hand washing facilities such as tippy taps, containers with clean water placed at vantage points for students use in your school?

1. Yes []

2. No []

30. What is the effectiveness of hand washing in preventing diseases?

1. Very low []

2. Low []

3. High []

4. Very high []

31. In general, what is the impact of hand washing in preventing diseases?

1. Very low []

2. Low []

3. High []

4. Very high []

32. What is the impact of poor hand washing practices on the health of students?

1. Very low []

2. Low []

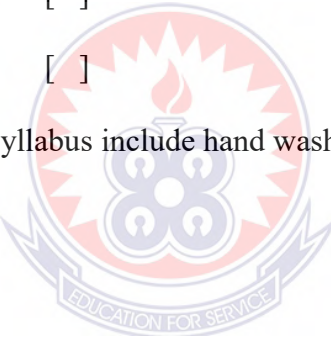
3. High []

4. Very high []

33. Does your school syllabus include hand washing practices?

1. Yes []

2. No []



Thank you for your cooperation!!!